
Digitized by the Internet Archive
in 2014

https://archive.org/details/canminingjournal1910donm

INDEX

CANADIAN MINING JOURNAL, VOL. 31.

JANUARY 1, 1910, TO DECEMBER 31, 1910.

E Editorial. * Illustrated.

Abstract of Report of Mr. Jas. Ashworth, 522-526.*
Acadia Coal Co., 477.
Accidents, Preventable, 323. E.
Accident at Goodwin Lake Mine, Twp. of Lorrain, Jan. 15, 1910, Whereby Frank Shepherd was Killed, 78.
Address by F. H. Sexton, Director of Technical Education, Nova Scotia, 435-6.
Advance Chapter From H. P. Davis' Handbook of the Cobalt District, 136-7.
Africa—Gold Coast, 770.
Ainsworth and Slocan Districts, Mining in, by E Jacobs, 143-5.
Alaska, 221, 350, 771.
Alberta, Coal Mine Branch, Annual Report of Department of Public Works of the Province of, 656-663.*
Alberta Provincial Coal Mine Officials' Examinations, 690-4.
Amalgamated Asbestos, 613. E.
Amalgamated Asbestos Corporation, 476.
Amalgamated Asbestos Corporation, Fire Protection at the Plants of the, 727.
Amalgamated Copper Co., 672.
Amalgamation and Cyanidation, The Electrochemical System of, by Elmer Ellsworth Carey, 18-20.
Amalgamation, Electrolytic Cyanidation and, by E. E. Carey, 393-4.
Amendment to The Criminal Code, The, 360.
American Labour Unionism in Canada, 583.
American Mining Congress, 717.
Anderson, G. R., on Photography at University of Toronto, 716.
Annual Meeting of The Canadian Mining Institute, Toronto, Mar. 2nd, 3rd, and 4th, 1910, Proceedings of the Twelfth, 163-5.*
Annual Meeting of the Mining Society of Nova Scotia, Halifax, March 15 and 16, 1910, The Eighteenth, 195-7.*
Annual Report of the Department of Public Works of the Province of Alberta, Coal Mine Branch, 656-663.*
Annual Report of the Nova Scotia Department of Mines for 1909, 260-265.*
Are British Columbia Ores Improving? by E. Jacobs, 531-2.
Argumentative Outfit, An, by John Ravenor Bullen, 182.
Asbestos, 710.
Asbestos Bureau, 62.
Asbestos Deposits in the Eastern Townships of Quebec, On the Distribution of, by John A. Dresser, 465-470.*
Asbestos Industry, The, by J. J. Harpell, 50-52.
Asbestos Mining in Quebec, Notes on Recent Developments in, by W. J. Woolsey, 434-5.
Ashworth, Jas., on Testing Safety Lamps, 12-13.*
Ashworth, Mr. James, Abstract of Report of, 522-526.*
Australia, 29, 61, 124, 220, 349, 509, 540, 609, 641, 737.
Australia, Electrolytic Copper Refining and Smelting in, 433.
Australian Nobel Dynamite, 329.
Austria, 251, 413, 641, 770.

Badgley, C. W., on Estimation of Nickel and Cobalt, 588-9.*
Barite in Washington County, Missouri, The Geology, Mining, and Preparation of, by A. A. Steel, 138-143.
Barnstead, Arthur S., on Nova Scotia's Mineral Output in 1908, 74-76.
Bartlett Fiasco, The, 67. E.
Bathurst District, New Brunswick, by G. A. Young, 488-492.*
Belgium, 770.
Bell's Asbestos Co., 319.
Bitter Creek, B.C., 498.
Blast Furnaces, The Mechanical Charging of, by E. J. W. Richards and Thomas Lewis, 420-8.*
Book Reviews—
Index of Mining Engineering Literature, 23.
Metal Statistics, 1910, 148.
The Mining Manual, 1910, 148.
The Colliery Managers' Pocket Book, Almanac, and Diary for the Year 1910, 148.
A Text-Book of Ore Dressing, 183.
The Chemistry of Cyanide Solutions Resulting From the Treatment of Ores, 183.
The Copper Handbook, Vol. IX., 277.
Telephonology, 407.
The Corrosion and Preservation of Iron and Steel, 407.
The Coal and Iron Industries of Nova Scotia, 439.
From Prospect to Mine, 548.
Ore Mining Methods, 548.
Canadian Annual Review of Public Affairs—1909—The, 548.
Dictionary of Metallurgical and Chemical Material, 622.
Rock Drills,—Design, Construction and Use, 713.
Modern Assaying, 714.
Practical Data for the Cyanide Plant, 714.
Testing for Metallurgical Processes, 744.
Practical Stamp Milling and Amalgamation, 744.
Brick, 265.
Briquetting Iron Ores, 712. E.
Briquetting of Iron Ores, The, by C. C. De Schwarz, 599-603.
Bristol Mine, Pontiac County, Quebec, The, 493-4.
Britain, Mine Rescue Work in, 728.
British Columbia Coal Mine Inspection, 712. E.
British Columbia Copper Co., 286, 642, 672.
British Columbia, The Engineer Group, Atlin Mining Division, by E. Jacobs, 528-9.
British Columbia Mines, Losses by Fire at, 492-3.
British Columbia, Mine-Rescue Stations in, 460.
British Columbia Mining and Smelting Conditions in, 236-9.
British Columbia in 1909, Mineral Production of, 457-460.
British Columbia in 1909, Mining in, by E. Jacobs, 38-44.
British Columbia, New Mining Field in, 697-8.*
British Columbia, Ore Production in, 436-7.
British Columbia Placer Gold Mining in, 405-6.
British Columbia in 1908, Review of Mining in the Province of, by Geo. A. Ohren, 5-7.
British Columbia Smelteries, Ore Receipts at, 732.
British Columbia, Special Correspondence, 26-7, 58-9, 91-2, 122-3, 150-1, 187-8, 217-218, 283-4, 346-7, 378-9, 411-413, 443-4, 474-5, 506-7, 537-8, 570-1, 607-8, 637-9, 669-671, 704-5, 735-6, 766-8.
British Columbia, Zinc Mining in, 274-5.
British Columbia, The Zinc Mining Industry in, 20-22.
British Mineral Rights Taxation, 56.
Brown, Thomas J., on The Use of Coke-Oven Gas as Fuel, 234-6.
Bruce Peebles & Co., 116.
Brussels Exhibition, Canadian Minerals at the, 463-4.*
Buffalo Mines, Ltd., 510, 672.
Building Stone, 265.
Bullen, John Ravenor, on—
An Argumentative Outfit, 182.
The Dinner Hour, 464.
Bureau of Mines Report, Ontario, 731.
Business Honour, 259. E.

Cairnes, D. D., on Forestry and the Coal Areas of the Yukon Territory, 131-132.
Campbell, D. F., on Electric Steel Refining, 695-7.
Carey, Elmer Ellsworth, on The Electrochemical System of Amalgamation and Cyanidation, 18-20; on Electrolytic Cyanidation and Amalgamation, 393-4.
Carter, W. E. H., on The Porcupine Gold Area, 361-366.*
Cobalt Mine Royalties, 757.
Copper Mine, Observatory Inlet, B.C., Hidden Creek, 763.
California, The Folsom Dredge Working Placer Ground in, by F. C. Perkins, 500.*
Canada Iron Corporation, 610.
Canada, Mining and Metallurgical Opportunities in, by A. B. Willmott, 527 and 552.
Canadian Annual Review of Public Affairs, The, —1909—Book Review, 548.
Canadian Iron and Steel, by Watson Griffin, 207-8, 231-4, 324-327, 388-393.
Canadian Manufacturers' Association, 501-503.
Canadian Minerals at the Brussels Exhibition, 463-4.*
Canadian Mining Institute, 242, 460, 616.
C. M. I. Committee at Ottawa, The, 193. E.
Canadian Mining Institute, The Quarterly Bulletin of the, 66. E.
Canadian Mining Institute for the Year 1909, Report of the Council of the, 76-78.
C. M. I., Toronto Branch, 731.
Canadian Mining Institute, Toronto, March 2nd, 3rd and 4th, 1910, Proceedings of the Twelfth Annual Meeting of the, 163-5.*
Canadian Mining Institute's Twelfth Annual Meeting, The, 129. E.
Canadian Mining Institute—Western Branch, 143, 197-8, 329.
Canadian Patents, 147, 279, 404, 438-9,* 604.
Canadian Westinghouse Co., 578.
Chambers-Ferland Co., 642.
Charging of Blast Furnaces, The Mechanical, by E. J. W. Richards and Thomas Lewis, 420-8.*
Charts, Two, 387.
Chemistry of Cyanide Solutions Resulting From the Treatment of Ores, The—Book Review, 183.
Chibougamau Commission, The, 335-6.*
China, 124, 540, 737.
City of Cobalt Mining Co., 672.
Claims Assessment Work in the Province of Ontario, by James Rennie, 210-211.*
Clay and Shale Deposits of Nova Scotia and Portions of New Brunswick and Prince Edward Island, The, by Heinrich Ries, 470-1, 499-500.
Clubs, Societies, and An Editor, 353. E.
Coal, 260-3.
Coal Areas of the Yukon Territory, Forestry and the, by D. D. Cairnes, 131-132.
Coal and Iron Industries of Nova Scotia, The—Book Review, 439.
Coal in Nova Scotia, The Cost of, Hon. Robt. Drummond, 44-45.
Coal Mine Branch, Annual Report of Department of Public Works of the Province of Alberta, 656-663.*
Coal Mine Officials' Examinations, Alberta Provincial, 690-4.
Coal Mines, Oxygen Breathing Apparatus in Pacific Coast, by E. Jacobs, 334-5.
Coal Mines Regulations Relating to Submarine Areas, Report on, by T. E. Forster, 267-9.
Coal Mines, Rescue Apparatus in, 369-370.
Coal Mining in Alberta During 1909, 615. E.
Coal Mining Regulations, The New Federal, 321. E.
Coal, The Price of, 527.
Coal, Reciprocity in, 684-6.
Cobalt During 1909, 45-47.
Cobalt, Estimation of Nickel and, by C. W. Badgley, 558-9.*
Cobalt in 1910, by A. A. Cole, 199-207.*
Cobalt, The Nissen Stamp in, 87-88.
Cobalt, A Protest From, 226. E.
Cobalt Provincial Mine, The, 343.
Cobalt, Special Correspondence, 25-6, 57-8, 89-91, 120-122, 149-150, 185-7, 215-217, 248-9, 281-2, 314-315, 344-5, 376-8, 410, 441-2, 472-3, 504-5, 536, 568-9, 605, 636-7, 667-8, 701-3, 733-4, 765.
Cobalt, Steam Driven Air Compressors In, by H. V. Haight, 209-210.*
Coke Ovens and Direct Ammonia Recovery Process, Koppers By-Product, 496-8.*
Coke-Oven Gas as Fuel, The Use of, by Thomas J. Brown, 234-6.
Cole, A. A. on Cobalt in 1910, 199--207.*
Colliery Manager's Pocket-Book, Almanac and Diary for the Year 1910, The, Book Review, 148.
Colvocoresses, G. M., on Present Developments at Gowganda, 584-9.*
Commendation, 323. E.
Company Notes—
Maritime Coal, Railway and Power Co, Ltd, 672.
La Rose, Third Annual Report, 672.
Trethewey Mining Co, 610, 672.
Nipissing Mines Co, 94, 254, 446, 578, 672.
Buffalo Mines Co, 222,, 254, 510, 672.
Amalgamated Copper Co., 672.
British Columbia Copper Co, 125, 221, 286, 578, 642, 672.
City of Cobalt Mining Co, 672.
Granby Consolidated, 190, 642, 673.
Wyandoh, 738.
Temiskaming & Hudson Bay, 510, 578, 740.
Canadian Westinghouse Co, 578.
Canada Iron Corporation, Limited, 578.

Temiskaming Co, 286, 350, 541, 578, 737, 740.
La Rose. 578.
Canada Iron Corporation, 610.
Kerr Lake Mining Co, 286, 610, 737.
Van Roi Mining Co, Limited, 641.
Chambers-Ferland Co., 642.
Van Roi Mining Co, Ltd, 446.
Amalgamated Asbestos Corporation, 476.
Crown Reserve Mining Co., 30, 125, 223, 477, 673.
Lake Superior Corporation, 414, 477, 610.
Acadia Coal Co., 477.
Coniagas Mines, 477.
Crow's Nest Pass Coal Co, 510, 738.
McKinley Darragh Savage, 542.
Dominion Coal Co., 252, 286.
Bell's Asbestos Co., 319.
Van Roi Mining Co, Ltd, 382, 446, 641.
Dominion Steel & Coal Corporation, 382.
McKinley-Darragh Co., 155, 382, 738.
Amalgamated Asbestos Corporation, 414.
New Dominion Copper Co., 446.
Nevada Consolidated Copper Co., 446.
Intercolonial Coal Mining Co, 190, 350, 542.
Dominion Iron & Steel, 190, 254, 414.
Nova Scotia Steel & Coal Co., 155, 190, 253.
Western Coal & Coke Co., 125, 190.
Yukon Gold Company, 221.
Pacific Pass Coal Fields Co., 222.
International Nickel Co., 223, 382.
Calumet & Hecla, 286, 382.
Asbestos Bureau, 62.
North Star Mining Co., 63.
International Coal & Coke Co., 94.
Dominion Coal Co., 125.
Le Roi Mining Co., 125, 542.
Peterson Lake Silver Cobalt Mining Co., Ltd., 153, 318.
Trethewey Silver Cobalt Mines, Ltd., 154.
Portland Canal Mining Co., Ltd., 62, 156.
Comparison, A., 67. E.
Compressed Air in a Canadian Mining Camp, Costs of Producing, by R. L. Webb, 102-111.*
Compressed Air Question in Cobalt, The, 386. E.
Compressors in Cobalt, Steam-Driven Air, by H. V. Haight, 209-210.*
Concentration, The Elements of Slime, by Walter McDermott, 299-303.
Concerning Nova Scotian Gold, 482. E.
Concerning One Appointment, 387. E.
Concerning Ourselves, 418. E.
Condition and Needs of Mining in the Yukon, by F. T. Congdon, M.P., 71-74.
Congdon, F. T., M.P., on Condition and Needs of Mining in the Yukon, 71-74.
Coniagas Mines, Limited, 477.
Conservation and Common Sense, 290. E.
Conservation Work of the Geological Survey for the Year Ending March 4, 1910, 175.
Conservative, by P. W. Hunt, 716.
Consolidated Mining and Smelting Company of Canada, Limited, The, 631-4.
Consolidated Mining and Smelting Company of Canada, Limited, 484-7.*
Contribution to the Philosophy of Shipment Sampling, by Joseph T. Mandy, 718-722.*
Copper, 265.
Copper Handbook, Vol. IX., The, Book Review, 277.
Copper Handbook, The History of Stevens', by Horace J. Stevens, 145-6.*
Copper Mines, Important, 557.
Copper Mining In the Province of Quebec, Early, by James Douglas, 452-6.
Copper Ore, Storage-Battery Electric Locomotives Handling, by F. C. Perkins, 270.*
Copper Refining and Smelting in Australia, Electrolytic, 433.
Correspondence—
Stevens, Horace J, 471.
Thompson, Phillips, 532.
Jennison, W. F., 666.
Nordegg, Martin, 667.
Denis, Theo. C., 680.
Haultain, H. E. T., 715.
Anderson, G. R., 716.
Hunt, P. W., 716.
Query, 745.
Jennison, W. F., 745.
McKay, G. J., 23.
Gwillim, J. C., 24.
Clark, McPherson, Campbell & Jarvis, 117.
Denis Theo., 118.
Turner, A. P., 146.
Mickle, G. R., 146.
Simpson, Louis, 212.
Jacobs, E., 212.
Handley, John, 246.
Hawtrey, R. O., 280.
Haanel, Dr. Eugene, 309.
Temiskaming Mine Managers' Association, 311.
Segsworth, Walter E, 311.
Kennedy, G. R. E., 408.
Haultain, H. E. T., 408.
Royce, R. H., 408.
Loring, F. C., 439.
Corrosion and Preservation of Iron and Steel, The, Book Review, 407.
Cost of Coal in Nova Scotia, The, by Hon. Robt. Drummond, 44-45.
Cost of Living, The, 99. E.
Costs of Producing Compressed Air in a Canadian Mining Camp, by R. L. Webb, 102-111.*
Criminal Code, The Amendment to The, 360.
Crown Reserve Mining Company, 30, 477, 673.
Crow's Nest Pass Coal Co, 510.
Crusher, The Largest Rock, In the World, 117.
Cuba, 94.
Cumming, James, on The Premier Diamond Mines—The World's Largest Crucible, 723-6.*
Cyanidation and Amalgamation, Electrolytic, by E. E. Carey, 393-4.
Cyanidation the Electrochemical System of Amalgamation and, by Elmer Ellsworth Carey, 18-20.
Cyanide Patents in Mexico, A Discussion of Leopoldo Salazar's Paper on the McArthur-Forrest, by J. M. Nicol, 271-3.

Davis Handbook of Cobalt, Ont., 99. E.
Davis Handbook of the Cobalt Silver District, Advance Chapter from, 136-7.
Davis Handbook of the Cobalt Silver District, The, 227. E.
Deloro, A Ministerial Visit to Sulphide, Madoc and, 406-7.
Denis, Theo C., on Report of Mining Operations in the Province of Quebec During the Year 1909, 517-521; on Preliminary Statement of the Mineral Production of the Province of Quebec During the Year, 1909, 176.
De Schwarz, C. C., on The Briquetting of Iron Ores, 599-603.
Developments at Gowganda, Present, by G. M. Colvocoresses, 584-9.*
Developments in Nova Scotia, 743. E.
Diamond Drilling in Nova Scotia, 432.
Diamond Mine, The World's Largest Crucible, The Premier, by James Cumming, 723-6.*
Dictionary of Metallurgical and Chemical Material, Book Review, 622.
Dinner Hour, The, by John Ravenor Bullen, 464.
Discussion of Leopoldo Salazar's Paper on the McArthur-Forrest Cyanide Patents in Mexico, A, by J. M. Nicol, 271-3.
Distribution of Asbestos Deposits in the Eastern Townships of Quebec, On The, by John A. Dresser, 465-470.*
Delcoath's New Shaft, The, 598.
Dominion Steel and Coal Corporation, 382.
Dominion Coal Co. 286.
Douglas, James, LL.D., on Early Copper Mining in the Province of Quebec, 452-6.
Dresser, John A. on The Distribution of Asbestos Deposits in the Eastern Townships of Quebec, 465-470.*
Drills in Overhand Stoping and Raising, Hammer, by H. B. Williams, 461-3.*
Drummond, Hon. Robt, on The Cost of Coal in Nova Scotia, 44-45.
Dust in Mines, Electro-Pneumatic Apparatus for the Removal of, by F. C. Perkins, 433.*
Duty, Mineral Rights, 56.

Early Copper Mining in the Province of Quebec, by James Douglas, 452-6.
East and West, 545. E.
Editorial Notes, 35, 67, 99, 130, 163, 194, 227, 260, 291, 323, 355, 387, 418, 451, 484, 516, 547 584, 615, 648, 680, 712, 744.
Egypt, 348.
Eighteenth Annual Meeting of the Mining Society of Nova Scotia, Halifax, March 15 and 16, 1910, The, 195-7.*
Eight-Hour Day in Nova Scotia, The, 212.
Eight-Hour Day, The, 162. E.
Electric Arc Process For Producing and Refining Steel, A New, by F. C. Perkins, 687-690.*
Electric Furnace, Tool-Steel Direct from the Ore in An, by Alfred Stansfield, 372-5.*
Electric Locomotives Handling Copper Ore, Storage-Battery, by F. C. Perkins, 270.*
Electric Mine Pumping Installation for Handling Hot Water, A Large, 115-116.*
Electric Motor Driven Mine Hoists, 308-9.*
Electric Operation of the Indiana Steel Plant, The, by F. C. Perkins, 529-531.*
Electric Smelting, by A. B. W., 756.
Electric Steel Refining, by D. F. Campbell, 695-7.
Electric Storage Battery Locomotives in Hungarian Mines, by Frank C. Perkins, 135-6.*
Electrical Transport on the Rand, 560.
Electricity, Hoisting by, 355.
Electricity in Mines, 198.
Electrically Driven Pumps of Lockport, N.Y., The, 79-80.
Electrochemical System of Amalgamation and Cyanidation, The, by Elmer Ellsworth Carey, 18-20.
Electrolytic Amalgamation, 183.
Electrolytic Copper Refining and Smelting in Australia, 433.
Electrolytic Cyanidation and Amalgamation, by E. E. Carey, 393-4.
Electro-Pneumatic Apparatus for Removal of Dust in Mines, by F. C. Perkins, 433.*
Elements of Slime Concentration, The, by Walter McDermott, 299-303.
Eleventh International Geological Congress, Sweden, 1910, by Dr. W. G. Miller, 591-8.*
Elk Lake, Special Correspondence, 735, 668.
Elmendorf, W. J., on Portland Canal Mining Company, Limited, 663-4.
Emergency Signalling Apparatus for Mines, New, 402-3.*
Employment for Students, by H. E. T. Haultain, 714.
Engineers and Institutes, 98. E.
Engineers as Citizens, 514. E.
Engineer Group, Atlin Mining Division, British Columbia, The, by E. Jacobs, 528-9.
English Gold Stamp Battery in South Africa, An, by F. C. Perkins, 456.*
English Railway Coal Bills, 743. E.
Eruptive Products, 276.
Estimation of Nickel and Cobalt, by C. W. Badgley, 558-9.*
European View of Porcupine, A, 742. E.
Europe, 29, 61, 317.
Examinations, Alberta Provincial Coal Mine Officials, 690-4.
Exchanges, 15, 89, 101, 183, 242, 266, 273, 279.
Experimental Work in Treatment of Zinc Ores, by E. Jacobs, 553-4.
Explosibility of Coal Dust, The, 546. E.
Explosions, Prevention of Mine, 566-7 and 598.
Explosives, A Primer On, 7.
Extension Explosion, The, by E. Jacobs, 8-9.*

Faribault, E. R., on Southern Part of Lunenburg County, Nova Scotia, 428-430.
Fernow, B. E., on The Relation of Mining to Forestry, 85-87.
Few Notes on Gold Production in Nova Scotia, A, by J. C. Murray, 716-7.*
Filter Leaves, Wear On, 433.
Fire at British Columbia Mines, Losses by, 492-3.
Fire-Damp, Unique English Device for Detecting, by F. C. Perkins, 756.*
Fire Loss and Mineral Products, 257. E.
Fire Protection at the Plants of The Amalgamated Asbestos Corporation, 727.
Fixation of Atmospheric Nitrogen and the Food Supply, The, by Leo Frank Guttmann, 243-245.
Folsom Dredge Working Placer Ground in California, The, by F. C. Perkins, 500.*
Forestry and the Coal Areas of the Yukon Territory, by D. D. Cairnes, 131-132.
Forestry, The Relation of Mining to, by B. E. Fernow, 85-87.
Forster, T. E., on Report on Coal Mines Regulations Relating to Submarine Areas, 267-9.
Fort William's Water Supply, Mining Engineering in Connection With, by H. Sydney Hancock, Jr., 330-334.*
France, 413, 609.
Fraser River, B.C., Mining Prospects on the Upper, 551.
French Mines, Safety Chambers In, 370.
From Prospect to Mine, Book Review, 548.

Gas Field, The Kent, 623-6.*
Gascoyne, Rowland, on Waterborne Packing of Stopes In the Transvaal, 635.
General Mining News, 27-8, 60, 93, 123, 152, 188-9, 218-220, 249-250, 284-5, 316-17, 380, 444-5, 475-6, 507-8, 538-9, 572, 608, 639-640, 671, 706-7, 768-9.
Geological Congress, Sweden, 1910, Eleventh International, by Dr. W. G. Miller, 591-8.*
Geological Survey Field Parties, etc., 312.
Geological Survey for the Year Ending March 4, 1910, Conservation Work of The, 175.
Geologist and His Glim, The, 450. E.
Geology, Mining, and Preparation of Barite in Washington County, Missouri, The, by A. A. Steel, 138-143.
Geology of the Porcupine District of Canada, Preliminary Notes on, by A. A. Hassan, 561-2.*
Germany, 124, 348, 509, 705.
Gibson, Thos. W., on The Year In Ontario, 47-50.*
Giddy Harumfrodite, The, 35, E.
Gold, 76, 263-4.
Gold and Silver Mining and Ore Reduction—Their Relation, 726-7.
Gold Area, The Porcupine, by W. E. H. Carter, 361-366.*
Gold Coast, 540.
Gold Deposits, Porcupine, by Reginald E. Hore, 649-656.*
Gold District, The Porcupine, by Hamlin Brooks Hatch, 306-8.*
Gold Fields, The New Porcupine, by A. M. Hay, 53-56.*
Gold Fields, The Porcupine, by W. H. Spencer, 137-8.
Gold in Quebec, 679. E.
Gold Mining in British Columbia, Placer, 405-6.
Gold Mining Property—Beauce County, Quebec, The Jersey Falls, 729.*
Gold, Nascent, by G. J. McKay, 23.
Gold Output, Rhodesian, 496.
Gold Production in Nova Scotia, A Few Notes On, by J. C. Murray, 716-7.*
Gold Stamp Battery in South Africa, an English, by F. C. Perkins, 456.*

Good Books, 709. E.
Good Example, A, 35. E.
"Good Luck" Mining Lamp, The, 533.*
Good Report, A, 516. E.
Goodwin, W. M., on Notes on Prospecting in Ontario, 177.
Government Positions, 34. E.
Gowganda, Present Developments At, by G. M. Colvocoresses, 584-9.*
Gowganda, Special Correspondence, 474, 569, 606, 668, 735, 411, 442, 766.
Gowganda To-Day, 581, E.
Gracey, A. H., on Sheep Creek District, B.C., 100.
Granby Affairs, 259. E.
Granby and Some Definitions, 259. E.
Granby Company's Annual Report, 754-5.
Granby Company Enlarging Its Field of Operations, by E. Jacobs, 681-2.
Granby Consolidated, 642, 673.
Granby Mines, Boundary District, 269-270.
Great Britain, 93, 124, 189, 220, 250, 348, 380, 413, 539, 641, 705, 737, 769.
Griffin, Watson, on Canadian Iron & Steel, 207-8, 231-4, 324-327, 388-393.
Growth of Steel Output in Canada, 451.
Guttmann, Leo Frank, on The Fixation of Atmospheric Nitrogen and the Food Supply, 243-5.
Gwillim, J. C., on The North Thompson Valley, B.C., 17.
Gypsum, 265.

Haight, H. V., on Steam-Driven Air Compressors in Cobalt, 207-8.
Hair-trigger Critic, The, 355. E.
Hammer Drill, The. 450. E.
Hammer Drills in Overhand Stoping and Raising, by H. B. Williams, 461-3.*
Hampton's Magazine and Mr. Bannell Sawyer, 130. E.
Hancock, H. Sydney, on Mining Engineering in Connection With Fort William's Water Supply, 330-334.
Happy New Year, A, 4. E.
Harpell, J. J., on Political and Mischievous Interference With Industry, 68-70; on The Asbestos Industry, 50-52.
Hassan, A. A., on Preliminary Notes on Geology of the Porcupine District of Canada, 561-2.
Hastings County, Ontario, 385. E.
Hatch, Hamlin Brooks, on The Porcupine Gold District, 306-8;* on Summer Route to the Porcupine, 327-9.*
Haultain, H. E. T., on Richards, 181-2; on A Suggestion on "Quartering-Down" Large Samples, 356-7; on A Note on the Sampling of Porcupine Ore Bodies, 357-8; on Some Notes on the Philosophy of Sampling, 358-360; on Employment For Students, 714; on That Timmins Sample Car, 408.
Hawthorne Silver and Iron Mines, The, 710. E.
Hay, A. M., The New Porcupine Gold Fields, 53-56.*
Hecla Mine Hoist, The, 398-9.*
Hidden Creek Copper Mine, Observatory Inlet, B.C., 763.
High Power Direct Current Centrifugal Mining Pumps, by Frank C. Perkins, 16.*
History of Stevens' Copper Handbook, The, by Horace J. Stevens, 145-6.*
Hoists, Electric Motor Driven Mine, 308-9.*
Hoist, The Hecla Mine, 398-9.*
Hoisting by Electricity, 355.
Holland, 641.
Hore, R. E., The Porcupine Trail, 617-622;* Porcupine Gold Deposits, 649-656;* Porcupine and the Mother Lode, 746.
Hours of Work in Belgian Coal Mines, 101.
House Cleaning Applied to Mineral Lands in Ontario, by G. R. Mickle, 67.
Hughes, Geo. W.—A Slocan, B.C., Pioneer and His Mining Properties, by E. Jacobs, 394-8.
Hungary, 317.
Hungarian Mines, Electric Storage Battery Locomotives in, by Frank C. Perkins, 135-6.*
Hunt, P. W., on Conservative, 716.

Important Copper Mines, 557.
In the High Court of Justice, 118.
Index of Mining Engineering Literature, Book Review, 23.
India, 61, 540.
Indiana Steel Plant, The Electric Operation of, The, by F. C. Perkins, 529-531.*
Indiscreet Official, An, 66. E.
Industrial Evolution, Mining and The, by R. B. Lamb, 749-752.
Industrial Federation, 322. E.
Industrial Section, 419, 533.
Inspection of Mines, 4. E.
Institute Meeting, The, 161. E.
Intellectual Proletariat, The, 483. E.
Intercolonial Coal Co, 350, 542.
Interference With Industry, Political and Mischievous, by J. J. Harpell, 68-70.
International Geological Congress, The, 584. E.
International Geological Congress, Sweden, 1910, The Eleventh, by Dr. W. G. Miller, 591-8.*
International Nickel Co, 382.
Iron, 264.
Iron Ore, Tool Steel Direct From, 194. E.
Iron Ores, The Briquetting Of, by C. C. De Schwarz, 599-603.
Iron and Steel, 76.
Iron and Steel Industry, The Canadian, by Watson Griffin, 207-8, 231-4, 324-327, 388-393.

Jacobs E, on The Extension Explosion, 8-9;* Mining in British Columbia in 1909, 38-44; Mining in Slocan and Ainsworth Districts, 143-5; A Slocan, B.C., Pioneer and His Mining Properties, 394-8; Rambler Cariboo Mine, Slocan, B.C., 431-2; The Engineer Group, Atlin Mining Division, British Columbia, 528-9; Are British Columbia Ores Improving? 531-2; Experimental Work in Treatment of Zinc Ores, 553-4; Granby Company Enlarging Its Field of Operations, 681-2; The Standard Mine, Slocan District, B.C., 747-9.*
Japan, Petroleum In, 265.
Jennison, W. F., Correspondence, 666, 745.
Jersey Falls Gold Mining Property—Beauce County, Quebec, The, 729.*

Kenora, Special Correspondence, 149, 215, 669.
Kent Gas Field, The, 623-6.*
Kerr Lake Mining Co, 610.
King, The, 289. E.
Koppers' By-Product Coke Ovens at Birmingham, Alabama, 305.
Koppers' By-Product Coke Ovens and Direct Ammonia Recovery Process, 496-8.*

Lamb, H. Mortimer, on The Year in the Province of Quebec, 36-38.*
Lamb, R. B., on Mining and the Industrial Evolution, 749-752.
Lake Superior Corporation, 477, 610.
Lamps, Testing Safety, by James Ashworth, 12-13.*
Largest Customs Smelter in Mexico, The, 755.
La Rose Consolidated, Third Annual Report of, 646. E.
La Rose Mines, 578, 672.
Last Mine Myth, The, 322. E.
Last Straw, The, 260. E.
Lead-Silver, 265.
Legal Column, 35, 88-89, 114-115, 180, 198, 276-7.
Leonard Prize, The, 181.
Le Roi Mining Co, 542.
Le Roi Mining Company, In Liquidation, 664-5.
Let the Punishment Fit the Crime, 387. E.
Lewis, Thos., on The Mechanical Charging of Blast Furnaces, 420-8.*
Locomotive, A Remarkable Compressed Air Mine, by F. C. Perkins, 763.*
Locomotives in Hungarian Mines, Electric Storage Battery, by F. C. Perkins, 135-6.*
Londonderry Steel, 554.
Lord's Day Alliance and the Mining Industry, 678. E.
Loring, Frank C., on South Lorrain, 22, 70.
Lorrain, South, by Frank C. Loring, 22.
Losses by Fire at British Columbia Mines, 492-3.
Lucky Jim, The, 483. E.
Lunenburg County, Nova Scotia, Southern Part of, by E. R. Faribault, 428-430.

M. E., 711. E.
Macoun, John, on The Protection of Mine Timbers, From Fungus, 133.
Maddock, The Oleaginous Mr. Henshaw, 65. E.
Madoc & Deloro, A Ministerial Visit to Sulphide, 406-7.
Mandy Joseph T, Contribution to the Philosophy of Shipment Sampling, 718-722.*
Maritime Coal, Railway and Power Co, Ltd, 672.
McArthur-Forrest Cyanide Patents in Mexico, A Discussion of Leopoldo Salazar's Paper on The, by J. M. Nicol, 271-3.
McCharles Prize, The, 22.
McDermott, Walter, on The Elements of Slime Concentration, 299-303.
McKay, G. J., on Nascent Gold, 23.
McKinley-Darragh-Savage, 542.
McKinley-Darragh-Savage Mines of Cobalt, Limited, The, 292-298, 337-343.*
McKinley-Darragh-Savage Report, The, 289. E.
Mechanical and Metallurgical Progress on the Rand, 745.
Mechanical Charging of Blast Furnaces, The, by Edgar J. W. Richards and Thomas Lewis, 420-8.*
Metal Statistics, 1910, Book Review, 148.
Metallurgical Opportunities in Canada, Mining and, by A. B. Willmott, 527 and 552.
Mexico, 189, 317, 349, 381, 414, 541, 609, 706, 737.
Mickle, G. R., on House Cleaning Applied to the Mineral Lands in Ontario, 67.
Miller, Dr. W. G., on Eleventh International Geological Congress, Sweden, 1910, 591-8.*
Miller, Dr. W. G., Presidential Address of, 166-169.
Mine Cost Data, 515. E.
Mine-Rescue Stations in British Columbia, 460.
Mine Rescue Work in Britain, 728.
Mine Telephones, New, 245-6.*
Mine Timbers, The Protection of, From Fungus, by John Macoun, 133.
Mineral Output in 1908, Nova Scotia's, by Arthur S. Barnstead, 74-76.
Mineral Output First Quarter of 1910, Ontario, 399.
Mineral Production of British Columbia in 1909, 457-460.
Mineral Production of Canada During the Calendar Year 1909, Preliminary Report of the, 170-175.
Mineral Production of Ontario in 1909, 191.
Mineral Production of the Province of Quebec During the Year 1909, Preliminary Statement of the, by Theo. C. Denis, 176.
Mineral Products, Fire Loss and, 257. E.
Mineral Rights Duty. 56.
Miners' Phthisis, 583. E.
Mines Branch, Program of, 371.
Mining Accidents in Ontario During 1910, 614. E.
Mining—A Business, 686-7.
Mining and Smelting Conditions in British Columbia, 236-9.
Mining and the Industrial Evolution, by R. B. Lamb, 749-752.
Mining and Metallurgical Opportunities in Canada, by A. B. Willmott, 527 and 552.
Mining Case Dismissed, 746.
Mining Engineering in Connection With Fort William's Water Supply, by H. Sydney Hancock, Jr., 330-334.*
Mining Engineers and Mining Institutes, by A. B. Willmott, 113.
Mining in Ainsworth and Slocan Districts, by E. Jacobs, 143-5.
Mining in British Columbia in 1909, by E. Jacobs, 38-44.
Mining in the Province of British Columbia in 1908, Review of, by Geo. A. Ohren, 5-7.
Mining in Nicaragua, 265-6.
Mining Machinery Exhibit at Western Pennsylvania Mining Exposition, 698-9.*
Mining Manual, 1910, The, Book Review, 148.
Mining News, General, 27-8, 60, 93, 123, 152, 188-9, 218-220, 249-250 284-5 316-317, 380, 444-5, 475-6, 507-8, 538-9, 572, 608, 639 640, 671, 706-7, 768-9.
Mining News of the World, 29-30, 61, 93-4, 124, 189, 220-1, 250-2, 285-6, 317, 348-350, 380-1, 413-414, 445-6, 509, 539-541, 577-8, 609, 640-1, 705-6, 737, 769-771.
Mining Operations in Quebec During 1909, 515, E.
Mining Opportunities in Canada, 647. E.
Mining Prospects on Upper Fraser River, B.C., 551.
Mining Society of Nova Scotia, The, 194. E.
Mining Society of Nova Scotia, The, 130. E.
Mining Society of Nova Scotia, Halifax, March 15 and 16, 1910, The Eighteenth Annual Meeting of the, 195-7.
Mining Work For Students, 711. E.
Ministerial Visit to Sulphide, Madoc and Deloro, A, 406-7.
Modern Assaying, Book Review, 714.
Murray, J. C., on A Few Notes on Gold Production in Nova Scotia, 716-7.

Nascent Gold, by G. J. McKay, 23.
Natural Resources, Mr. Clifford Sifton and, 97. E.
Nevada Consolidated Copper Co., 446.
New Brunswick Bathurst District, by G. A. Young, 488-492.*
New Brunswick, The Clay and Shale Deposits of, by Heinrich Ries, 470-1, 499-500.
New Demands of the U. M. W. A., 259. E.
New Dominion Copper Co, 446.
New Electric Arc Process For Producing and Refining Steel, A, by F. C. Perkins, 687-690.*
New Electric Process for Producing and Refining Steel With Composite Arc Electrodes, A, by Frank C. Perkins, 82-85.*
New Federal Coal Mining Regulations, The, 321 E.
Newfoundland, 640.
New Mining Field in British Columbia, 697-8.*
New Porcupine Gold Fields, The, by A. M. Hay, 53-56.*
New Zealand, 124, 285.
Newspaper Comment, 744. E.
Nicaragua, Mining in, 265-6.
Nicholson, Neil A, on Practical and Economical Mining, 627-8.
Nickel and Cobalt, Estimation of, by C. W. Badgley, 558-9.*
Nickel Industry, The, 81-82, 589-590.
Nicol, J. M., on A Discussion of Leopoldo Salazar's Paper on The McArthur-Forrest Cyanide Patents in Mexico, 271-3.
Nineteenth Annual Report of the Ontario Bureau of Mines, The, 614. E.
Nipissing Mines Co, 446, 578, 672.
Nissen Stamp in Cobalt, The, 87-88.
Nitrogen and the Food Supply, The Fixation of Atmospheric, by Leo Frank Guttmann, 243-5.
North Star Mining Co, 63.

North Thompson Valley, B.C., The, by J. C. Gwillim, 17.
Northern Partnership Group, Atlin Mining Division, B.C., 603-4.
Northern Quebec, 371.
Norway, 348, 509.
Note on the Sampling of Porcupine Ore Bodies, A, by H. E. T. Haultain, 357-8.
Notes on Portland Canal Mining District, B.C., by William W. Rush, 228-230.*
Notes on Prospecting in Ontario, by W. M. Goodwin, 177.
Notes on Recent Developments in Asbestos Mining in Quebec, by W. J. Woolsey, 434-5.
Nova Scotia, A Few Notes on Gold Production In, by J. C. Murray, 716-7.
Nova Scotia Department of Mines for 1909, Annual Report of the, 260-265.*
Nova Scotia, Developments In, 743. E.
Nova Scotia, Diamond Drilling In, 432.
Nova Scotia During 1909, The United Mine Workers in, 13-15.
Nova Scotia, Halifax, March 15 and 16, 1910, the Eighteenth Annual Meeting of the Mining Society of, 195-7.*
Nova Scotia, Southern Part of Lunenburg County, 428-430.
Nova Scotia, Special Correspondence, 119-120, 148-9, 184-5, 213-215, 247-8, 280-1, 313-314, 344, 375-6, 409-410, 441, 472, 503-4, 534-5, 605, 667, 700-1, 733, 764-5.
Nova Scotia, The Clay and Shale Deposits of, by Heinrich Ries, 470-1, 499-500.
Nova Scotia, The Cost of Coal In, Hon. Robt. Drummond, 44-45...
Nova Scotia, The Eight-Hour Day In, 212.
Nova Scotia, The Mining Society of, 130. E.
Nova Scotia, The Mining Society of, 194. E.
Nova Scotia Mining Examinations, 355. E.
Nova Scotia Tungsten Mining, 546. E.
Nova Scotia's Mineral Output in 1908, by Arthur S. Barnstead, 74-76.

Ohren, Geo. A., on Review of Mining in the Province of British Columbia in 1908, 5-7.
Oleaginous Mr. Henshaw Maddock, The, 65. E.
One View of Modern Education, 583. E.
Ontario Bureau of Mines Report, 731.
Ontario, Claims Assessment Work in the Province of, by James Rennie, 210-211.*
Ontario in 1909, Mineral Production of, 191.
Ontario Mineral Output First Quarter of 1910, 399.
Ontario Public School Text Books, The, 225. E.
Ontario, Special Correspondence, 25-6, 57-8, 89-91, 120-2, 149-150, 185-7, 215-217, 248-9, 281-3, 314-315, 344-6, 376-8 410-411, 441-3, 472-5, 504-6, 536-7, 568-9, 605-7, 636-7, 667-9, 701-4, 733-5, 765-6.
Ontario The Year In, by Thos. W. Gibson, 47-50.*
Opportunities for Mining Ventures and Investments in Canada, 33-4. E.
Opportunities in Canada, Mining and Metallurgical, by A. B. Willmott, 527 and 552.
Ore Mining Methods, Book Review, 548.
Ore Production in British Columbia, 436-7.
Ore Receipts at British Columbia Smelteries, 732.
Our European Letter, 10, 111, 179, 240, 303, 366, 400-401, 495-6, 555-6, 629-630, 682-4, 752-4.
Oxygen Breathing Apparatus in Pacific Coast Coal Mines, by E. Jacobs, 334-5.

Pacific Coast Coal Mines, Oxygen Breathing Apparatus In, by E. Jacobs, 334-5.
Paper Mill Pumps, 533.
Passing of Le Roi, The, 449. E.
Peat, 513. E.
Pebbles for Tube Mills, 731.
Pennsylvania Mining Exposition, A Mining Machinery Exhibit at Western, 698-9*.
Perkins, F. C., on The Electric Operation of the Indiana Steel Plant, 529-531;* The Folsom Dredge Working Placer Ground In California, 500;* A Unique Tunnelling Machine, 403-4;* Electric Storage Battery Locomotives In Hungarian Mines, 135-6;* High Power Direct Current Centrifugal Mining Pumps, 16;* A New Electric Process for Producing and Refining Steel With Composite Arc Electrodes, 82-5* Storage-Battery Electric Locomotives Handling Copper Ore, 270;* Electro-Pneumatic Apparatus For the Removal of Dust in Mines, 433;* An English Gold Stamp Battery in South Africa, 456;* A New Electric Arc Process for Producing and Refining Steel, 687-690;* A Remarkable Compressed Air Mine Locomotive, 763;* Unique Engglish Device for Detecting Fire Damp, 756.*
Personal and General, 22, 57, 89. 147, 183, 213, 242, 278, 291, 343, 375, 409, 440, 451, 464, 503, 534, 568, 604-5, 636, 665-6, 700, 732, 764.
Peterson Lake, 130. E.
Peterson Lake Silver Cobalt Mining Co Ltd, 118, 318.
Petroleum in Japan, 265.
Philosophy of Shipment Sampling, Contribution to The, by Joseph T. Mandy, 718-722.*
Philosophy of Sampling, Some Notes on The, by H. E. T. Haultain, 358-360.
Photography, 680. E.
Photography Again, 712. E.
Photography at University of Toronto, by G. R. Anderson, 715.
Placer Gold Mining in British Columbia, 405-6.
Political and Mischievous Interference With Industry, by J. J. Harpell, 68-70.
Porcupine, 34, 355, 515, 645. E.
Porcupine, A European View of, 742. E.
Porcupine and Cobalt, 547. E.
Porcupine and the Mother Lode, by R. E. Hore, 746.
Porcupine and Papers, 743. E.
Porcupine at Present, 679. E.
Porcupine District of Canada, Preliminary Notes on Geology of The, by A. A. Hassan, 561-2.*
Porcupine Gold Area, The, by W. E. H. Carter, 361-366.
Porcupine Gold Deposits, by Reginald E. Hore, 649-656.*
Porcupine Gold District, The, by Hamlin Brooks Hatch, 306-8.*
Porcupine Gold Fields, The, by W. H. Spencer, 137-8.
Porcupine Gold Fields, The New, by A. M. Hay, 53-56.*
Porcupine Ore Bodies, A Note on the Sampling of, by H. E. T. Haultain, 357-8.
Porcupine, Special Correspondence, 150, 249, 282-3, 315, 345-6, 410-411, 443, 473, 505-6, 537, 569, 606-7, 637, 668, 702-3, 734-5, 765-6.
Porcupine, Summer Route to The, by Hamlin Brooks Hatch 327-9.*
Porcupine Trail, The, by Reginald E. Hore, 617-622.*
Portland Canal Analyses, 407.
Portland Canal District, B.C., 616.
Portland Canal Mining Co., 62.
Portland Canal Mining Company, Limited, by W. J. Elmendorf, 663-4.
Portland Canal Mining Company, The, 98. E.
Portland Canal Mining District, B.C., Notes on, by William W. Rush, 228-230.*
Practical and Economical Mining, by Neil A. Nicholson, 627-8.
Practical Conservation, 582. E.
Practical Data for the Cyanide Plant, 714.
Practical Stamp Milling and Amalgamation, 744.
Precipitation, 559.
Preliminary Notes on Geology of the Porcupine District of Canada, by A. A. Hassan, 561-2.*
Preliminary Report of the Mineral Production of Canada During the Calendar Year 1909, 170-175.
Preliminary Statement of the Mineral Production of the Province of Quebec During the Year 1909, by Theo. C. Denis, 176.
Premier Diamond Mine—The World's Largest Crucible, The, by James Cumming, 723-6.*
Present Developments at Gowganda, by G. M. Colvocoresses, 584-9.*
President Eliot on Education, 741. E.
Presidential Address of Dr. W. G. Miller, 166-169.
Preventable Accidents, 323. E.
Prevention of Mine Explosions, 566-7 and 598.
Price of Coal, The, 527.
Primer on Explosives, A, 7.
Prince Edward Island, The Clay and Shale Deposits of, by Heinrich Ries, 470-1, 499-500.
Prize, The McCharles, 22.
Proceedings of the Twelfth Annual Meeting of the Canadian Mining Institute, Toronto, March 2, 3, and 4, 1910, 163-5.*
Process for Producing and Refining Steel With Composite Arc Electrodes, A New Electric, by Frank C. Perkins, 82-85.*
Process for Smelting Nickel-Cobalt-Silver-Arsenic Ores, A, 182.
Producer-Gas Power Plants, 258. E.
Production of British Columbia in 1909, Mineral, 457-460.
Programme of Mines Branch, 371.
Progress and Procrastination, 354. E.
Property to be Assessed, 56.
Prospecting in Ontario, 162. E.
Prospecting in Ontario, Notes on, by W. M. Goodwin, 177.
Prospector, The, 516.*
Prospects of the Tyee Copper Co, 133-4.
Protection of Mine Timbers from Fungus, The, by John Macoun, 133.
Protest from Cobalt, The, 226. E.
Publicity, 546. E.
Pumping Installation for Handling Hot Water, A Large Electric Mine, 115-116.*
Pumps, High Power Direct Current Centrifugal Mining, by Frank C. Perkins, 16.*
Pumps of Lockport, N.Y., The Electrically Driven, 79-80.*

"Quartering-down" Large Samples, A Suggestion On, by H. E. T. Haultain, 356-7.*
Quarterly Bulletin of the Canadian Mining Institute, The, 66. E.
Quebec During the Year, 1909, Preliminary Statement of the Mineral Production of the Province of, by Theo. C. Denis, 176.
Quebec During the Year 1909, Report of Mining Operations in the Province of, by Theo. C. Denis, 517-521.*
Quebec, Early Copper Mining in the Province of by James Douglas, 452-6.
Quebec Mining Law Amendments, 354. E.
Quebec, Northern, 371.
Quebec, Notes on Recent Developments in Asbestos Mining In, by W. J. Woolsey, 434-5.
Quebec, On the Distribution of Asbestos Deposits in the Eastern Townships of, by John A. Dresser, 465-470.*
Quebec, On the Distribution of Asbestos Deposits in the Eastern Townships of, by John A. Dresser, 465-470.*
Quebec Placers, 408.
Quebec, Special Correspondence, 215, 535-6, 701, 733.
Quebec, The Bristol Mine, Pontiac County, 493-4.
Quebec, The Jersey Falls Gold Mining Property, Beauce County, 729.*
Quebec, The Year in the Province of, by H. Mortimer Lamb, 36-38.*
Quick and the Dead, The, 547. E.

Railway Statistics, 66. E.
Railway to Porcupine, A, 744. E.
Rambler-Cariboo Mine, Slocan, B.C., by E. Jacobs, 431-2.
Rand, Electrical Transport On the, 560.
Rand, Mechanical and Metallurgical Progress, On the, 745.
Reciprocity in Coal, 677. E.
Reciprocity in Coal, 684-6.
Reduction, Their Relation, Gold and Silver Mining and Ore, 726-7.
Refining, Electric Steel, by D. F .Campbell, 695-7.
Refining Steel, A New Electric Arc Process for Producing and, by F. C. Perkins, 687-690.*
Relation of Mining to Forestry, The, by B. E. Fernow, 85-87.
Remarkable Compressed Air Mine Locomotive, A, by F. C. Perkins, 763.
Rennie, James, on Claims Assessment Work in the Province of Ontario, 210-211.
Report, Granby Company's Annual, 754-5.
Report of Mining Operations in the Province of Quebec During the Year 1909, by Theo. C. Denis, 517-521.
Report of the Mineral Production of Canada During the Calendar Year 1909, Preliminary, 170-175.
Report of Mr. James Ashworth, Abstract of, 522-526.
Report of the Council of the Canadian Mining Institute for the Year 1909, 76-78.
Report on Coal Mines Regulations Relating to Submarine Coal Areas, by T. E. Forster, 267-9.
Rescue Apparatus in Coal Mines, 369-370.
Rescue Stations in British Columbia, Mine, 460.
Rescue Work in Britain, Mine, 728.
Resolutions Adopted by the Canadian Commission of Conservation, 147.
Review of Mining in the Province of British Columbia in 1908, by Geo. A. Ohren, 5-7.
Rhodesia, 29, 124, 189, 220, 577, 705.
Rhodesian Gold Output, 496.
Richards, by H. E. T. Haultain 181-2.
Richards, Edgar J. W., on The Mechanical Charging of Blast Furnaces, 420-8.
Ries, Heinrich, on the Clay and Shale Deposits of Nova Scotia, and Portions of New Brunswick and Prince Edward Island, 470-1.
Rock Crusher, The Largest, in the World, 117.
Rock Crushing Plant, by Paul C. Van Zandt, 757-763.*
Rock Drills, Design, Construction and Use, Book Review, 713.
Roumania, 29, 380, 705.
Royal Commission of Inquiry on Technical Education, The, 417. E.
Rush, William W., on Notes on Portland Canal Mining District, B.C., 228-230.*
Russia, 29, 93, 220, 285, 380, 540, 770.

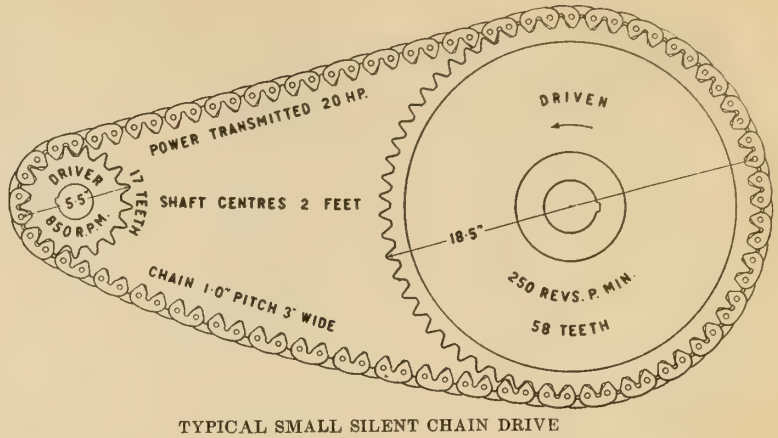
Safety Chambers in French Mines, 370.
Safety Lamps, Testing, by James Ashworth, 12-13.*
Sampling, Contribution to the Philosophy of Shipment, by Joseph T. Mandy, 718-722.*
Sampling of Porcupine Ore Bodies, A Note on the, by H. E. T. Haultain, 357-8.
Sampling, Some Notes on the Philosophy of, by H. E. T. Haultain, 358-360.
Sand Filling of Stopes, 312.
Sawyer, Mr. Bannell, Hampton's Magazine and, 130. E.
Scheelite, 549-551.*
Scotland, 609.
Servia, 540.
Sexton, F. H., Director of Technical Education, Nova Scotia, Address by, 435-6.
Shale Deposits of Nova Scotia, and Portions of New Brunswick and Prince Edward Island, The Clay and, by Heinrich Ries, 470-1, 499-500.
Share Market, 158, 192, 224, 256, 288, 320, 352, 384, 416, 448, 480, 512, 544, 580, 612, 644, 676, 708, 739, 772.

RENOLD PATENT SILENT

MANCHESTER, ENG.,

CHAINS

Are Superior to Belts



TYPICAL SMALL SILENT CHAIN DRIVE

Require less space, prevent slipping, save power, give maximum production. Have a long life and a breakdown never occurs.

ARE ESPECIALLY ADAPTED TO THE HARDEST SERVICE

Canadian Agents

JONES & GLASSCO., MONTREAL

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. | Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.

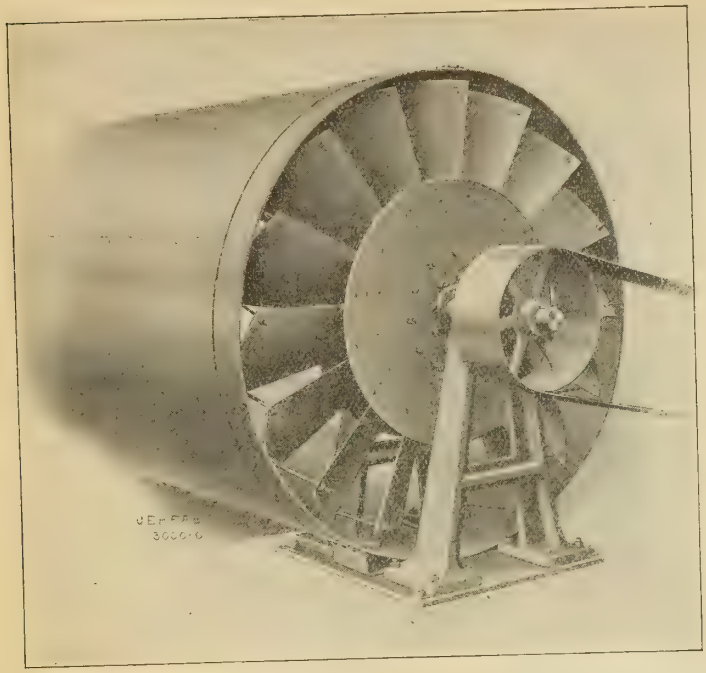
Write us for Bulletin A



CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 522, Cobalt, Ontario



Jeffrey Propeller Fan
for
Mine Ventilation

This fan is highly recommended wherever the development does not justify the installation of our centrifugal fan.

It has no equal for boosting along feeble currents in large operations.

A DISTINCT IMPROVEMENT
OVER
THE ORDINARY DISC FAN

It is self contained, simple in operation and embodies many new features which are described in our Bulletin X23, mailed on request.

WE BUILD COMPLETE COAL MINE EQUIPMENTS

The Jeffrey Manufacturing Company
COLUMBAS, OHIO, U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance Street

SULLIVAN DIAMOND CORE DRILLS



IT IS EASIER to string wires than to lay pipes or haul boilers. So there are many cases in which electricity is more convenient than steam or air for operating Diamond Drills.

Sullivan Electric Diamond Drills are made in any capacities, for either direct or alternating current. Their compactness and adaptability permit operation either underground or from the surface. Holes bored at any angle.

Catalogue 655

Air Compressors
Rock Drills
Coal Cutters

Sullivan Class "E" 300 foot Electric Diamond Drill in operation underground in West Australia

SULLIVAN MACHINERY CO.
Railway Exchange, CHICAGO, U.S.A.

Birmingham — Butte, Salt Lake — Cobalt, Ont., St. Louis — Denver, San Francisco — El Paso — Seattle — Joplin — New York, Spokane — Pittsburg, Sydney, N.S.W. — Rossland

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

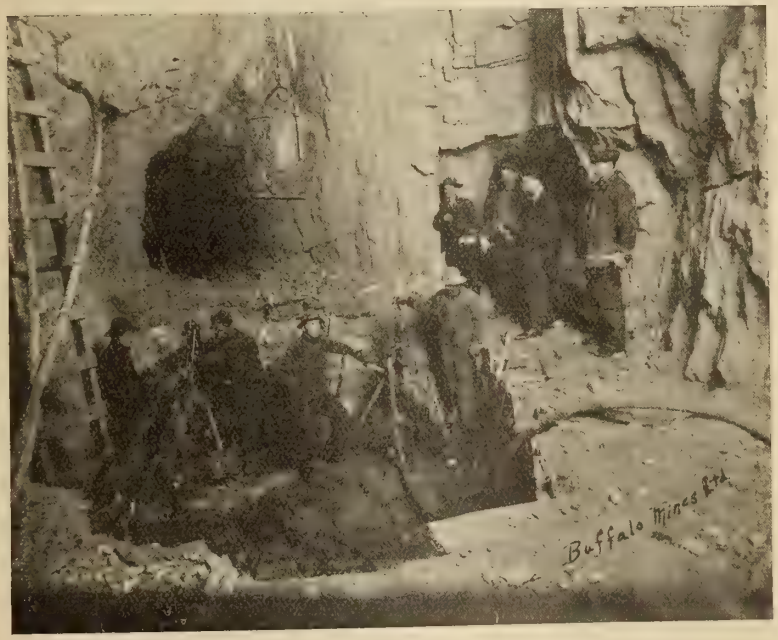
Successfully used at the following
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



RAND

"Little Giant"

Rock Drills

¶ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

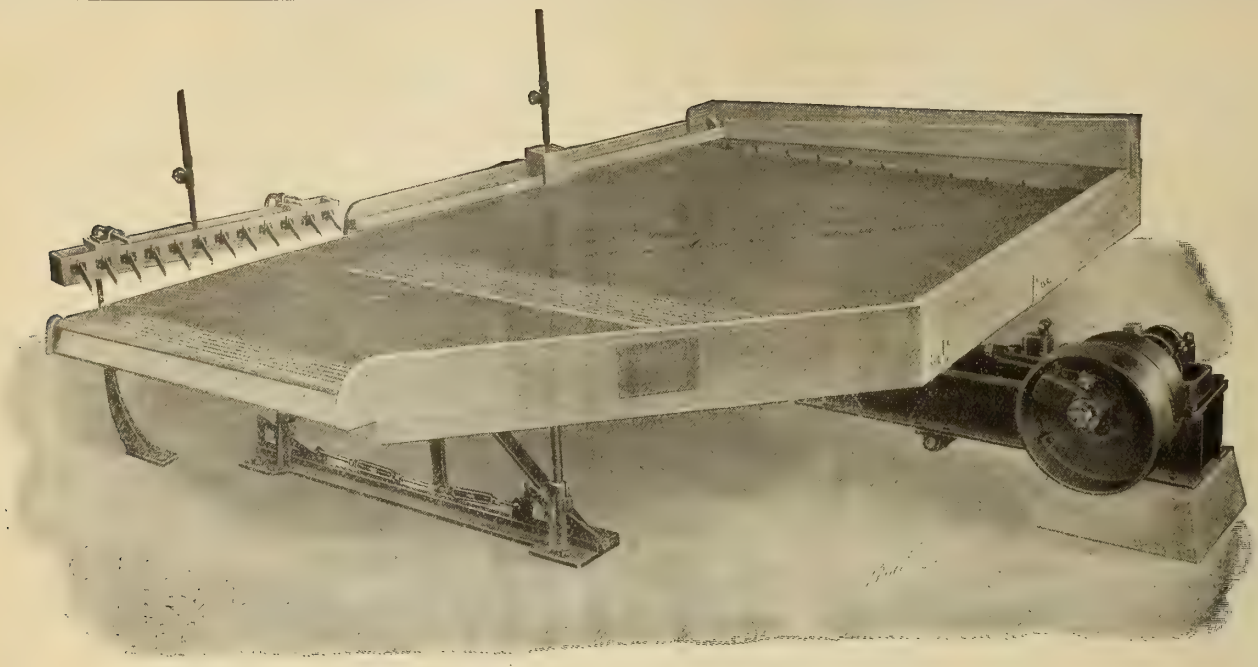
¶ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

¶ Prices and catalog on request, or ask to have one of our representatives call.

CANADIAN RAND CO., LIMITED

Montreal, Canada

TORONTO, COBALT, HALIFAX, WINNIPEG, ROSSLAND, MONTREAL.



The Improved No. 3 Deister Slime Table

Is another step forward in the concentration of slimes. Embodying the same general principles as our No. 3 table, the improved mechanical construction has enabled us, **in actual mill operation,** to make a greater saving with less attention and repairs.

EMIL DEISTER, - - Fort Wayne, Indiana

The CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have recently been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillipine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faros Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

French Cochin-China

NO DELAY IN ISSUING FULL PARTICULARS ON APPLICATION

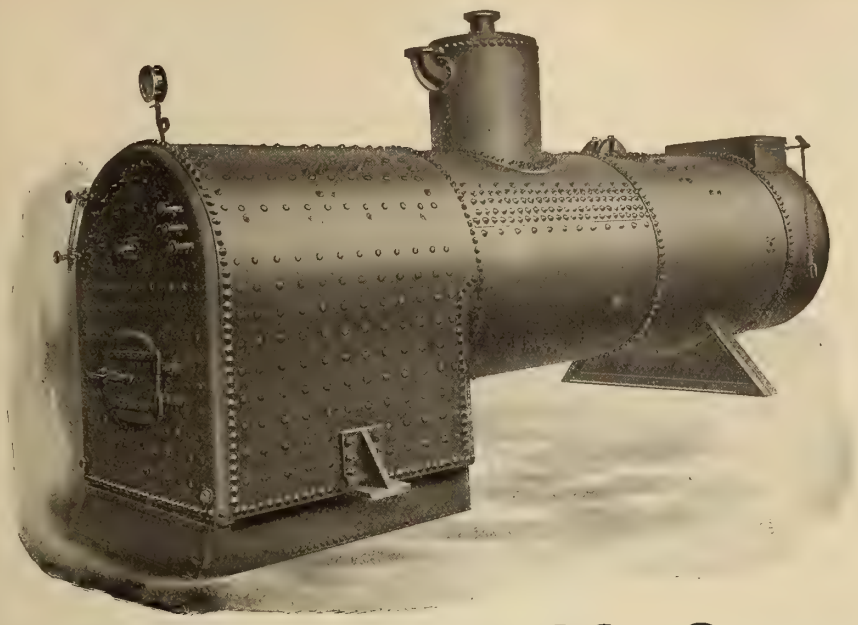
The Canadian Laboratories

Chemical and Physical tests of all Materials.

Mining properties examined and reported upon.

Write for prices for Ore analysis.

37 Melinda St. Toronto



BOILERS

Locomotive Portable
Clyde Marine
Square Fire Box Marine
Vertical
Return Tubular
Water Tube

ASK FOR OUR LIST OF
BOILERS ON STOCK WITH PRICES

THE GOLDIE & McCULLOCH CO., LIMITED

GALT, - ONTARIO, - CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.

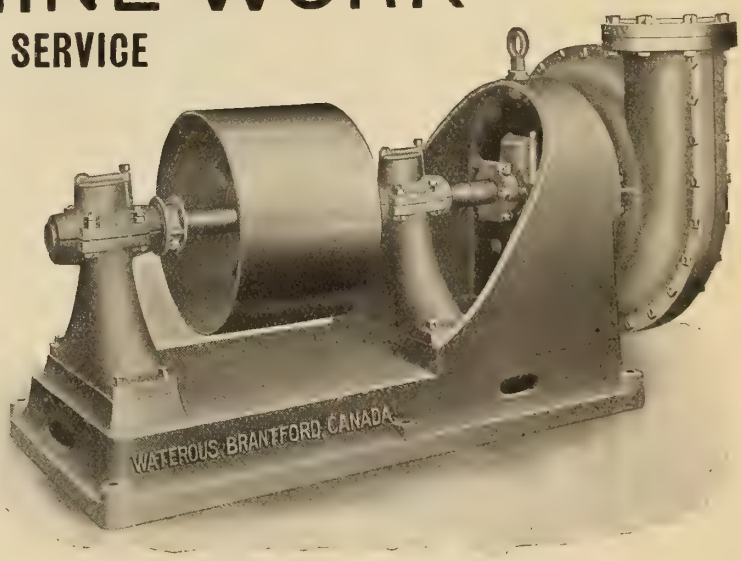
CENTRIFUGAL PUMPS
FOR MINE WORK
AND FOR ALL KINDS OF SPECIAL SERVICE

Built
HORIZONTAL and VERTICAL
For
DIRECT and INDIRECT DRIVE
In

Sizes with Discharge Opening up to 16 inches in diameter.

These pumps are carried in stock and can be supplied promptly.

Send for bulletin No. 200 for full description and specifications.

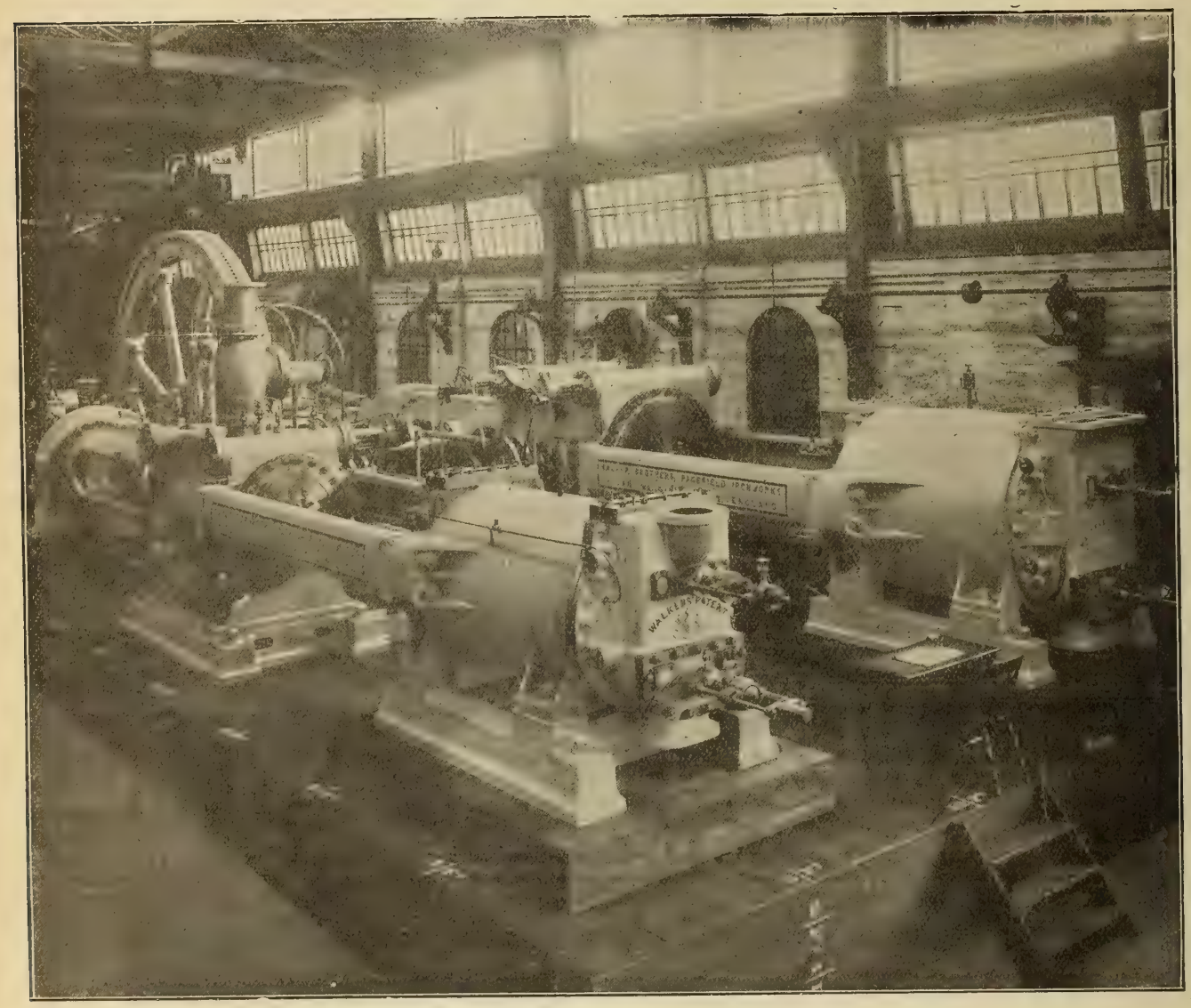


WATEROUS ENGINE WORKS CO. LIMITED

BRANTFORD, CANADA

Walker Brothers (Wigan) Limited

Wigan, England



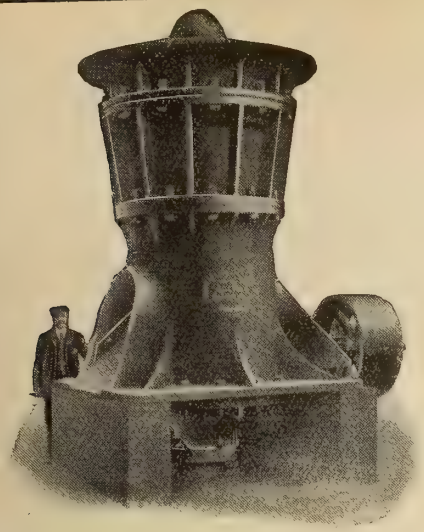
Largest Air Compressors in Canada

are of WALKER BROTHERS (Wigan) LIMITED manufacture.

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

lucluding
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF
AND ALL KINDS OF
BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President

C. A. MACPHERSON, Sec-Treas.

Bound Volumes For Sale

The book department of the Canadian Mining Journal has a limited number of complete bound volumes of the Canadian Mining Journal (including index) for the years 1907 and 1908 for sale. Anyone wishing one or both of these volumes should apply at once to secure his order. The price is $5.50 per volume or the two volumes for $10.00.

Book Department

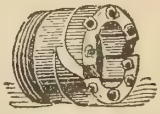
Canadian Mining Journal

313 Confederation Life Building, Toronto

We personally break all our carbons.

Goods sent on approval for selection.

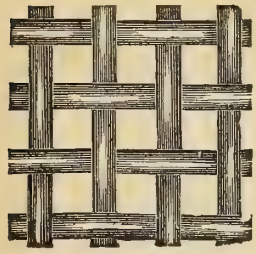
CARBON
(Black Diamonds)
and BORTZ for
DIAMOND DRILLS



S. DESSAU'S SONS
IMPORTERS
180 B. Broadway,
N. Y.

Carbon for all mechanical purposes.

Bortz for all mechanical purposes.



SCREENS

FOR MINERS AND EVERY OTHER USE.

Write for Special Catalogue.

Perforated Metals and Steel Wire Cloth

The B. GREENING WIRE CO., Limited

HAMILTON, Ont. MONTREAL, Que.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

BELLISS

Engines, Air Compressors

Ask for Catalogue.

CANADIAN AGENTS

LAURIE & LAMB

Consulting and Contracting Engineers

211-212 Board of Trade Building, MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

Aluminum Powder

Manufactured By

THE

CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

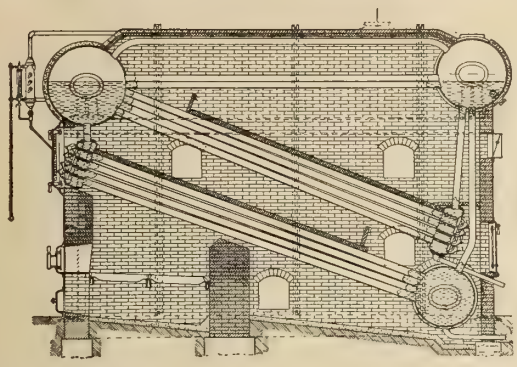
Works, Valleyfield, Quebec

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Robb Water Tube Boiler



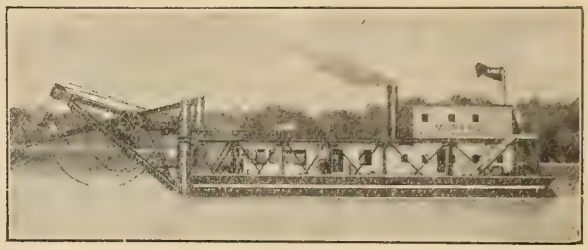
Straight tubes. Perfect water circulation.
Dry or superheated steam.
Half the usual number of handholes.

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
Calgary Block, Calgary, - -	J. F. Porter	"

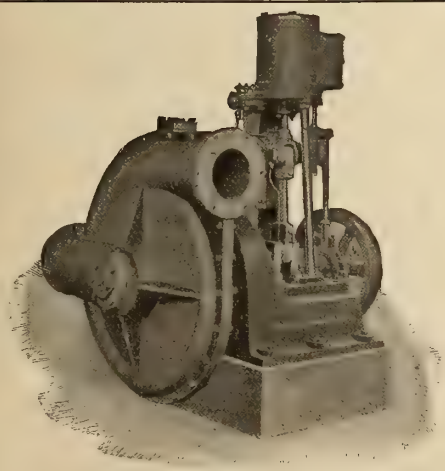
M. Beatty & Sons
Limited
Welland, Ontario
MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors' Machinery.

Sole Canadian Maker Williams "Faivrette" Clams
Agents: E. LEONARD & SONS, Montreal, Que., and St. John, N.B.,
R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.
BRIDGES
TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds
BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



Morris Machine Works
BALDWINSVILLE, N.Y.
Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

New York Office—39-41 Cortland Street

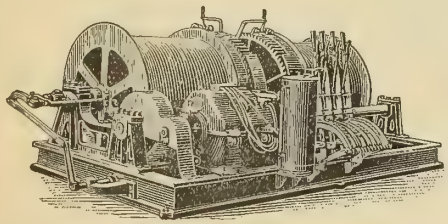
AGENCIES
Henion & Hubbell, 223-231 North Jefferson St., Chicago, Ill.
Harron, Rickard & McCone, San Francisco, Cal.
Zimmerman-Wells-Brown Co., Portland, Ore.
H. W. Petrie, Toronto, Ont.

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

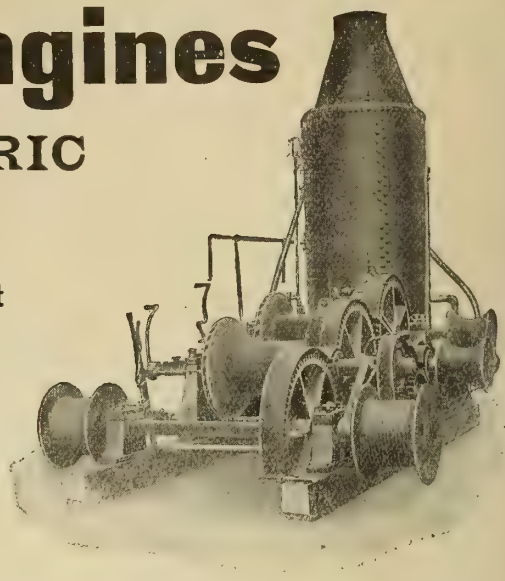
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL P.Q.

PERSONAL TUITION

Special Courses in
Geology, Mineralogy, etc.
Address: Instructor, care of
The Canadian Mining Journal, Toronto

A REAL RAILROAD

CANADIAN PACIFIC RAILWAY

The Limited Line OF Unlimited Comforts

Christmas Holiday Rates

SINGLE FARE

Dec. 24, 25, good for return Dec. 27; Also Dec. 31, Jan. 1, Good for return Jan. 3, 1910

FARE AND ONE THIRD

Dec. 21 to 25th, Dec. 28th to Jan. 1st. Good for return until Jan. 5, 1910.

BETWEEN ALL STATIONS IN CANADA

Insure a comfortable Christmas Journey by having your tickets read over

CANADIAN PACIFIC RAILWAY, ***R. L. Thompson, Dist. Pass. Agent,*** TORONTO

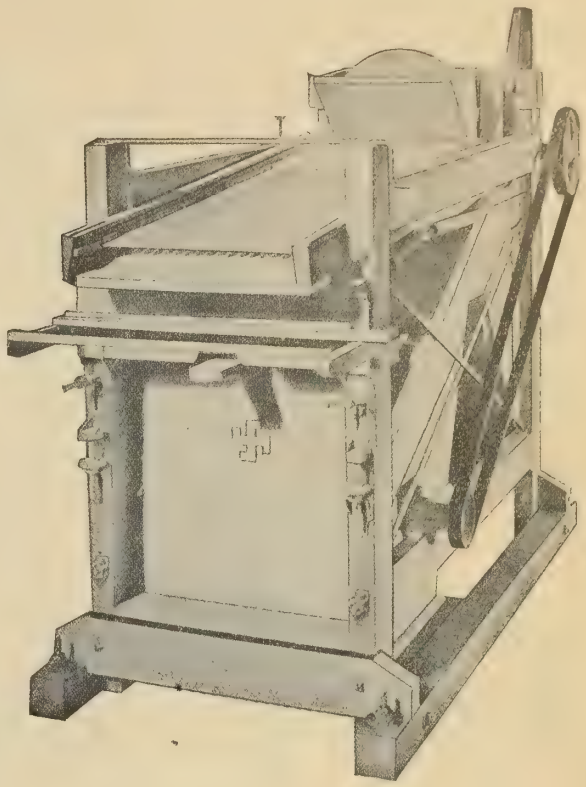
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

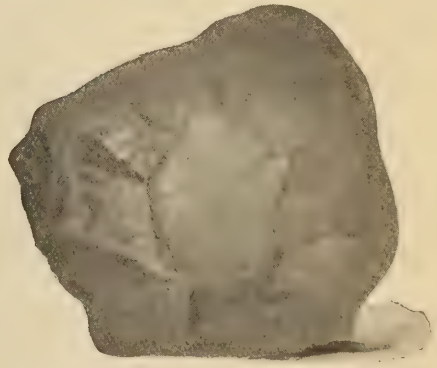
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



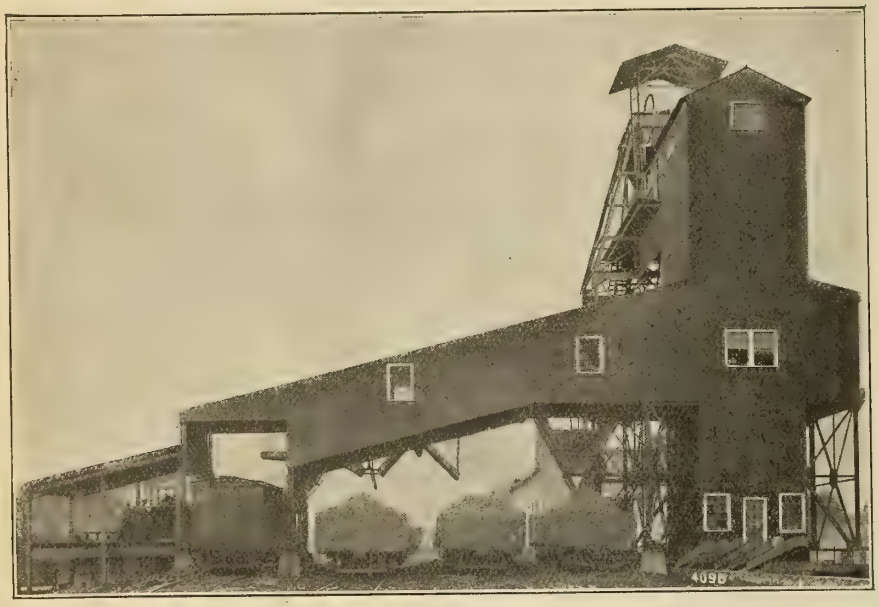
Largest carbon ever found. ¼ actual size.

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.

"LINK-BELT"

COAL TIPPLES

CONSTRUCTED OF WOOD OR STEEL



Steel Coal Tipple built for the Franklin Construction Co., Benton, Ill.
Equipped with "Link-Belt" Shaking Screens, Weigh Hopper, etc.

Our manufactures include

Conveyors, Car-Hauls, Screening Plants, Complete Washery Equipments, Box-Car Loaders, Weigh-Boxes, Etc.; Original, "Ewart" Link-Belt, "Dodge," "Monobar," "Ley," and other Chains; >FLINT-RIM< Sprocket Wheels, Small Rollers and Truck Wheels for Conveyors, Carriers and Cars.

CATALOGS

Link-Belt Company

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK, 299 Broadway
ST. LOUIS, Missouri Trust Building
NEW ORLEANS, Wilmot Machinery Co.
PITTSBURGH, 1501-2 Park Building
SEATTLE, 139-440 New York Block
DENVER, Lindrooth, Shubart & Co.

DRUMMOND, McCALL & CO.

MONTREAL TORONTO LONDONDERRY, N.S.

Wrought Iron and Steel Pipes

All Sizes and to any Pressure

Iron and Steel Boiler Tubes

Red, White and Blue Brand Mining Steel

Full stock always on hand.

Cold Drawn Seamless Steel Boiler Tubing

"KERVA" BRAND

For Stationary, Marine and Locomotive Boilers

Pressed Steel Floor Plates

Raised Diamond and Ribbed Pattern

BRATTICE CLOTH

Tarred, Airproof, also Fireproof. Quality Guaranteed. All Sizes for Direct Import.
Sample Books on Request.

LARGE STOCKS CARRIED IN MONTREAL FOR IMMEDIATE SHIPMENT

ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F). Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

1910

We shall appreciate your enquiries and orders for Assay Apparatus and Chemicals during the year 1910.

LYMANS, Limited

(ESTABLISHED 1800)

MANUFACTURING CHEMISTS

Importers and Dealers in Chemical and Assay Apparatus

MONTREAL,



RIGHT OF WAY MINE, COBALT, SHOWING BUILDINGS ROOFED AND SIDED WITH OUR ACORN QUALITY CORRUGATED GALVANIZED SHEETS.

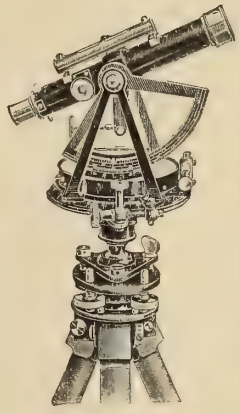
Acorn Quality Corrugated Galvanized Sheets

Satisfy every requirement for mining construction work. They are fireproof, durable and economical. Buildings may be erected more quickly by using our Corrugated Sheets than by any other style of construction.

Our ACORN QUALITY Corrugated Galvanized Sheets will stand the **British Government Acid Test** for Admiralty and other public service. This guarantees lasting service in the most trying conditions, and that is what mining men want.

We can furnish **Corrugated Leaded Sheets** and Painted Sheets for special purposes. We give prompt attention to enquiries. Write us at once for prices and information.

METAL SHINGLE & SIDING Co LTD.
PRESTON & MONTREAL

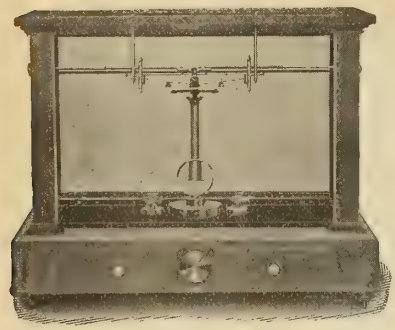


Casartelli's Improved Mining Theodolite

With Telescope and Levels, 4½-in. compass, 6-in. horizontal circle, and vertical arc, reading to three minutes. Tangent adjustments. Ball and socket motion, and parallel plates, complete in case, with set of jointed legs.

Simpler than any other instrument of equal utility. Strong, yet convenient in use, it is always absolutely precise.

JOSEPH CASARTELLI & SON
Scientific Instrument Makers,
43 Market Street,
MANCHESTER, - - Eng.



TYPE H BUTTON BALANCE

6 INCH BEAM

Sensibility 1-100 Milligram

This is an excellent balance for silver button work, having many of our latest improvements, and although moderate in price it is fully up to the standard of

THE PRECISION FACTORY

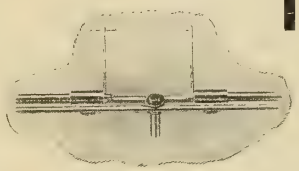
The Improved Rider Carrier, here shown, is vastly superior to the incomplete, cumbersome and badly working carrier furnished on most balances. There are no metal surfaces in contact, and all parts will work smoothly even after years of use.

Send for Catalog A-16 describing balances and weights.

WM. AINSWORTH & SONS

Denver, Colo., U. S. A.

CANADIAN AGENTS
The Chemist and Surgeons Supply Company,
32 McGill College Avenue, Montreal.
Lyman Sons & Company,
380 St. Paul St., Montreal.
B. C. Assay & Chemical Supply Company,
Vancouver, B. C.



Dominion Coal Company

Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

CANADIAN MINING INSTITUTE

NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.
Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.
The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

Springhill Coal

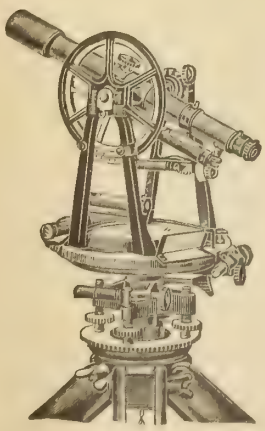
The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

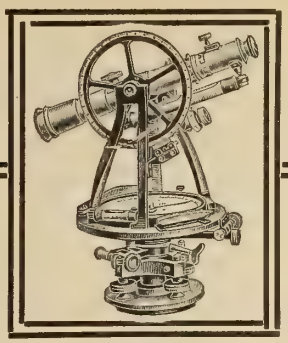
RAMPART CEMENT

Perfectly Sound. Never swells or bursts.
Reliable for all purposes for which hydraulic cement is used.
Fineness 92 per cent. through a 200 mesh sieve.
Strength up to standard specification and permanent.
Used by the leading Mining Companies of the Maritime Provinces.

Sydney Cement Co., Ltd.

Rampart Brand

SYDNEY, NOVA SCOTIA, CANADA



K & E
Engineering Instruments

The superior design, high quality of material, workmanship and finish which characterize our Surveying Instruments, account for their use on nearly every important engineering enterprise.

When in the market for a new surveying outfit, we will be pleased to quote on your requirements, as we can furnish every requisite of the engineer for field or office.

Send for our Solar Ephemeris for 1910.
Our complete Catalogue sent free on request.

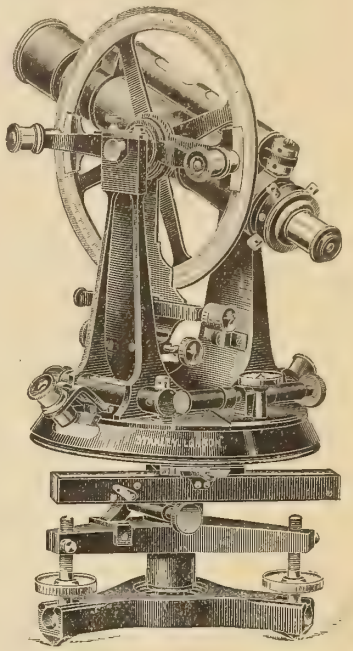
KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

STANLEY, LONDON

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our J65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK



New Pattern Transit Theodolite with Through Compass

W. F. Stanley & Co., Limited
Great Turnstile, London, England



A Happy New Year is sure if you start the Year Right. Babbitt all your Bearings with

Harris Heavy Pressure Bearing Metal

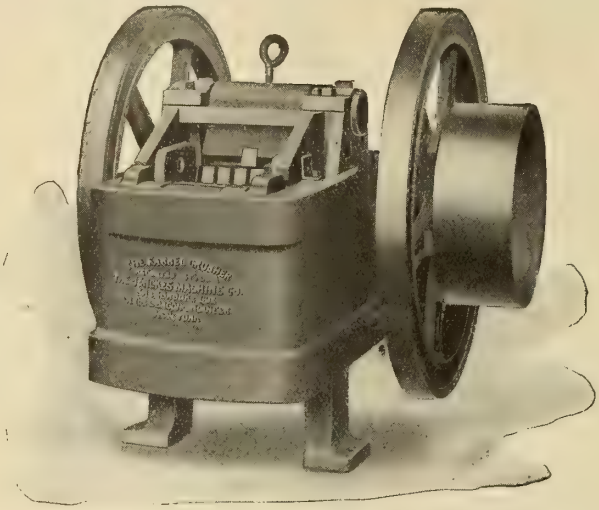
and you have Perfect Joy, Cool Bearings and a saving in Power. We make Babbitt Metal for all requirements.

The Canada Metal Co., Limited, Toronto

The Standard Jaw Crusher of the World

For either fine or coarse crushing, you will find that our Farrel-Bacon Crushers are endorsed by experts everywhere, and the favorite from the Atlantic to the Pacific.

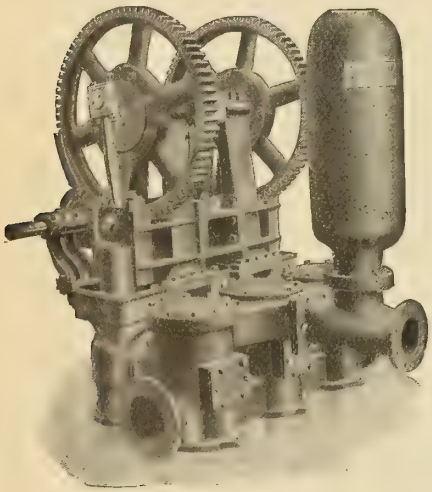
Built in all sizes, having capacities from 5 to 250 tons per hour.



Catalog mailed you on request or write our nearest Sales Office.

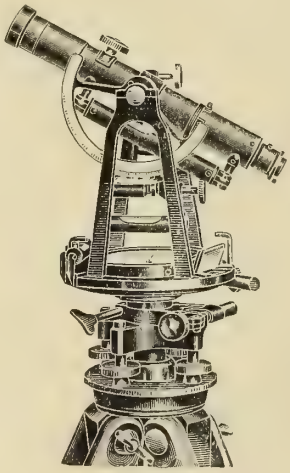
The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.



POWER AND STEAM PUMPS, CENTRIFUGAL PUMPS, ROTARY AND VACUUM PUMPS.

The SMART-TURNER Machine Co. Limited, Hamilton, Ont.



DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.
68 BEAVER HALL HILL
MONTREAL

Eugene Dietzgen Co.
Limited
10 SHUTER STREET, TORONTO



Manufacturers of
Instruments of Precision, Mining, Surveying, Mathematical. Drawing Materials.
CATALOG ON REQUEST

LUDWIG NAUEN
HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF
ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, January 1, 1910 No. 1

The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

	Page.
Editorials	1
(a) The Year 1909	1
(b) The Zinc Problem	4
(c) Inspection of Mines	4
(d) A Happy New Year	4
Review of Mining in the Province of British Columbia in 1908. By Geo, A. Ohren	5
A Primer on Explosives	7
The Extension Explosion. By E. Jacobs	8
Wolfram Mining and Smelting Co., Limited	9
Our London Letter	10
Testing Safety Lamps, by Jas. Ashworth	12
The United Mine Workers in Nova Scotia During 1909	13
Exchanges	15
High Power, Direct Current, Centrifugal Mining Pumps. By Frank C. Perkins	16
The North Thompson Valley, B.C., by J. C. Gwillim	17
The Electrochemical System of Amalgamation and Cyanidation, By Elmer E. Carey	18
The Zinc Mining Industry in British Columbia	20
The McCharles Prize	22
South Lorrain	22
Personal and General	22
Book Reviews	23
Correspondence	23
Special Correspondence	25
General Mining News	27
Mining News of the World	29
Company Notes	30
Statistics and Returns	30

THE YEAR 1909.

A Review.

When, one year ago, we reviewed the growth of Canadian mining during the previous twelve months, we expressed the belief that the year 1909 was to be a period of strong expansion. Events have proved this belief to have been well founded. The past year has brought health and strength to almost every department of mining in the Dominion. Indeed, the commercial and financial conditions have been excellent; and rich accessions, in the way of new mining territory, have been added to our stores of mineral wealth. As a nation, Canada looks forward to the coming year not only without misgivings but with sturdy confidence. Never before were the prospects so good for the industry that we represent; and, most certainly, never before have the people of Canada been so widely interested in that industry. For the past year we have much for which to be thankful; that the dawning year will bring us more is, humanly speaking, certain.

We shall survey now the salient points in the history of each mining Province during 1909.

Nova Scotia.—Beginning with Nova Scotia, the events that centred round Glace Bay first command attention. Whilst early in the year all things pointed to a heavy shipping year for the Dominion Coal Company, even then a cloud, the size of a man's hand, had gathered in the horizon. The intention of the United Mine Workers of America to paralyze the company's business by precipitating a strike at the opening of navigation was rumoured. The strike became an accomplished fact in July. The U.M.W.A. prepared its campaign in a manner peculiar to itself. Throughout the United States, for instance, it worked upon the sympathies of its adherents by disseminating grotesque fictions as to the conditions of labour at Glace Bay. To its followers in the employ of the Dominion Coal Company, it held out promises equally grotesque. But the U.M.W.A. made a sad mistake in underestimating the strength of the local Provincial Workmen's Association, a body that the foreign organization had resolved to disrupt. After a few months of costly and absolutely needless "strike," the U.M.W.A found itself in a humiliating position. By its own action it had given assured and lucrative employment to the members of its rival, the P.W.A.; and, after depriving two or three thousand of its own followers of work, it was quite unable to assume the responsibility of supporting them. The outcome was inevitable. After a period of light shipments, the Dominion Coal Company gradually resumed its normal outputs. This was made possible by the fact that throughout the strike the leaders and men

of the P.W.A stuck fearlessly to their colours and refused to be dominated by imported demagogues.

Throughout the year the U.M.W.A. succeeded in shutting down several coal mines, including the collieries of the Cumberland Railway and Coal Company. In no sense, however, was the agitation finally successful. The net effect was a loss to the Province, to the companies, and, especially to the miners, of several millions of dollars. While the experience has been expensive, we have no hesitation in stating that the the U.M.W.A. has lost its hold upon Nova Scotia. And for this blessing hardly any price is too high.

That long-desired consummation, the amalgamation of the Dominion Iron and Steel and Dominion Coal is now assured. The legal victory of Steel over Coal led, by perceptible degrees, to this momentous step. This victory, the consequent improvement in Dominion Steel finances, the re-organization of its huge plant, together with a successful year, helped to balance matters. From geographical and industrial reasons the two concerns were always intended for each other. May the union prove fruitful.

Gold mining in Nova Scotia has not yet been galvanized into life. The whole Province outputs scarcely as much as comes from a few Rhodesian prospects; and this despite ideal working conditions, favourable legislation, and extensive unprospected territory. On this subject we shall touch in a later editorial. We shall, however, record here our conviction that the gold mines of Nova Scotia, maugre all reports to the contrary, will repay proper investigation.

At this date official returns as to iron ore, gypsum, limestone, etc., are not available. But indications point to a sustained output in all minerals save coal. The falling off in this commodity is due entirely to the action of the U.M.W.A.

Nova Scotia's present needs, from the point of view of mining, are, firstly, the services of a competent, commercially-trained mining geologist; secondly, discriminate publicity; and, thirdly, a complete diagnosis of the present condition of its mining industry generally by a commission of unimpeachable specialists.

New Brunswick.—Except for gypsum and limestone quarries, and a light production of coal, New Brunswick has hardly qualified as a mining province. The iron deposits of the Canada Iron Corporation, Ltd., are to be a large asset. Antimony mining, recommenced this year on a small scale, has been suspended temporarily. Near Moncton, gas and oil prospects, under the management of English interests, are showing up encouragingly.

Indifference to her mineral wealth is the prime cause of New Brunswick's backwardness. A well-organized Bureau of Mines is badly needed.

Quebec.—Quebec has been the scene of many changes. The organization and flotation of Amalgamated Asbestos, which embraces under one administration the bulk of the chief asbestos-producing mines, have been sufficiently commented upon. The excessive capitalization of this consolidation will require to be offset by close technical management and by comprehensive marketing facilities. Black Lake Consolidated, a consolidation of several asbestos mines that are not at present producing, has been favourably reported upon as to ore in reserve and ore indicated.

The erection at Lachine of a large plant for the manufacture of finished asbestos products, marks a departure. This will assuredly bring about an increased demand.

The mining of mica has been quiet. For chrome ore the market has been sporadic.

The attempt to create interest in alluvial gold in Eastern Quebec appears to have been but a flash in the pan. Of silver in the Ville Marie district it is hard to obtain definite news.

The Province of Quebec, since the resignation of Mr. J. Obalski, has been without a technical officer in the local Department of Mines. Good men are scarce, but they are obtainable. The man to fill Quebec's requirements must have special knowledge of the land and of the people. Also, unless his energies are to be unprofitably dissipated, he must have a corps of assistants. The late changes and amendments in the Quebec mining laws give the prospector and investor a much better chance. But the public require more authentic information as to the whole Province. A strong Department of Mines is, therefore, a pre-requisite.

Ontario.—The mining industry of Ontario is waxing fat. Cobalt has contributed about twelve million dollars worth of silver during the year, and has abated not a jot or tittle of her vigour. South Lorrain is coming to the front. Gowganda, wounded almost mortally by over-capitalization, still shows signs of life. The Elk Lake region is holding its own. To the west and south of Gowganda, many new prospects await development. Cobalt money has been invested in one or two of the old Thunder Bay mines—not unwisely. The cobalt-silver smelters are all doing well. On the whole, the outlook for silver is most hopeful.

Ontario gold-mining, always an uncertain quantity, has received a decided fillip. The reports that come from Porcupine, north-east of Cobalt, are, to say the least, very interesting. Although opinion must be based upon insufficient data, there seems to be reason to regard the Porcupine region as one of exceptional promise. Wide ore-bodies, in which are spectacular superficial showings of gold, have been stripped. Men who have made their money in Cobalt are buying claims at fancy prices and, strange to relate, one English concern is already on the spot. This is as enterprising as it is exceptional.

The mining of iron-ore is progressing slowly. Several large purchases of mines and prospects have been made in Eastern Ontario, and a number of smaller

transactions have been arranged in the western ranges. At least two new blast furnaces will be put in commission during 1910.

Copper and nickel, as usual, form the backbone of Ontario's mineral production—although, to make the figure apposite, silver will have to be compared to some more important part of the Province's anatomy, possibly the heart and lungs.

We cannot here do more than mention a few of the other minerals of the Province. Mispickel, iron pyrites, talc, marble, feldspar, and corundum are the bases of growing industries. The decrease in oil production is counter-balanced by an increase in the supply and use of natural gas. The clay and cement industries are thriving.

As a whole, mining in Ontario is in good shape. Its mining administration, though by no means inerrant, is honest. Its mining laws, complicated to a most exasperating degree, must soon be revised and simplified. But not even the most wretched laws can stem the tide of prosperity that has set in.

Alberta.—The coal-mines of Alberta, from all indications, will have produced considerably more coal during 1909 than during the preceding year. And this despite the strike of the miners employed in the southern part of the Province—a strike that for a time embarrassed copper smelters in south-eastern British Columbia.

The plans of the German Development Company, and of several other large concerns, are maturing. When railway connections shall have been completed, Alberta's coal output will rapidly assume proportions incomparably larger than its present production.

Exploration for natural gas, particularly at Bow Island, has developed large flows. Oil has not been encountered as yet.

British Columbia.—Our westernmost Province, British Columbia, is dealt with preliminarily on another page. The events that stand out with prominence may, however, be noticed here. In the Boundary country, copper smelting has made headway. Although the total tonnage for the year will be lessened by the fuel shortage that affected the British Columbia Copper Company, and by the suspension of work at the mines of the Dominion Copper Company, yet the activities of the Granby and of the Consolidated mining and smelting companies helped to fill the gap. Dominion has now been reorganized and is in operation. Granby has increased its furnace capacity considerably, and Consolidated Mining and Smelting is handling more ore than ever.

Rossland gold-copper mines are in good condition, although shipments have dropped as compared with 1908. Sheep Creek gold-mining is coming to the front. Considerable capital from London and from Montreal has found its way into the camp.

Renewed activity has been observable on the Queen Charlotte Islands and in the Portland Canal district.

Zinc mining will probably take a new lease on life as a result of the Convention held at Nelson on Dec. 15th. Concerted action of this kind is infinitely more effectual than is the advocacy of any number of individuals.

On the coast, coal outputs have increased. To the east, the Crow's Nest Pass Collieries are getting into normal condition. Other collieries have had fair seasons.

British Columbia is yet pre-eminently the mining Province of the Dominion, mainly because of a measure of co-operation amongst mine-managers and because, also, of a lively appreciation on the part of the Local Government of what successful mining means to any country.

Yukon.—Sufficient evidence is already to hand to prove that the gold returns from the Yukon for 1909 will exceed those for 1908 by a considerable quantity. The cheap electric power, generated at a colliery 43 miles north of Dawson, is now available. This will bring into the category of payable propositions much untouched placer ground. The achievement of Yukon Gold, which company succeeded in getting a flow of water in its fifty-mile long ditch, is worthy of record. The approaching dividend on Yukon Gold shares, incidentally, may be an isolated occurrence. Shareholders should enquire carefully into costs and reserves.

Technical Education.—Following the example of Nova Scotia, Quebec has adopted measures to provide useful technical training for the rising generation. New Brunswick lags behind. Ontario's elaborate system needs modification. The western Provinces are evolving institutions of their own. We rejoice to notice that the subject of technical training is engaging the thoughts of several members of the House of Commons.

Conservation of Natural Resources.—Canada's new sense of nationhood has broadened her in several directions. It has opened her eyes to the advisability of following the lead of other nations in conserving her resources. Our Federal Government is wisely looking into problems of forestry and kindred questions; but, so far, no steps have been taken to apply the principles of conservation to mining. This will and must come.

Legislation.—Two Provinces, Nova Scotia and Quebec, have effected notable changes in their mining laws. In both cases the changes have been improvements.

A Select Standing Committee of the House of Commons deliberated during last session on subjects pertaining to mining laws. Little was accomplished. More is hoped for this year, especially in the direction of codifying a Dominion mining law and placing the administration of that law in competent hands. The present situation is intolerable.

Departmental.—The two branches of the Federal

Department of Mines, the Geological Survey and the Mines Bureau, have grown in grace in the past twelve-months. The Survey, being the parent stem, is, of course, superior in organization, larger in scope, and incomparably more important than the newer limb. But to each credit is due. Publications have been improved. Work has been systematized, and much will be expected of both branches during the coming year.

THE ZINC PROBLEM.

The mining convention, held in Nelson, B.C., on December 15th, should be fruitful of good. On another page is given extended notice of the proceedings. A few general points require discussion.

The convention was called for the purpose of defining the present condition of zinc ore mining in the Kootenays, and to formulate a memorial to the Dominion Government setting forth the needs of the industry..

The present annual production of zinc ore in British Columbia is small and uncertain. The electric smelting plant at Nelson has failed to produce the metal on a commercial scale. Hence the market must be found in the United States.

But the annual consumption of zinc and zinc products in Canada represents an outlay of nearly eight hundred thousand dollars. Much of this material is imported from the United States. Practically none of it is manufactured in Canada.

The metallurgical treatment of the lead-zinc and other zinc-bearing ores of southeastern British Columbia is the crux of the question. Could this be solved, British Columbia could readily supply the whole of Canada and, probably, compete in foreign markets.

Recognizing this, the convention memorialized the Dominion Government, requesting that the Federal Mines Branch be authorized to undertake the investigation of the electro-thermic reduction of zinc ores.

For several reasons it was thought that to ask assistance in the shape of a bounty would be impolitic. In the first place, the zinc-smelting industry is not yet established; secondly, a clause in the Payne tariff provides for the imposition of additional duties against goods produced in other countries under a system of bounties.

While it was suggested during the meeting that the plant of the Canada Zinc Company, at Nelson, might be put at the disposal of the Mines Branch for experi mental work, it was clearly understood that the Canada Zinc Company, as a company, had had nothing to do with bringing about the convention.

A strong committee of five has the whole matter in hand. Funds have been raised to defray expenses; and there is every appearance of earnestness about the movement.

We endorse most heartily the request embodied in the memorial. The Dominion Government can, and, no doubt, will, come to the aid of the Kootenay operators. The Mines Branch has never been called upon by more responsible men. Its services are needed. It has a splendid opportunity of proving its usefulness.

"INSPECTION OF MINES."

Our attention has been drawn to the fact that a sentence in one of our editorials, November 1st, is open to misconstruction. The sentence occurs in an editorial headed "Inspection of Mines." It reads thus: "So long as inspection is left entirely to provincial officials it will be neither adequate nor effective."

Isolated from its context, this sentence might be interpreted as a harsh criticism of our various provincial inspectorates. This we did not intend. The editorial in question referred specifically to inspection of coal mines, and to the need that exists of the co-operation of the Dominion Department of Mines.

As regards the inspection of our metalliferous mines, and we now refer particularly to Ontario, the only criticism that we can make is that there is not enough of it. What there is of it is surprisingly effective. But the Ontario Government is slow in appreciating the situation. Its one inspector has given intelligent, devoted and constant service for four years. The results of his labours are shown in largely decreased death-rates amongst mine employees. With a small staff of deputies, the Ontario Inspector of Mines would be at liberty to attend more closely to the higher phases of his duties.

This, we hope, will appeal to the common sense of Ontario's not unintelligent administration.

A HAPPY NEW YEAR.

To our readers we extend the season's greetings. We hope that during the year 1910 each will arrive closer to the desire and purpose of his days. Further, we hope that every day of the New Year will bring some new delight.

Dr. Ludwig Mond, one of the most notable figures in modern industrial chemistry, died in London, England, on December 10th. Canadians will remember Dr. Mond more particularly for the process of copper-nickel reduction and separation of which he was the inventor.

REVIEW OF MINING IN THE PROVINCE OF BRITISH COLUMBIA IN 1908.

By George A. Ohren.

The calendar year 1909, in all its varied aspects, now lies behind us. The interesting sequence of events that have transpired in the growing mining industry of British Columbia at this moment but remain a mere matter of history; these events having their influence upon the future, of course, but, nevertheless, being relegated to the dead past. Part of the general scheme of advancement, looked forward to as the year was ushered in, has become a realized fact; many expectations that were sanguine during the early months have been hopelessly shattered. Horizons that then appeared nebulous and cloudy have since cleared and brightened, and despite the several little retrogressions in some quarters the year was fraught with the elements of progress and it can be truthfully said that another step forward has been taken.

In the Boundary, the premier mining district of the Province, substantial advancement was looked for during 1909. While some of the marks of progress, outlined at that time, have been duly passed, others are still lying before us in the impending future. The disabling of the electric power system that supplies the mines, by the cold weather of early January, caused somewhat of a set-back. The strike of coal miners in Southern Alberta was the occasion of a grave depression in the tonnage shipped from the mines of the B. C. Copper Co. for nearly four months. Activity in the affairs of the Dominion Copper Co. was mostly confined to reorganization and untangling legal knots, and little or no work was done on the mines until near the last of the year, when diamond drill exploration was started on the Rawhide, the leading mine controlled by that company.

The Granby Consolidated M. S. & P. Co., taking advantage of the low price of copper, augmented, in turn, each of its eight big furnaces at the Grand Forks smelter. The last furnace was completed and blown in during the early part of December. The furnaces were lengthened from 18 to 22 feet and made four feet wider. This increased the capacity of the smelter from 3,500 to 4,500 tons per day. The lately completed convertor plant has a capacity of 40,000,000 lbs. copper per annum. The total receipts of the Granby smelter in 1908 amounted to 1,049,670 tons, and the receipts for the year 1909 will just about equal or slightly surpass these figures. A 2% dividend was paid in December. The management of this company has not tried to make an extraordinary year's production, but has worked along on a sane basis and taken steps to improve conditions for times when metal prices will be stronger.

Although the mines of the British Columbia Copper Co. were closed down for several months on account of fuel shortage, the ore shipments from its mines to the company's Greenwood smelter will total approximately the figure of 1908, or about 360,000 tons. A change in the mine management took place October 1st, when P. S. Couldrey, erstwhile manager, Le Roi 2, Ltd., Rossland, took charge. The ore shipments were noticeably heavier shortly after this change. On the Oro Denoro mine operated by this company, extensive development work was done and much ore located.

The Consolidated Mining & Smelting Co. of Canada, Ltd., operating the Snowshoe-Phoenix Amalgamated, will ship over 100,000 tons more from the Snowshoe in 1909 than during the previous year. A tramway has been built on the Amalgamated and the railway spur will soon be completed, so that the output for this group in 1910 will be record-breaking.

The Greenwood-Phoenix tunnel was driven a couple of hundred feet; the Argo tunnel, at Greenwood, is in nearly 300 feet, and one 20-inch galena vein cut. The Sally shipped 130 tons of $125 ore. The Golden Eagle sent 330 tons to Grand Forks smelter. The Bruce mine shipped 210 tons, and the Crescent 20 tons of select ore: Little Bertha, 30 tons.

It will be seen that had the Dominion mines shipped an average tonnage and the B. C. Copper Co. not been compelled to shut down, that the total output of the Boundary would have greatly exceeded that of 1908, but, as it is, the matter has been deferred, and with the new equipment of the Granby smelter it will be possible in 1910 to exceed all past records, which will easily be the case if things in general are only normally favourable.

While the Great Northern Railway Company pushed its branch as far as Princeton in the Similkameen during the past year, this move did not lead to the shipping of ore that will likely take place in 1910. The Nickle Plate mine was lately bought by a New York development syndicate, new machinery added to the old plant, and extensive production for next year is planned. The Vermilion Forks M. & D. Co. has opened up its coal mines and will produce on a moderate scale from the present. The Kingston, Golden Zone, Number Four, and Bear Creek mines were under development all year.

In the Rossland gold-copper district, the Consolidated smelter and refinery at Trail will show an increase of nearly $1,000,000, or approximately $6,000,000 in production of gold, silver, copper and lead, over 1908. An addition to the refining plant was made during the year and a new copper furnace put to work. At the Centre Star-War Eagle group of the Consolidated M. & S. Co. of Canada, Rossland, the ore production for 1909 will approximate 175,000 tons, 10,000 or 15,000 tons below 1908. The company acquired the City of Spokane, Mugwump, and other mines contiguous to the Centre Star during the year and has a large reserve of ore. The production of the Le Roi 2, Ltd., will also fall a few thousands below 1908, but this is not surprising as the main shaft was retimbered and sunk from the 950 to the 1,350 level. This concern paid six shillings ($1.44) per share in three equal dividends during the year, and it is expected will pay another two-shilling dividend from the net profits of 1909. As the Le Roi mine was not shipping from the middle of March until the last week in October, the output of that mine this year will only total about 10,000 tons. The property was inactive for nearly five months while

a plan of development and financial policy was being outlined in London. Two diamond drills are at work as the year closes, probing the ground from the 1,650-level downward—possibly the work will be extended to the 2,650-level. A crew of about 80 men is at work, and mining and shipping on a small scale going on. Several of the smaller mines were worked under lease during the early months but with indifferent success. It is to be hoped that 1910 holds better things for this camp than 1909 did, but the outlook is none too bright just now, taking the camp as a whole. Rossland shipments will fall nearly 100,000 tons below 1908 for the past year, or approximately 200,000 tons, that would probably average close to $11 per ton.

The Sheep Creek gold district, near Nelson, is principally responsible for an increase in Slocan-Kootenay shipments of about 50,000 tons of rather high-grade. The quantity of ore mined and sent to concentrator and smelter during 1909 will figure, roughly, 350,000 tons, whereas for 1908 the total was about 295,000 tons. The big Blue Bell lead-zinc property doubled its output, milling 46,000 tons. The big St. Eugene silver-lead property of the Consolidated held its own, but has lowered its ore reserve by nearly one-third. The Silver King, at Nelson, was operated from April until shut down by fire in August, resuming shipments in November. In the Slocan the Richmond-Eureka and the Van-Roi took a more stable position on the shipping list. It was in the Sheep Creek-Ymir district, however, that substantial tonnages were taken from the Queen, Nugget, Kootenay Bell, and Yankee Girl. The Second Relief also doubled its previous yearly output. Steps are being taken to place the growing zinc mining industry of this district on a more substantial basis. Government aid will be invoked toward experimental work, a bounty on zinc mined will be sought and a higher tariff advocated on manufactures of zinc now coming into this country. The bounty now existing on lead mined here has been a great stimulus to the industry, and it is thought the fostering of the zinc industry would tend to open large mines now idle and help the smaller mines. It would probably solve the great object in the zinc question here, and that is a commercial zinc smelter in this district.

In East Kootenay the Sullivan group was taken over by a new company, the Fort Steele M. & S. Co., during the year, and while there were many rumours of the resumption of work active operations were not begun. It is likely, though, that work on this big lead-zinc mine will be started early in 1910.

It was in the coal fields of this district that good progress was made during 1909, although the tonnage shipped may not surpass that of 1908 by very much. The Crows Nest Pass Coal Co. operated almost without interruption during the year, erected a new 3,000-ton tipple at Michel and installed two high pressure (1200) and one low pressure compressors. Also began the installation of another 1,000 coke ovens. The Hesmer Mines (C.P.R.), capacity 3,000 tons per day, also made a substantial output. The Corbin Coal & Coke Co., Corbin, installed a high pressure compressor, boilers, air locomotives, etc., and maintained a small output, which will be materially increased in 1910. The McGillivray Creek Coal Co., near Coleman, opened up its property and spent over $200,000 on tipple, buildings, and plant, and will show a good output for next year. The output of the International Coal & Coke Co., Coleman, will be somewhat reduced on account of the three months' strike of its miners. As it is, the figures will be about 390,000 tons of coal and 53,000 tons of coke. Two 7 in. x 14 in. compound air locomotives were added to the up-to-date plant of this company during the year.

The Canadian-American C. & C. Co., Frank, shipped approximately 100,000 tons of coal and will begin the production of coke in 1910. The West Canadian Collieries was also affected by the strike and the output reduced over twenty per cent. A new compressor plant was installed at the Bellevue mine of this concern. The Alberta Ry. & Irrigation Co., Lethbridge, shipped nearly 3,000 tons per day, excepting through the strike; opened up No. 5 mine and equipped it with steel tipple, 3,384 cu. ft. compressor, etc. At the Royal mine a 14 in. x 22 in. compressor and 14½ in. x 20 in. hoist were installed, and an output of about 300 tons per day maintained. The Nicola Valley C. & C. Co., Merritt, kept up a good output and installed a new air compressor plant, to be used for operating coal cutters, engines, etc.

So it will be seen despite the strike the coal output this year will be a good one and several new substantial mines have been opened up and equipped with modern machinery, ready for a heavy production in 1910.

In the Kamloops copper camp, a little work was done on three of the leading properties; and the B.C. Copper Co. bonded 33 claims on which it is expected development will be begun in 1910.

On the Coast the mines have not prospered as they should have and mismanagement is blamed for a lot of trouble. The Tyee Copper Co. is reported in considerable debt. The Vancouver Island coal properties have made a big production and the South Wellington mines have entered the market.

In the Portland Canal district the Red Cliff has ordered an air compressor, boilers, and mining plant, and will be a shipper in 1910. The Stewart and Portland Canal M. Co. properties are showing up well and will install plants in the Spring. The Consolidated M. & S. Co. of Canada has secured the Ikeda copper property, Queen Charlotte Island; the Granby Consolidated M. S. & P. Co. is interested in the contact group, in the same district and it is rumoured that the Le Roi and Le Roi 2, Ltd., are negotiating for copper claims of a promising character in the island mining districts, and will likely operate on the Coast during the coming summer.

The second section of the G. T. P. Ry, is being built up the Skeena River toward Hazelton, within a radius of 100 miles of which place are to be found the promising Telkwa (copper-coal), Babine (silver-lead), and 9-mile mountain (silver-lead), mining districts. Extensive development was carried out in these districts during the past year. The country is rich in mineral wealth. The third section of the G. T. P. Ry. is building from Yellowhead pass, westward. The Provincial government is behind a move to aid the Canadian Northern railway in building from Vancouver to Yellowhead pass. The G. T. P. Ry. is planning a branch from near Yellowhead pass to Vancouver. These railways will open up a country rich beyond comprehension in mineral wealth, including the famous Cariboo gold district. The extension of the C. P. Ry. from Midway to Nicola and of the C. N. Ry. from Princeton to Vancouver, will give the boundary two outlets to the Coast within the next year or so.

The total mineral production in British Columbia during 1908 was $23,851,277 and there is little doubt but that these figures will be exceeded in 1909. The total recorded production from 1852 to 1908 was $323,377,559, in annual figures that have increased year by year, although there was a reduction in 1908. B. C. coal deposits

are among the most extensive in the world and work has hardly been begun on them; there are big iron deposits awaiting development. The province still contains practically 300,000 miles of unprospected territory.

There is now a movement to better the zinc mining industry here, one thing asked being higher duty on zinc manufactures entering Canada, tending to encourage Canadian manufacture of zinc. The revision is upward and the consumer will have to pay for it. It seems to rest upon the United States, being the larger manufacturing country, to start reciprocity between the two countries. Of course, this is a question that can be argued from many a different point of view, but from that of a miner, in the final analysis, the boundary line, the tariff wall, red tape, etc., are a costly and inconvenient necessity (?) and it would seem more desirable to work toward reciprocity than away from it.

As far as the coal fields are concerned, reciprocity with the United States would no doubt be beneficial if they had more complete railway connection with that country, independent of existing roads; but until such time as this is the case, the main competition is with coal shipped in via the Great Lakes.

To sum up, it will be seen that the ore shipments from the boundary and Sheep Creek districts have increased, while the Rossland shipments have dropped; the net increase running over 100,000 tons. The coal fields will just about equal, or slightly surpass, the shipments of 1908, but have made unprecedented progress in the way of development and preparation for future work. Railway development has been all that could be asked for. The Portland Canal, Queen Charlotte Islands and Rabine-Telkwa districts have received the attention that is due them from the mining interests and much development work done. Taking everything into consideration, the production has been conservative and the work progressive and along the lines of good mining practice. The industry will show a far better balance sheet than was that for 1908 and another stone has been built into the foundation that is to support the better things to come in 1910 and in other years that are yet enveloped in the womb of time.

A PRIMER ON EXPLOSIVES.

The United States Geological Survey is about to issue a "Primer on Explosives" as an aid to the coal miner in particular and also to all who handle explosives. J. A. Holmes, expert in charge of the mine accidents investigations of the Survey, gives the purpose of the primer in the following words: "Of the common causes of the larger mine accidents, such as the falls of roof and coal, gas and dust explosions, mine fires, and the misuse of explosives, all of which are often closely related, each must be studied and fought in a manner peculiar to itself. The last mentioned—the misuse of black powder and other explosives—is sometimes considered the least important of these causes of mine accidents; but its importance is much greater than the statistics indicate, for the reason that this misuse of explosives may itself be the cause of many of the mine fires, gas or dust explosions, or falls of roof, and thus be responsible for a death roll often credited to other causes.

"The use of explosives is increasing both in quantity and in the variety of purposes to which they are applied. They are now made at no less than 150 plants in different parts of the United States, and the annual product approaches 500,000,000 pounds. Of all this material there is no such thing as a safe or safety explosive when in the hands of a careless or ignorant person. This statement is true whether considered in connection with the transportation or use of these explosives in mining. In addition to the large losses of life and property resulting from an improper use of explosives in mining, the recent statistics of the Railway Bureau for the Safe Transportation of Explosives have shown more than 400 persons killed or injured and over $2,000,000 worth of property destroyed from accidents from this source. The fact that through co-operative effort under the wise supervision of this bureau during the three years of its existence these losses have been reduced to almost nothing should encourage the hope that similar co-operative effort may likewise greatly reduce losses of life and property from the use of explosives in mining.

"This little book on explosives is published in the hope that it may aid in accomplishing this purpose. The aim has been to tell what explosives are and how they should be handled with a view toward greater safety, and to do this in language free from unnecessary technicalities. It has been prepared by Charles E. Munroe, explosives expert, and Clarence Hall, explosives engineer, of the Technologic branch of the United States Geological Survey. It has been revised in the light of suggestions made by the mining engineers associated with the Survey, by several mine managers, by the experts associated with the manufacture of explosives, and by Col. B. W. Dunn, Chief of the Bureau for the Safe Transportation of Explosives.

"Much of the information for this primer has been obtained from experiments conducted at the Mine Accidents station of the United States Geological Survey at Pittsburg, authorized by Congress, May, 1908, for investigations as to the 'causes of mine explosions.' These investigations have shown the recent development of a new type of quick flame explosives designated as 'Permissible Explosives,' which can be used with greater safety than black powder in mines where gas or inflammable dust exists under conditions indicative of danger, for the reason that the flame from the explosion of black powder lasts from 1,000 to 4,000 times as long as the flame from those newer explosives and is therefore more likely to ignite the gas or dust in these mines.

"Lists of permissible explosives were issued by the Geological Survey on May 15, and October 1st, of the present year, the latter list containing the names of thirty-one explosives, and with these lists is to be found a statement of the conditions under which these explosives have been selected from a larger number presented for examination. There are also in course of publication, and soon to be issued, bulletins dealing with other phases of the subject, such as methods and results of using permissible explosives in coal mining operations, the results of Tests of Explosives, and concerning the dust problem in coal mining.

"The large death roll of American mines is an oft recurring appeal to the miner and the management that they co-operate in every possible effort for greater safety. It may never be possible under conditions such as exist to-day to prevent mine accidents. Little may be accomplished in that direction by either the operators or miners working alone, but experience in all countries shows that through the hearty, determined co-operation of the two, these accidents may be greatly reduced."

THE EXTENSION EXPLOSION

Written for the Canadian Mining Journal by E. Jacobs.

An explosion which resulted in the loss of 32 lives took place on the morning of October 5th in No. 2 mine of the Wellington Colliery Company's Extension colliery, situated about ten miles from the town of Ladysmith, Vancouver Island, British Columbia. An exhaustive enquiry, extending over eight days was held, with the object of ascertaining the cause of the disaster. The Provincial Government secured the services of Mr. James Ashworth, a well-known English coal mining engineer, to give expert testimony, and was represented as well by Mr. Wm. Fleet Robertson, Provincial Mineralogist; Mr. F. H. Shepherd, Chief Inspector of Mines; Mr. Archibald Dick, Inspector of Mines for the Coast District, and by counsel. The Wellington Colliery Company also had counsel in attendance, while Messrs. J. H. Hawthornthwaite and Parker Williams took part in the enquiry on behalf of the miners.

During the enquiry a mass of evidence was taken. A brief summary of that given by Mr. Andrew Bryden, colliery manager at Extension; Mr. Alexander Shaw, overman at the mine in which the explosion occurred; Mr. F. F. Shepherd, Mr. W. F. Robertson and Mr. Jas. Ashworth follows, also the finding of the coroner's jury:—

Mr. Shaw deposed that at the time the explosion took place he was in the mine, on the slope, accompanied by a fireman. This was about 8.45 o'clock on the morning of October 5th. He felt at first as if the air had been taken completely from him. As no gas had been reported in No. 2 mine that morning, he could not understand what had occurred. He and the fireman at once went into some of the mine workings to investigate but were soon met by afterdamp. After going back they entered the counter level, and eventually found some of the miners, whom they directed out to the slope. He worked in the mine until 3 p.m.; meanwhile it had been fairly well determined where the trouble had occurred. After half an hour's respite he returned to the mine, but could not stand further effort in the mine, so left it, Mr. Andrew Bryden remaining in charge of operations. Mr. Shaw was submitted to a long cross-examination.

Mr. Andrew Bryden was also closely cross-questioned. In the course of his evidence he told of his investigations in company with Inspectors Shepherd and Dick, and Mr. Thos Graham, general superintendent of the Western Fuel Company, Nanaimo. In all there were probably 50 or 60 men working in the part of the mine where the explosion took place. Of these 32 were killed, 17 bodies having been recovered on Wednesday and the remainder early Thursday morning. He stated that a "cave" had occurred in the mine, and gave as his opinion of how the explosion had occurred as follows: "When the cave occurred there was a certain amount of gas, about half an inch or so, and the breaking of the coal during the caving process, created probably, a certain amount of dust. It may or may not have come in contact with a naked light, because, wherever a force may have struck a blind end, heat was generally there to a considerable extent. My reason for believing that the cave was the cause was because evidence of force extended from both ends of the cave and at two widely separated points. These blind ends are the only places where any scorchings are shown on the timbers."

Chief Inspector Shepherd gave very full evidence, first as to the preliminary investigations he and others made, and afterwards of the examination of the working places in the part of the mine where the cave and explosion occurred. Much detailed information of this examination was included in this testimony. The ventilation was dealt with and deductions were stated, these supported by indications of the direction of force and indications of flame. After stating that the mine was universally damp, as shown by hygroscopic observations mentioned in evidence, the probable condition of the atmosphere was thus indicated: "The evidence would tend to show that on the morning of the explosion the percentage of gas in the atmosphere of the mine was something below two per cent., but there was no evidence to show how much below. It might be conceded that marsh gas was present in the atmosphere of the mine that morning, but there was no body of standing gas or explosive gas reported that morning, nor more recently than August 14th." After quoting at length from an article on "Pressure as Affecting Explosive Conditions," and giving information on "Flame in Compressed Air Pipe," and other relevant matter, Mr. Shepherd continued: "I am of the opinion that such conditions obtained in the present case. A large cave had occurred, as shown, in No. 2½ level, extending along the level for more than 500 feet. This cave contains about 1,000 tons of fallen material, principally coal, which fell about seven feet. This represents a dynamic force of 7,000 tons, or a sudden displacement of 27,000 cubic feet of air, transmitting its velocity through the narrow drivages of the mine, which, upon meeting resistance at the dead ends, or sul de sacs of the mine, created a compression of the mine atmosphere, which converted the partly charged atmosphere, which under other circumstances, would not be considered dangerous, into an explosive condition. * * * The character of the explosion was of low intensity, which fact was, in my opinion, due to the absence of contributing factors, such as coal dust, to the damp condition of the mine, and the large area into which the explosion could take place." Mr. Shepherd was submitted to a long cross-examination by Mr. Hawthornthwaite.

Mr. W. F. Robertson, Provincial Mineralogist, corroborated the evidence of Mr. Shepherd regarding the condition of the working faces and, generally other conditions stated by the Chief Inspector of Mines. In his opinion the cause of the explosion was directly connected with the cave in No. 2½ level. The cave, he thought, occurred before the explosion, as there are none of the timbers left that show any evidence of heat in any shape. All the indications point to the explosion following. Dust blown on the top of the cave would indicate that the cave was down before the explosion occurred. The caved area is in the neighbourhood of 515 to 520 feet. There is no doubt in his mind that, by evidence given, previous to October 5th there had been no sagging or weighing on the timbers. He



Fig. 1.



Fig. 2.

SCENES AT EXTENSION COLLIERY

went on top of the cave and examined it very carefully and found a geological condition which, to a considerable extent, accounted for the suddenness of the caving. In this particular part of the roof there is a roll. In this cave it does not come up regularly; it commences to steepen at this point, and gradually increases in pitch until it takes a sudden roll, and seems to extend the whole length of the cave. It seems to have been a coincidence that the roll follows the level right along. Much other testimony was also given by Mr. Robertson.

Mr. James Ashworth, mining engineer, said that he was one sent by the Department of Mines to give expert testimony with regard to this explosion. He corroborated Mr. Shepherd's evidence in regard to the conditions of the faces of each stall and the positions of the different bodies found. He had seen, though, in one place, a hole and evidence of a badly blown out shot. After going into some detail as to conditions, he stated that the force which came along with the cave was followed by the fall of the roof, which brought down gas, and a man having a naked light the gas was ignited at a point he indicated. He was of the opinion that the cave occurred before the explosion. Dust was deposited on the top of the cave after the explosion.

At the request of Chief Inspector Shepherd, the coroner appointed two competent miners to investigate the place where Mr. Ashworth considered there was evidence of a blown put shot, but their testimony did not agree with that of the expert engineer.

After a lengthy consideration of the evidence, the coroners jury returned the following verdict:

"We, the jury empanelled to enquire into the cause of the explosion which took place in No. 2 Extension mine on October 5th, 1909, have come to the conclusion, after investigating the evidence of the different sworn witnesses, that the explosion was caused by the cave in No. 2½ level. Gas being present in its atmosphere, gas and dust being liberated by the cave, the sudden displacement of the air creating the compression, causing the partly charged atmosphere to become dangerous, and coming in contact with naked lights, exploded.

"Taking into consideration the unnatural and faulty conditions of the roof of this particular cave, and in view of the fact of no evidence to show bad timbering, we can in no way hold the company responsible, and therefore exonerate the company from criminal negligence.

Recommendations.

"(1) Taking into consideration the volume of work entailed in this particular department, and after taking from the statements of the Chief Inspector of Mines, and evidence in general, we are of opinion that the Coast District, being so large, it is impossible to make as thorough or systematic inspection as is absolutely necessary. We therefore recommend that the staff be increased.

"(2) That Rule 9a, Sec. 1, Coal Mines Regulation Act, be strictly enforced.

"(3) That every collier in British Columbia be compelled to equip its mines with up-to-date oxygen life-saving apparatus.

"(4) That where safety lamps are necessary, only re-lighting lamps of the Wolff principle be used.

"(5) That the maps of the mines be extended and kept up-to-date, and that index hand boards be placed in conspicuous places in different parts of the mines, showing the nearest way to the face, and that the management see that the men are instructed regarding them.

"(6) That greater precautionary measures be taken by the Inspector of Mines when gas of approximately 2 per cent. exists.

"(7) That coroner's juries, in cases where enquiries extend over one day, should be reasonably compensated. This enquiry having lasted eight days, we respectfully petition the Minister of Mines to consider our case, and compensate us accordingly."

"William G. Fraser, Foreman."

WOLFRAM MINING AND SMELTING CO., LTD.

Figures adduced at a shareholders' meeting of the above company are instructive. During July and August the company's mines produced 40 tons of tungsten concentrates, which sold at 28 shillings per unit. The ore mined ranges in tungsten contents from 1.7 per cent. to 2.2 per cent., which, apparently, is considered quite satisfactory. A very ready market is found for the mineral, despite current belief to the contrary.

OUR LONDON LETTER

British Miners and Mining Royalties in the General Election—Heavy Gravitation Stamp Development on the Rand—Powerful Three-throw Ram Pumps for Mine Draining in New Zealand—English Views on the Reverberatory Practice in Mexico—Copper Position and Rumours—Lead Prospects and a Canadian Proposal—Big British Zinc Plant Described—Successful Vacuum Process in Cornish Mine.

Special Correspondence to the Canadian Mining Journal.

The miners of Great Britain, organized, as they are, into trade union associations in each county and then into a National Federation, are proposing to take a big part in the general election which is looked forward to in January. Besides the ordinary Labour programme, they specifically ask for a Ministry of Mines, and are in favour of the minerals and mines of the country being under and managed by the state. As a matter of more practical politics, they ask for the legislative enactment of a minimum daily wage of $2 per day for miners. At the present time they say there are thousands of miners working in this country for $1.25, 75 cents and even 50 cents per day.

In the new taxes contained in the budget which has been thrown out by the House of Lords and which has therefore brought about this general election, there was a tax on mining rents and royalties coming as a result of the general taxes on land values. Mining royalties consist of royalties on each ton produced, practically a dead rent for the protection of the rent owner, with an accompanying compensating system of "shorts" for the protection of the mine owner, and of way-leaves above and below ground. Besides coal, they are charged upon other minerals, but coal is by far the most important.

The royalties and way-leaves on coal amount to about $21,000,000 per annum, while all other metals and ores only pay about $4,000,000 per annum. Upon coal these royalty charges vary in different coalfields from a minimum of 5 cents per ton in Northumberland and Durham to a maximum of 30 cents per ton in West Scotland. The average in each district varies from 6 cents per ton in the Forest of Dean, South Wales, to 14 cents per ton in West Scotland, this showing that mining royalties are not so much a tax as a rent for superior advantages of seam, situation, or both.

It is held by supporters of royalties that all that can be said to enter into the cost of coal is the minimum royalty of 6 cents per ton on the Forest of Dean. It is a well-known fact that coal owners would rather pay 60 cents per ton royalty for some mines than be compelled to work others without royalty.

As a perfect illustration of the way in which the royalty system has grown up in this country, although it is now part and parcel of the ordinary business results of our civilization, take the case of the coal mines held by the Dowlais Company. In the year 1748 the then Marquis of Bute leased to Anthony Brown eight miles of mineral property in Merthyr, Glamorganshire, for 99 years at $500 royalty per year. Some years later this lease was transferred to the Dowlais Company, which held it until its expiry in 1848. The Dowlais Company then re-leased it from the Butes at $100,000 per year, and apparently considered that even at that hugely enhanced figure they had struck a good bargain.

Popular opinion seems to have attached rather more importance to the question of mining rents and royalties than the subject deserves. Undoubtedly mining rents and royalties are a nuisance to the persons who have to pay them, and the total sums paid, as we have shown, are considerable. But these promises are by no means sufficient to authorize the popular conclusion that the system of royalties is an oppressive tax on one of the staple industries of the kingdom.

The Liberal Government proposed to put an annual tax of 5 per cent. on the rental value of all rights to work minerals, and on all mineral way-leaves, excluding brick, clay and earth, sand, chalk, limestone and gravel. The financial result of the mineral rights duty was estimated by Mr. Lloyd-George to add $875,000 a year to the revenue. It was urged by the Government that this was not a tax on minerals, but a tax on the landlords, who make a levy on the mine owners for the right to work minerals. The Government regards mining royalties as a tax on the springs of national wealth.

As the budget forms the real fighting centre of the election, it is interesting to point out these mineral and mining factors.

At the opening meeting of the winter session of the Institution of Mining and Metallurgy, Mr. W. A. Caldecott, discussing the development of the heavy gravitation stamps, said that the history of ore crushing by means of gravitation stamps showed a progressive increase in their weight and in corresponding efficiency. He had carried out a series of milling tests at the Knights Deep battery, which was equipped with stamps weighing 1,350 pounds when new, with the object of discovering some means whereby stamp-milling efficiency could be increased. Encouraged by the results of these and many other tests, including a duty of approximately 6½ tons through 1,500-mesh screening with stamps weighted up to 1,622 pounds, he recommended that the next stamps erected by the Consolidated Goldfield Companies should have a weight of 1,550 pounds each when new. Such a departure excited much adverse comment among experienced millmen generally, but the mills were satisfactorily at work today after periods of service ranging up to three years.

In accordance with the present changed state of professional opinion, he said, all Rand batteries lately erected or designed had stamps of a weight not long ago deemed extravagant, and, aided by the installation of tube mills, stamp duties of eight tons were now as common as those of four tons a few years ago. In order to employ heavy gravitation stamps to full advantage, it was absolutely necessary that a uniform speed should be maintained. That, in spite of certain obvious disadvantages, they still held their own was probably due to the fact that pneumatic and steam stamps as hitherto designed had proved wasteful of power and liable to derangement under the vibrations and shocks inevitable during crushing.

A serious effort was, however, now being made to utilize a new type of Holman pneumatic stamp at New

Kleinfontein mill. The day of the stamp as a unit of crushing capacity had passed away. The unit of the present basis was the tonnage per month or per day. The future limit of stamp weight was difficult to foretell, but it would probably be determined more by the mechanical considerations involved, as in the cam system of lifting, than by any decreased relative efficiency as a device for pulverizing ore. The advantages of heavy stamps as compared with lighter ones were: Reduction of the initial capital expenditure in erecting 200 stamps at 1,750 pounds with accessories, in place of 270 stamps at 1,250 pounds each; reduction in size of mill building, almost proportionate to the less number of stamps, 30 per cent. less shafting, belts, and other moving parts to maintain, and 30 per cent. less labour required.

Messrs. Hathorn, Davey & Co., of Leeds, have constructed for the Waihi Gold Mining Company of New Zealand two sets of powerful three-throw ram pumps for mine draining purposes. Each pump is capable of raising 1,500 gallons of water per minute, against a head of 800 feet, and has rams 12 inches in diameter by 2 feet 6 inches stroke. They are driven by variable speed, direct-current, 500-volt motors of 420 b.h.p., which have a speed variation of 50 per cent. The power is transmitted from the motor to both ends of the crankshaft through two stages of machine-cut gearing. The slides are loose and independent, so that should they be damaged by a fall of the mine roof or from any other cause, they could be readily replaced. This type also allows of easy adjustment. The bed-plate is built up in sections for easy lowering into the mine.

The water valves comprise a nest of small-sized valves, allowing ample waterway, which can be easily taken out for examination or repair. They are mounted on a valve-plate adjustable externally, and are of the makers' improved type for dealing with gritty mine water. Each valve is of gunmetal, with a leather joint ring. There is a vacuum vessel directly below each pump, and an air vessel immediately above. A large by-pass is provided in order to reduce the load on the motor at starting. This, of course, can be closed as soon as the pump is in motion. There is a bearing between and outside each crank, and each bearing is adjustable in four directions. In addition to the 12-inch rams, a separate set of interchangeable rams is provided. These are 10 inches in diameter to enable the pumps to deal with a smaller quantity of water against a correspondingly higher head, if it should be necessary to move them to a lower position in the mine.

Mr. L. D. Ricketts has been speaking in this country on recent developments, and especially experiments in reverberatory practice at Cananea, Mexico. He tells us how for the purpose of matting their flue dust from the blast furnaces and roasted concentrates a very large reverberatory furnace was installed in 1896, but this 100-foot structure had to be closed down until recently owing to the difficulty of firing with ordinary fuel. Powdered coal was tried unsuccessfully, and now finally oil is being used with special burners, and over the 72,000 tons of material smelted in the last eighteen months a very considerable saving has been effected in costs. Even the $1.68 per ton now ruling is thought to be capable of reduction in three ways: (a) Decreasing the excessive stack temperature at present existing, although three Stirling boilers are used to absorb waste heat; (b) decreasing cost of material and labour for repairs; (c) increasing the average daily capacity by fewer delays for repairs, and by decreasing the flue dust produced in the blast furnaces and increasing the amount of calcines from the McDougal roasting furnaces.

Mr. Ricketts expressed the belief that the introduction of large reverberatories would aid most copper smelters, as found at Cananea, by admirably seconding the blast furnace practice, in using up the flue dust and fine concentrates at low cost, and by removing the fine material from the charge, lessen the blast furnace cost also.

The latest copper market movements here show a great curtailment of speculative operations compared with the huge turnover recorded recently. The statistical position on this side has again grown appreciably worse, and renewed selling pressure has become manifest. The statistics for the second half of November disclosed a fresh notable increase in the European visible supply. Practically no disposition is shown to force forward sales.

Circumstantial reports have been circulated here to the effect that a London offer of $25,000,000 has been made for the property of the Arizona Copper Company in Edinburgh on behalf of the American capitalists who are behind the negotiations for the great copper combine. The chairman and another director of the Arizona Copper Company have sailed for New York, and no official information is obtainable. The Arizona has an ordinary share capital of $1,899,870, and its output is 17,000 tons of copper per annum.

The lead market on this side, like that devoted to copper, benefits by the great development of electrical enterprises. Unlike the more important metal, however, lead has not a serious overproduction and generally unstable statistical condition to contend against. Over here stocks are not unduly large, and the arrivals are well within the capacity of the market. Many lead mines sell their output at average prices for a year ahead; hence when the Convention came into existence some months ago the output of these for this year was already virtually disposed of. A few weeks ago the Convention's brokers bought freely in London, raising the price of prompt delivery from about $64 to $67, selling heavily at the same time to consumers everywhere. Contracts for 1910 will shortly be arranged, and the course of events in this connection may be interesting.

Messrs. Lindgens & Sohne and Messrs. Bergman & Simons, of Mulheim, Germany, have purchased from the Lead Products Syndicate, of Liverpool, Barton's patents for manufacturing litharge and red lead for Germany, Luxemburg, Austria, Russia, France, Italy, Sweden, Norway and Denmark. A company is in course of formation to work the Canadian patents in the neighbourhood of Niagara, where cheap electrical power is available. It is also intended to establish factories, as soon as possible, in the United States and Australia, and probably in Japan. In Barton's process the finished litharge is produced in one operation from metallic lead, at a temperature far below the point of fusion. No sifting, grinding or after-treatment is required.

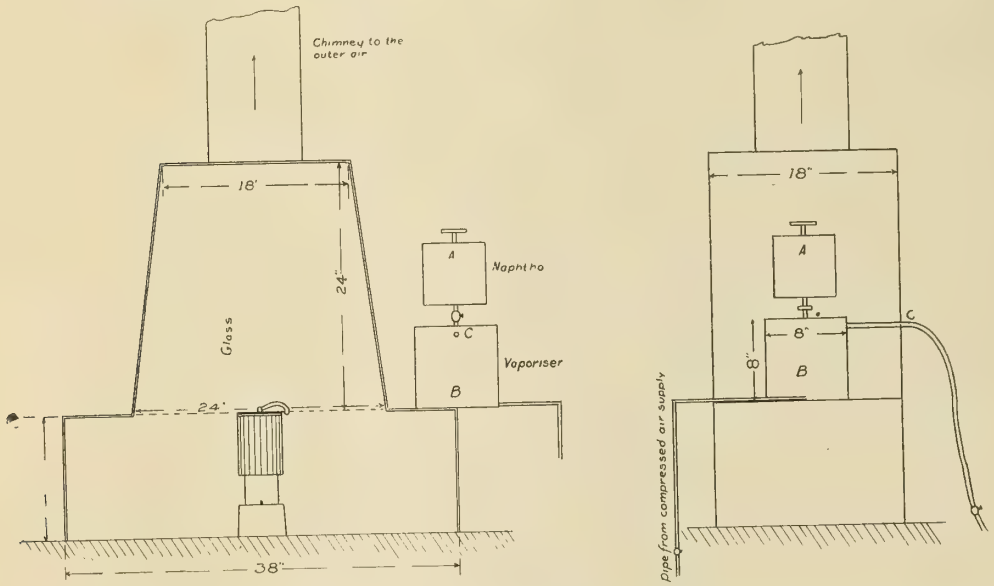
The Central Zinc Company has organized a big plant at Seaton Carew, West Hartlepool, which has a smelting capacity of about 35,000 tons of zinc blende per annum, which should produce about 10,000 tons of spelter. This company is a subsidiary of the Sulphide Corporation, formed to treat the Broken Hill Central mine's zinc blende. It was formed in 1906, since which time extensive experiments have been carried on prior

to the starting of the plant at West Carew in May, 1908. The distillation furnaces are of the recuperative type. The pottery is 315 feet long, the upper floor of which is constructed of reinforced concrete. The roasting furnace is steel-panelled, 105 feet long by 75 feet wide, and the distillation works are 415 feet long by 56 feet wide. All the latest developments for zinc blende treatment have been adopted.

For the past two years the Elmore vacuum process has been in operation at the Dolcoath mine on its complex ores, with the result that practically all the sulphides are removed as a concentrate almost free from tin, leaving the tin in the tailings, which is passed on to the usual water concentrating appliances for the recovery of the tin practically free from sulphides. Where tin ore contains only copper sulphides, the vacuum process produces a high-grade copper concentrate readily salable to the copper smelters. This gets rid of the copper impurity, and at the same time purifies the tin ore so as to make it valuable to the smelter. Following this success, I understand, this process is about to be applied to similar ores found in two other widely separated parts of the world, namely, the Straits Settlements and South Africa.

TESTING SAFETY LAMPS

Written for the Canadian Mini ng Journal by James Ashworth.



The British Columbia Coal Mines Regulation Act of 1897, Chapter 138, Rule 8-A, enacts that in addition to the requirements of Rule 8, every safety lamp so in use shall be tested in an explosive mixture of gas and tar at least once every week. This rule came into force on the 1st of January, 1905, but by the written consent of the Minister of Mines, a further reasonable time might be allowed in which to prepare such testing of lamps. Up to quite recently it has not been possible for outlying collieries, where lighting gas is not available, to make this test more than once a week. The required test, where lighting gas is available, does not entail any very great or practicable difficulty, but where the gas has been specially prepared, the process of testing has been very tedious and expensive. The onerous nature of this rule became accentuated when the Inspector of Mines decided that a weekly test did not entirely fulfil the requirements of Rule 8-A. The rule further enacts that "should the glass, washers, gauze or any essential part of such lamp have been renewed, or removed and replaced after the lamp has been so tested, then such lamp shall be again tested, and any lamp which shall be shown by such tests to be imperfect or inefficient, shall not be allowed in any mine to which this Act applies, until such imperfection or inefficiency shall have been remedied and the lamp shall have passed a satisfactory test. And every colliery so using safety lamps shall be equipped with apparatus for making such tests of some such form as shall be approved of by the Minister of Mines, and such tests shall be of such a character as may from time to time be approved by the Minister of Mines.

It is quite clear that no double gauze lamp could be properly cleaned without the removal of all the parts from the lamp case, and, therefore, the literal observance of this rule means that the lamps must be tested daily. Although this rule came into operation in January, 1905, its observance has not been precisely insisted upon until recently, because of the want of a suitable arrangement to expeditiously pass the safety lamps through a practical test. Some firms using the Wolff Spirit Lamp adopted an arrangement consisting of an air tank, a gas generator and a gas cylinder, such as supplied by the Wolff Company. This apparatus has a tank similar to a gasometer filled with air, and this air is forced through a rubber tube into the gas generator, which is a sheet iron box divided in the inside into several horizontal compartments, on which absorbent cotton is placed. The shelves forming the compartments are slightly inclined, so that the excess of naptha (76°) on one shelf may run down on to the one below. The naptha is placed in a glass reservoir fixed on the top of the generator, and the supply of naptha is regulated by a tap. Air from the tank being forced into the bottom of the generator and zigzagged by the shelves, becomes charged with any desired percentage of gas.

The explosive mixture thus produced is then passed through a coiled pipe, perforated on its inner side and surrounded by a metal case, having a pane of glass on one side, through which the action of the mixture on the safety lamp placed within the coil can be observed. In the event of the mixture containing too much gas, more air can be admitted through a shutter arrangement at the base of the testing box. The main objection to this arrangement is that the process is very slow, and the man operating the test is exposed to the fumes of the gas.

The British Columbia Government, through its Chief Inspector, advised the coal operators that they were expected to observe the law, and must devise an apparatus which, if satisfactory, would be approved by the Minister of Mines. The writer having, therefore, taken the matter in hand, designed the arrangement shown by the accompanying drawings. Thus there is a box made of sheet iron, the bottom part where the lamp is shown being open on the front side, and the upper part enclosed by a glass plate, whilst entirely protected from the gas fumes. A constant current of air passing through the case goes right out to the open air up the chimney. Ten or more lamps are placed in the box at once, and after the cylindrical vessel "A" has been filled with naptha, the spirit is allowed to run through into the vaporizer "B," where there are shelves covered with cotton wool, so placed as to zigzag the compressed air, which is regulated by a tap and admitted at the bottom, as in the Wolff arrangement The operator then takes the flexible tube "C" into his hands, and after opening the tap applies the gas to the top or bottom part of the lamp, as he may desire, and the explosive mixture of gas and air is thus forced into the lamp. If the gauzes are sound the lamp may be extinguished, but if faulty, the gas issuing from the tube is at once ignited, and the lamp is then known to be dangerous.

These tests can be made very quickly and economically, and being in full accord with the Coal Mines Regulation Act, will doubtless receive the approval of the Minister of Mines very shortly.

In conclusion the writer hopes that this apparatus may be of use to other mining men who have had, or may have a similar difficulty to face.

THE UNITED MINE WORKERS IN NOVA SCOTIA DURING 1909

(By our Glace Bay Correspondent.)

The resume of conditions attending the coal-mining industry of Nova Scotia during the year 1908 which appeared in the Canadian Mining Journal of 15th January 1909, recorded a steady progress in all things connected therewith, and this year stood out as one marked by unusual advances in tonnage, legislation, technical education, and precautions for safety. The year just past unfortunately presents a very different aspect. It has been a year of stagnation and reaction. At the end of the 1908 resume it was stated that: "In any case there is no justification for any glowing forecasts of the progress of the coal industry in 1909," but the most pessimistic of men could hardly have foreseen that the tonnage of coal mined for the year would be less than in any year since 1903. At the date of writing it is not possible to compile any correct statistics of tonnage to compare with previous years, but it is within the mark to say that the coal production of Nova Scotia for 1909 will be almost one million tons less than it would have been had the delegates of the United Mine Workers of America not been able to bring about the several strikes which have marked the summer. The strike situation has so dominated the year's work, that its history must be to a large extent a retrospect of the U. M. W. A. trouble.

It has long been the policy of the leaders of the United Mine Workers of America to obtain control of all the coal workers in Canada, a policy that is expressed in the name of the organization. The miners, organizations which existed previous to the formation of the United Mine Workers of America, were the "American Miners' Association," the "Workingmen's Benevolent Association," and the "Miners' National Association." When these organizations were eventually superseded by the United Mine Workers of America, there can be no doubt that the territorial limitation which was inferred from such a title as the "Miners' National Association," occurred to the leaders of the U. M. W. A., and the title which they chose for the new organization is probably as wide and comprehensive a description of the ultimate aims of this Union as could have been devised. These aims are doubtless the absolute domination of all coal mines in the American continent from the headquarters of this union in the United States. It is particularly the desire of this organization to control the mine workers of Nova Scotia in order to consolidate their powers througout the whole of the great coal field which occupies the eastern half of North America.

Since 1904 the leaders of the U. M. W. A. have had agents actively working in Nova Scotia. In September 1905, a district president of the U. M. W. A. addressed the Grand Council of the Provincial Workmen's Association of Nova Scotia in Halifax, and at the Annual Convention of the U. M. W. A. early in 1906 the Dominion Coal Company and the P. W. A. were fiercely assailed for having entered into the Three Years Contract, particular exception being taken to a clause in that Contract which provided that "The employees shall not attempt to restrict the sale of the coal of the Company to any person, firm or corporation." This clause was objected to because it precluded a sympathetic strike by the Dominion Coal Company's workmen.

At the expiration of the Three Years Contract, the P. W. A. and the Dominion Coal Company were unable to agree upon new terms, and a conciliation board was called for by the workmen. The award of this board was accepted by both parties, and in March 1908 a contract was signed accepting the terms of the award until the end of 1909. After the signing of this contract the leaders of the U. M. W. A. grew very active and

commenced to organize locals of the American union, and vigorously attacked the Grand Officers of the P. W. A, chiefly by instituting a series of vexatious legal actions, in all of which the U. M. W. A. were nonsuited by the Courts. This fratricidal warfare did not interest the coal companies until at the beginning of 1909 the U. M. W. A. commenced to initiate into membership certain minor colliery officials of the Dominion Coal Company, who were forthwith discharged, in accordance with a long standing rule that no official who has the direction of other men can belong to a labour union. The constitution of the U. M. W. A. provides that all persons employed at collieries where that union is in control shall be members of the Union, with the single exception of the "Manager and the top-boss," and the "closed shop" in its most intolerable shape marks the U. M. W. A. wherever it is in power.

The U. M. W. A. workmen of the Dominion Coal Company applied for a Board of Conciliation, alleging discrimination against members of the U. M. W. A. as such. The award of the board found that no discrimination had occurred, and that there was no ground for any of the charges made by the representatives of the U. M. W. A. At the mines of other companies in Nova Scotia, Conciliation boards were called by the U. M. W. on various pretexts; namely, at Sydney Mines and Springhill. The award of the board in each case was adverse to the U. M. W. A. After the sitting of the various boards, various members of the International Executive of the U.M.W.A. came to Nova Scotia and paid organizers were put in the field throughout the mining districts of the province. These men spent money with great freedom throughout the first six months of 1909, and they prepared the ground for future events in a skillful manner, showing a considerable knowledge of human nature and the methods of bringing about labour troubles. The coal trade in the early part of this year was in an exceedingly slack condition and there was a shortage of work. The officers of the U. M. W. A. dispensed a large amount of money in what was called "relief" and put themselves into touch with the various religious and political organizations; they made especial endeavours to win the good-will of the wives and families of the miners through the medium of ladies related to the U. M. W. A. organizers. The U. M. W. A. leaders appeared to identify themselves with every form of advanced social legislation; they particularly laid themselves out to influence the men from Great Britain and various parts of Europe, and they appropriated as part of the platform of the U. M. W. A. most of the labour and social legislation which has been slowly evolved by the legislatures of the old world. Not a word was spoken about the possibilities of a strike, and the propaganda of this American organization was so designed that it was hailed as a new gospel and, unconsciously, a great number of people became enthused with it who were in absolute ignorance of the ultimate aims of the campaign—aims which to-day are unfortunately only too apparent.

The campaign among the general public was such as we have outlined, but among the workmen the bait held out was more specific, including, as it did, the eight hour day, a large increase in wages, reduction of house rent and the price of workmen's coal, certain minimum wages for certain classes at work, the collection of dues through the company's office, the establishment of a completely "closed shop," and the utter humiliation of the leaders of the Provincial Workmen's Association, accompanied by the extinction of the local union. The men were given to understand that all these things would automatically follow recognition of the U. M. W. A., but until the last moment these men did not think that a strike would be called.

At the end of June a circular letter was dispatched to all the operators in Nova Scotia, demanding their attendance at a joint convention with leaders of the United Mine Workers at Sydney. This demand was, of course, entirely ignored by every coal company. At the beginning of July the Dominion Coal Company was notified that unless it met leaders of the U. M. W. "To discuss the matters of difference between your company and ourselves" a strike would be called. By purposely omitting to make any specific demands upon the company in their ultimatum, the U. M. W. endeavoured to escape the penalties of the Industrial Disputes Act for calling a strike without legal notice.

The day before the strike local president of the U. M. W. A. gave an interview to the press, stating that his organization controlled 95 per cent. of the Coal Company's workmen, and there can be no doubt that the men who went on strike took this statement as being correct. Many of the men who went on strike had been members of the U. M. W. A. for a few days only, having been induced to join that union by a combination of coercion, cajolery and deceit, and when these men joined the U. M. W. locals they had not the slightest intention of going on strike. They were induced to strike by a series of falsehoods, and they have been kept out on strike by falsehood invented after falsehood. A newspaper was started by the help of U. M. W. funds to keep alive and foster the agitation, and this paper has been of great assistance to the leaders by disseminating among the strikers the falsehoods which have been necessary to prolong the abstention from work. This was rendered the easier to arrange as those strikers who could read English were counselled not to read those newspapers which disagreed with the position of the U. M. W. The agents of the U. M. W. have carried on a persistent misrepresentation of the number of men at work and the output produced from the mines of the Coal Company, and even at this late date very few of the men on strike believe the output figures which are given out by the company. The unwitting foreigners have been shamefully deluded. They were assured that the strike could not last more than a few weeks, and were promised large rewards if they would come out. They were also told that when the strike was over, and the U. M. W. had won, their wages would be increased up to $6.00 and $9.00 per day. All through the strike violent attacks have been made on the personnel of the company's management, on H. M. Inspectors of Mines, on the Government, and on the magistracy and judiciary in their administration of the law. Lying reports were disseminated the world over regarding the condition of the mines underground, the rate of wages and the conditions of living on the surface. Bribes have been offered to men holding important positions in the company's employ to defect at critical moments, attempts were made to intercept letters and telegrams in transit, and many overt and illegal acts have been committed in secret, apart altogether from the open and violent intimidation which has been carried on under the direction of the leaders in Glace Bay, and the funds of the U. M. W. have been used without stint to defend members of that union who have broken the law.

An exceedingly large sum of money has been disbursed from the International treasury of the U. M. W. during this strike. It is not a labour trouble that has arisen out of intolerable grievances, for as yet the strik-

ers have not formulated a single grievance, but it was brought about by "malice aforethought" by the campaign of the trained organizers of the U. M. W., and it has been maintained by a lavish expenditure of union funds. It is a well-known fact that many of those who have drawn upon the funds of this union had no right to do so. Many men have been in receipt of strike allowance who had not worked in the mine for years, and there are men living on their own farms in Cape Breton who are drawing strike pay. In some parts of the island it has been a recurring subject for joking when the farmers from the country came into the mining towns to draw their strike pay.

The Deputy Minister of Labour's report on the U. M. W. A. situation stated that at Glace Bay the strike was practically broken, and that most of the strikers would be "surplus labour through the winter months." At Inverness he found the strike was never at any time an effective one, and at Springhill the situation has resolved itself into a deadlock. This summing up can hardly be improved upon. An interesting sidelight on the Glace Bay strike is that on the 14th of December, the date on which the U. M. W. A. members voted for the presidental election of that union, the output was over 11,000 tons, What this means is shown by a comparison with previous years. In December 1906 the average daily output was 8,500 tons, in the same month of 1907 and 1908, it was 10,800 and 7,000 tons respectively.

The operators of Nova Scotia opposed the coming of the U. M. W. consistently and from the first, and the reason is not far to seek. The U. M. W. has a record of the worst kind in the United States, and their operations have always been attended by violent breaches of the peace. It was feared the same results would follow in Nova Scotia, and the fear has been more than justified. We have also witnessed in Halifax the General Manager of a large coal company forced to testify on the witness stand to the price of coal in Montreal at the very time when large coal contracts are pending there, for which the keenest competition is going on between the American coal mines and our own. This gentleman was asked to disclose in public the very secrets which our American competitors are spending money to get, in order to underbid our Canadian business just sufficiently to get the orders. There seems something anomalous in a state of affairs which allows an unincorporated foreign union to prosecute our operators because it is suspected they have tried to prevent ruinous cut-throat competition, while at the same time this union is pouring American money into the Province which is being used to gain American domination of our coalfields. Our coal companies have been compelled to spend large amounts in protecting their properties against physical violence and incendiary fires, and some 5,000 men have had to suffer contumely and bodily danger from a body of men numbering less than 2,000, because the latter were incited by American strike-breeders, and defended by American money. As the law stands to-day every Canadian corporation is apparently at the mercy of any United States labour union which sees fit to send into our country its heralds of discord to spend money in engineering strikes, and we have no protection should these funds get into the hands of an ill-advised or foolish man, or should the power of calling strikes be given to men whose integrity is not unimpeachable. The records of many United States labour leaders are not such that Canadians can contemplate with equanimity their present unchecked powers in the Dominion. Our Canadian industries and our national labour organizations may justly ask that protection shall be given them from the marauding and irresponsible actions of International organizations controlled from the United States, and from the scenes of lawlessness and bloodshed for which these bodies have been responsible in the Dominion.

EXCHANGES.

The Mining World, December 4th, 1909.—Editorially The Mining World credits 113 United States mines and metallurgical works with $55,398,429 paid in dividends during the 11 months ending Nov. 30th, 1909. Fifteen Canadian companies, thirteen of which operate in Cobalt, paid during the same period $6,120,188 to shareholders. By a curious misprint Crown Reserve is rendered "Crown Point."

Economic Geology, October-November, 1909.—In an article "On the Origin of Petroleum," Mr. L. V. Dalton comes to the conclusion that the great majority of oils are derived from the decomposition during long ages at comparatively low temperatures of the fatty matters of plants and animals, the nitrogenous portions of both being eliminated by bacterial action soon after the death of the organism. The fats and oils from terrestrial fauna and flora may have taken part in petroleum formation; but the principal role must, from the nature of most petroliferous deposits, have been played by marine life.

We fear that Mr. Dalton's point of view is one-sided.

Mining Science, December 2nd, 1909.—"The Application of Steel to Mine Timbering" is the title of an article by R. B. Woodworth. Among the advantages claimed for steel is the matter of re-use. Isolated props are now very seldom withdrawn and are utterly worthless when the time comes for their replacement. In English mines steel roof supports have been taken out, turned and used 200 times over. Experience in the United States has corroborated this.

A curious peculiarity of the new ferro-titanium rails, which have been made experimentally in the United States for a little more than a year, is that they may be entirely free from titanium, and at most they contain but little. In this respect the "alloy" differs from all others. The properties of nickel-steel, for instance, depend upon the presence of a material percentage of nickel, and manganese-steel must have a carefully adjusted proportion of manganese, for the new metal, the steel is made in a convertor and blown in the usual way, when it receives a charge of titanium alloy. This is a product of the electric furnace, and is a mixture containing 10 to 15 per cent. of titanium and 5 to 7 per cent. of carbon, the remaining portion being iron. Each ton of steel receives a charge of about 8 pounds of 10 per cent. alloy, the effect being to increase the slag removed from the metal in the ladle, while the ingots are free from blow-holes. The titanium unless in excess of what is necessary to remove the impurities, all passes off in the slag. The treatment gives special durability to rails for curves, and at the Grand Central Station in New York an ordinary rail lost 3.03 pounds per yard in four months, while a titanium alloy rail of the same composition was worn away only 1.01 pounds per yard in six months. The few dollars increase per ton of Bessemer rails is expected to be much more than offset by added durability.

HIGH POWER DIRECT CURRENT CENTRIFUGAL MINING PUMPS

By Frank C. Perkins.

One of the most important installations connected with mines is undoubtedly the drainage plant, and the recent development of direct current machines for steam turbines service requiring dynamos of high speed and special design has resulted in the construction of similar machines to act as special high speed direct current motors for coupling two centrifugal pumps.

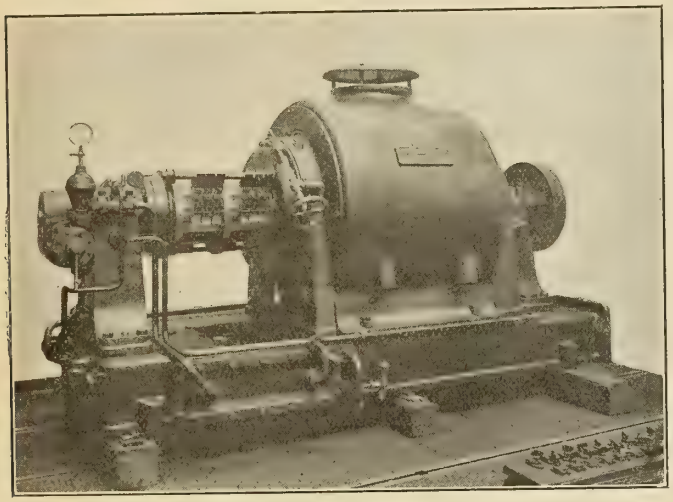


Fig. 1. Direct Current Motor for Driving a High Speed Centrifugal Pump of the Merles Mining Co.

The accompanying illustration (Fig. 1) shows a new Swiss direct current motor for coupling to a mining pump operating at a speed of 1,320 revolutions per minute.

In driving the same at full load, it develops 450 horse power and is operated on the 550-volt mining power circuit. Another similar electric centrifugal pump for mining service is shown in the accompanying illustration (Fig. 2), having a capacity of 55 horse power, normal rating, but being able to carry overloads continuously up to 75 horse power without injury. It runs at a speed of from 2,500 to 3,150 revolutions per minute, with a speed regulation of 50 per cent. up and 20 per cent. down.

These Swiss direct current high speed motors for mining pump service were designed and constructed at Baden, by Brown, Boveri & Co. The 500 horsepower motor operates at a speed of 2,600 revolutions per minute, and the 40 horse power drives the centrifugal pump at a speed of 4,000 revolutions per minute, while the largest electric direct current motor for pumping service has an output of 2,300 horse power working under a speed of 900 revolutions per minute.



Fig. 2. Direct Current Electric Mine Pump of 75 H.P. maximum capacity

These high speed Swiss direct current mine pump motors are provided with a series compensating winding as well as a shunt winding, and can operate over a wide range of speed with the help of a variable resistance in series with the latter.

It may be stated that forced lubrication is employed, the oil being forced continuously through the bearings by means of a pump worked from the motor shaft. The oil returns to the reservoir, where it is cooled by means of a water spiral and from which it is taken by the pump and fed to the bearings.

It is held that the principal advantage of this type of motor for the above class of work over the usual type of three-phase motor is the great speed variation obtainable without loss of efficiency when desired while otherwise the speed is constant, irrespective of the load. The efficiency of these machines is high and the ventilation in a similar manner to that employed for the turbo-dynamo. The air enters from underneath the leaves at the chimney-shaped opening at the top, the ends being completely enclosed, the machine being thus particularly adapted for use in mines.

The construction of the commutator is also the same as that employed for the turbo-dynamos, heavy shrinking rings being used, insulated from the commutator by means of solid mica the brushes remain fixed at all loads and speeds without sparking.

The hardening and strengthening influence of a minute proportion of some element in an alloy, which is a marvel and mystery of metallurgy, is not confined to the various steels. Arsenic is a hardly appreciable impurity of furnace copper, but it now appears that the electrolytic copper coming so generally into use is too pure for certain purposes. On the Prussian railways it has been noticed in recent years that the number of fractured locomotive staybolts was strangely increasing. Investigation shows that this has followed the increasing use of electrolytic copper, and that of 23 broken staybolts collected, 21 were of this metal, and only 2 of furnace copper. Of the electrolytic samples, only one contained arsenic, which was present in all furnace copper bolts tested. The high quality of copper containing traces of arsenic had been already recognized, and railways in Italy and the British Colonies specify 0.15 to 0.55 per cent. of arsenic as necessary in all copper bought.

Mr. H. H. Sutherland, formerly of Nova Scotia, recently disposed of several properties in the new Porcupine Gold District. The first sale was made to Mr. Noah Timmins, of Montreal. Another property, the Reamsbottom, was sold by Mr. Sutherland to a Montreal syndicate, and the Davison was acquired from him by a very wealthy Montreal investor who is already largely interested in Northern Ontario.

THE NORTH THOMPSON VALLEY, B.C.

By J. C. Gwillim.

(Continued from last issue.)

GEOLOGICAL AND MINERAL RESOURCES.

Concerning the geology and mineral resources of the district between Yellowhead Pass and Kamloops, several reports have been issued by the Canadian Geological Survey, but none of these gives much information of the central portion of the route along the upper North Thompson.

Dr. Dawson, in his Kamloops Map Sheet report of the years preceding 1890, covers the ground as far as the small coal field 50 miles north of Kamloops, and McEvoy, in his Report of 1898, covers the ground south of Yellowhead Pass to the Albreda summit, about 30 miles south of the "Cache." Between these mapped, examined areas is a stretch of over 150 miles, traversed in 1871 by Dr. Selwyn; but his report gives very little information beyond the occurrence throughout the district of mica schists and gneiss—an Archean series which he affiliates with the talcose micaceous schists of Old Cariboo, but which Dr. Dawson later describes as the Shuswap.

As far as known, the geology of the lower North Thompson, south of Raft River, is similar to that of Dr. Dawson's Shuswap sheet—a mixture of Archean gneiss, Cambrian schists, carboniferous cherts, and limestone, with a few small areas of greenstone, and Tertiary sedimentaries.

Some placer gold has been found on the bars of the river up to Clearwater junction, also on some of the tributaries. In 1901 a modern dredge, built by F. Satchill Clarke, of Vancouver, was operating at a point 12 miles above Kamloops; but the work was discontinued owing to the shallow nature of these bar deposits. Several fair showings of mineral in place have been made on Jamieson Creek, on Lewis Creek, and on Barriere River. Also at a point a little above Raft River some quartz and galena have been found. Galena, zinc blende, pyrites, and quartz with fair gold and silver values appear to constitute the prevailing ore. These are probably similar to the known occurrences about Adams and Stump Lakes eastwards and southwards.

With reference to the occurrences of mineral at these places, they seem to have been forgotten since Southern Kootenay came forward as a producer of metals. Many people may be astonished to learn that prior to 1890, or even as late as 1896, the deepest mine shaft in British Columbia was one of 400 feet at Stump Lake, 22 miles south of Kamloops. Some of the samples from this district are cited as carrying up to 6 ounces of gold and 90 ounces of silver; also several running $15 in gold with from 15 to 400 ounces of silver per ton.

Another promising district, according to Dr. Dawson, was Jamieson Creek, 15 miles up the North Thompson from Kamloops, with gold values from $11 to $22, and silver from 2 ounces to 34 ounces per ton. The quartz-galena ore from near Raft River assays: silver, 60 ozs.; Lead, 35%; gold $7 per ton.

From such occurrences there appears to be some promise of mineral development along the North Thompson, on its lower portion at least. Into this portion of the district drain several fairly large streams—such as Clearwater and Raft Rivers from the plateau country to the north-west; Lewis Creek, Barriere River, and Lost Creek from the eastwards. The Clearwater especially leads a long way into the district between the North Thompson and Quesnelle Lakes. Some placer gold has been reported from its upper waters, and good timber lands are abundant. All of these streams are clear, while the trunk stream, the North Thompson, is muddy with glacial waters derived from the much more mountainous country further north.

Beyond Raft River, at the head of boat navigation, a barrier of granitic and gneiss-mica schists crosses the country, and thence indefinitely, probably to the heads of Peace River, these crystalline Archean rocks form the first range west of the Rocky Mountains proper. The only mineral occurrences so far reported are some gold in quartz at Mad River; and various showings of white mica at the Big Bend on the Columbia, at High Bank, on the North Thompson, and at Canoe River and Mien Mountain near Tete Jaune Cache. Similar deposits were found far to the north-west on Finlay River by some of the Klondike gold-seekers on their way up by the Edmonton route.

The principal tributary of the North Thompson north of the sharp turn at the Raft River, is Blue River, coming in from the west. Looking up this rather straight, long low valley, one is impressed with a rapid change in topography on the northern side, the comparatively low, wooded mountains of the plateau give place to rugged, high peaks, with exceedingly green-coloured slopes to timber line.

At the same time the climate changes to a damp one, similar to that of the northern Selkirks about Revelstoke and Big Bend. Tributary mountain torrents bring down much glacial debris, amongst which is some limestone and a micaceous sandstone. Otherwise the evidence points to a persistence of the gneiss and mica schist, so far almost totally unprospected, except by hunters, who sometimes bring in good specimens of white mica, which go to show a wide distribution of this mineral for over one hundred miles along the route.

The best-known deposits of this mica are at Mica Mountain, and near Canoe River, in the range of mountains immediately west of the great open valley between the Cache and the Canoe River. These are said to have been found by an Indian, Alexis, while goat hunting. He brought specimens to the Hudson Bay people at Kamloops, after which the properties passed into other hands. Several expeditions have been made from Kamloops to these deposits from time to time, and two shipments made, one of half a ton in 1896, and another of 600 lbs. in 1898. The mica is of good quality and sometimes cuts in dimensions of 8 by 10 inches. It is found in spots along very wide and very feldspathic pigmatite dikes, which are mostly conformable with the enclosing mica schists and gneiss. These deposits are described in Mr. McEvoy's report of 1898. Also there is some account of them, and of the North Thompson route, in the B.C. Minister of Mines Report for 1901. At that time the properties were examined and Crown granted. Since then, so far as known, little has been done.

THE ELECTROCHEMICAL SYSTEM OF AMALGAMATION AND CYANIDATION.

By Elmer Ellsworth Carey, San Jose, Cal.

ABSTRACT PUBLISHED BY SPECIAL ARRANGEMENT WITH THE ENGINEERING MAGAZINE.

In the recovery of precious metals the three methods most generally used by miners, are: (1) The gravity system, used in sluicing, rocking, panning, etc. (2) The amalgamation system, in which values are recovered in the form of amalgams; this system calls for mercury riffles, mercury baths, pan amalgamation or plate amalgamation. (3) The chemical system, in which values are dissolved in certain solutions from which they are recovered by various systems of precipitation. The leaching of values from ore is known as lixiviation and the solvent most generally used is cyanide of potassium, although other solvents are known to metallurgists.

In the gravity system only the particles of gold and platinum heavy enough to be caught in riffles can be saved; the values in placer slimes, all miscroscopic and float gold, and all the values associated with the heavy sands are lost.

When we come to consider the saving of values by amalgamation we find hundreds of devices and machines which are designed to force sand, pulp, etc., into close contact with mercury; hundreds of patents have been issued for devices in which the gangue is passed through a mercury bath; but in practical milling operations only two devices are generally used—the copper plate coated with mercury, and the mercury riffle or mercury well. Only free, clean gold will alloy with mercury ordinarily, and only clean mercury has an affinity for gold. Gold in slimes will not amalgamate under ordinary conditions, and miscroscopic, rusty and coated gold cannot be saved by standard methods of amalgamation. Gold associated with sulphur, arsenic, lead, zinc, iron and tellurium amalgamates with difficulty or not at all, owing to the fouling and sickening of the mercury. Values in slimes cannot be saved on the standard mill plate by usual methods.

In milling operations when mercury wells are used the surface of the mercury often becomes covered with a coating of fine sulphides, which diminishes its alloying properties; for this reason mercury wells are not found in many mines in the United States although they are generally used in Australia.

In lixiviation we find endless difficulties; only when certain conditions are present can cyaniding be profitably employed; there are large areas, such as are found in Idaho, where there are hundreds of mines in which the ore is not amenable to cyanide treatment. While in lixiviation theoretically we have an ideal method of gold extraction, yet in practice we find the system hedged about by a multitude of exasperating troubles; generally speaking, cyanide plants are expensive to install, difficult to operate, and the average extraction is not over 85 per cent.

In view of the above very conservative statements regarding the shortcomings of the three popular systems of gold extraction, it is not strange that investigators have long sought improved methods in the metallurgy of precious metals.

Electrochemical science has devised improved methods for the reduction and refining of the useful materials, and it is not unreasonable to suppose that the same science will point the way to even greater improvements in the metallurgy of gold.

We will suppose that both the positive and negative electrodes or wires of a battery or dynamo are immersed in water, the two electrodes being an inch apart. The positive electrode is known as the anode, the negative pole as the cathode, and the separating water is called the electrolyte. When the battery or dynamo is in operation, lines of electrical force pass between the anode and cathode through the water, and there take place in the electrolyte a number of reactions; in other words, electrochemical conditions are present in the water, and these conditions form the key to the electrochemical system of amalgamation and lixiviation. An interesting experiment can be tried by any one. Pour a few ounces of mercury into a flat glass or porcelain dish, pour over the mercury half an inch of water containing a pinch of salt or a few drops of acid; immerse the negative wire from a dry battery in the mercury. Now touch the water only with the positive wire and note the activity that at once is manifest. Try this experiment with dirty mercury and note the instantaneous brightening and cleaning of the mercury. Place the positive pole in the mercury and the negative in the water, and the mercury soon becomes foul. Restore the wires to their original positions and note that the mercury clears at once. Grind the mercury in a small mortar with some sulphur or oil and it becomes foul. Now return the foul mercury to the dish and apply the current as at first. Note the clearing of the mercury and see how quickly the detached globules coalesce. Then remove the mercury and add a pinch of bichloride of mercury to the water; immerse both wires and note how quickly there is a deposition of mercury on the cathode or negative wire. In this simple experiment is the germ of the electrolytic system for the recovery of precious metals. While the theory of electrochemical action has been known for many decades, it is only within the last few years that methods and machines for making a practical use of the theoretical knowledge have been devised.

A distinction should be made between electrochemical amalgamation and electrochemical lixiviation. In the first place no solvent is used, and the values are recovered directly in the form of amalgam. In electrochemical lixiviation the action of the solution is hastened by the presence of the electric current, and the values are deposited by electro-deposition on suitable cathodes; the cathode may be lead, copper, aluminium or mercury.

Electrochemical amalgamation may be used in connection with (a) the standard mill plate, (b) mercury wells, or (c) the mercury bath (pan amalgamation.)

When the usual copper plate is used, anodes are suspended above it close enough to come in contact with the passing flow of water and pulp, which acts as an electrolyte. The copper plate is connected as the cathode.

Electrolytic sluices with suspended anodes require more water than the usual mill plate. Mercury may be supplied as in the usual practice, or it may be supplied to the water in the form of a solution of bichloride of mercury. A solution of common salt added to the water greatly increases the efficiency of the device. High-grade graphite anodes give the most satisfactory results; there is a grade of graphite made especially for anodes which is superior to the ordinary carbon. A current density of one-tenth to one-quarter ampere per square foot of cathode surface is ample.

Mercury wells such as are described in the second volume of Richard's work on Ore Dressing can be connected electrolytically and their efficiency greatly increased, some tests were made some years ago in South Africa with mercury wells in which the baffle plates were connected as anodes, and I am informed that a similar construction is now being successfully used in California. There are several methods of constructing electrochemical mercury wells and many experiments have shown that the electrolytic mercury well is a very efficient gold saver; there is no fouling or flouring, and no scums or coating of sulphurets collects on the mercury. Electrolytic mercury wells will extract values from slimes and will recover gold that cannot be amalgamated by the usual methods; they require no skilled attention and possess many advantages over plates.

In pan amalgamation, anodes are suspended from the stirrers and the mercury is connected with the negative wire; various systems of pan amalgamation have been described especially in connection with cyanidation (Parks, Pelatan-Clerici, Molloy, Hannay, etc.) but there is no essential difference in these various processes.

Turning to electrochmenical lixiviation, the claim is made that under electrochemical conditions the cyanide solution is more active than usual; values pass into the solution which are lost in the ordinary systems; the time of treatment is reduced and the extraction increased, while there is a decrease in the operating cost; precipitation by electro-deposition goes on simultaneously with the leaching process and the usual troubles are eliminated; a molecule of cyanogen after taking up a particle of gold, is released as nascent cyanogen, having greatly increased affinity for gold and silver. The solution is constantly regenerated, the loss of cyanogen being negligible. The larger particles of gold are amalgamated directly without passing into the solution. In electro-cyanidation the pulp and solution are agitated in a shallow tank having the bottom covered with quick silver (cathode); revolving stirrers cause the pulp to travel with a circular motion over the quicksilver for an hour or two; this is equivalent to passing the pulp over several miles of mercury surface. During this period the values are amalgamated directly or pass into the solution and are precipitated by electrolysis, the extraction averaging 97 per cent. All ores, so far as known, are capable of successful treatment by means of electro-cyanidation.

Within the next few years, I expect to see the electrochemical cyanidation process perfected to such an extent that it will become automatic and continuous; pulp from the mill will continuously enter a series of tanks, and from the lower end of the system the tailings will be continuously discharged. In fact plans for such a continuous system have already been prepared.

At present electro-cyanidation is in the experimental state, although it was once used quite successfully for several months at the De Lamar mine in Idaho; electro-deposition (Siemens-Halske process) is successfully employed in many mines in South Africa.

Let us consider again electrolytic amalgamation, taking as a text the so-called base or rebellious ore. When low-grade pyritic ore is crushed to 100, 150, or 200 mesh, practically all the gold is released as free gold; but only a small percentage of the assay value can be recovered by the usual mill plate. Gold when in a very finely divided state quickly becomes coated with argillaceous, talcose, sulphurous, or arsenious coverings, and it will not amalgamate; very fine gold easily acquires coatings, gaseous or otherwise, which effectually prevent the amalgamation contact; values in slimes cannot be extracted by the usual mill plate; particles of gold in placer deposits sometimes become coated by local galvanic action, and we have rusty, silicious, or cupreous coatings which effectually prevent amalgamation. With electrochemical conditions, all these difficulties are automatically overcome, and the broad statement can be made without fear of successful challenge that all values not encased are recovered, including platinum and the values associated with black sand.

In electrochemical amalgamation and cyanidation, a few pounds of common salt should be added to every ton of ore or pulp; by electrolysis the chloride of sodium is reduced to nascent chlorine and nascent sodium. Bichloride of mercury is also added to the water or solution; this salt under electrolytic action evolves nascent chlorine and mercury. As a result of these reactions, an alloy of nascent sodium and mercury is formed; this alloy absorbs nascent hydrogen produced by the decomposition of the water, and the resulting compound, known as hydrogen-sodium amalgam, has a powerful affinity for gold; in fact no compound known to science has a more powerful amalgamating action. The water and solutions become charged with nascent chlorine and hydrogen; these gases instantly destroy foul or greasy substances in the pulp; rusty or coated gold is quickly cleaned, the gases mentioned reducing all oxides. Nascent hydrogen reduces oxides at normal temperature. As a result of this cleaning and reducing action, gold particles have been freed from all substances that would prevent amalgamation, and amalgamation takes place at the first contact with the mercurial surface. Electrochemical action keeps the mercury in a perfect state, and it also prepares the gold for amalgamation; in the mercury riffle or well we have the necessary fall to bring every particle of gold into intimate contact with the mercury surface. And as the quickened mercury surface is at all times exposed to the passing pulp, we have the most perfect conditions possible for effective amalgamation. We have therefore all the specifications which would be called for in an ideal amalgamation device—simplicity, low cost, ease of installation and operation, absence of skilled attendance, large capacity, and high percentage of extraction.

In using the electrolytic system in placer and dredge operations, the auriferous material is at first passed through a series of screens until a 10 or 12 mesh concentrate is obtained; the coarser particles of gold will be saved by the usual riffle system. The 12-mesh concentrate, containing the values ordinarily lost, is then

passed over the electrolytically connected plate or riffles of suitable length and 95 per cent. of all values not encased are recovered at a trifling expense. The successful application of the electrolytic system on gold dredges would double the net savings. Under the present system the fine tailings of the dredges generally contain greater assay values per ton than the amount of gold recovered; that is, on ground where 15 cents per yard is recovered it will generally be found that the assay value of the tailings is 25 or 30 cents per ton. In ten years I estimate that gold and platinum to the amount of $25,000,000 have passed through the tail sluices of California dredges and have been forever lost. Within the next ten years the value of the lost gold in the dredge tailings will exceed $40,000,000, unless some new system of successfully extracting these elusive values is discovered.

THE ZINC MINING INDUSTRY IN BRITISH COLUMBIA.

A convention of mine managers and others directly interested in the mining industry, especially in lead-zinc mining, was held at Nelson, British Columbia, on December 15. There was an attendance of between 40 and 50, including most of the managers of the larger lead and zinc mines of the Kootenay district. Among those present were: W. H. Aldridge, managing director of the Consolidated Mining and Smelting Company of Canada, Ltd.; J. S. Airheart, general manager, and Geo. B. Squire, general superintendent, of the Highland-United Mines, and R. A. Airheart, superintendent of the United mine, all of Ainsworth; James Anderson, of the Ruth Mines, Ltd., Sandon; A. J. Becker, manager of the Lucky Jim and Sunset mines, Slocan; G. O. Buchanan, Dominion Supervisor of Lead Bounty, Kaslo; G. F. Caldwell, Utica mine, Kaslo; A. Fournier, manager of the Selkirk Mining Co., Ltd. (Cork mine), Kaslo; S. S. Fowler, general manager the Canadian Metal Co. (Blue Bell mine), Riondel; H. Giegerich, No. 1 mine, Ainsworth, and Province Mine, South Fork of Kaslo Creek; A. H. Gracey, Nugget Mines, Ltd., Sheep Creek, Salmo; Chas. J. Greenstreet, Big Ledge mine, Upper Arrow Lake; F. W. Guernsey, Consolidated Mining and Smelting Company, Trail; Robert R. Hedley; E. Jacobs; A. H. Kelly, Dandy mine, Nelson; John Keen, Goodenough mine, Kaslo; G. Weaver Loper, vice-president Lucky Jim Mines; D. H. Nellis, Woodberry Creek, Ainsworth; T. G. Procter, Nelson; A. D. Wheeler, Gallagher mine, Ainsworth, and W. E. Zwicky, manager Rambler-Cariboo Mines, Ltd., Kaslo.

The holding of the convention was proposed by W. R. Haldane, district freight agent for the Canadian Pacific Railway Company, who interested prominent Nelson men in the matter. F. A. Starkey, president of the Nelson Board of Trade, and E. K. Beeston, secretary, then took the matter in hand and made all arrangements for the meeting in Nelson, which, after it had been called to order by Mr. Starkey, elected Mr. Keen chairman and Mr. Beeston secretary. Numerous letters of apology for inability to attend and of hearty sympathy with the chief object of the meeting, were read by the secretary, the writers including R. F. Tolmie, Deputy Minister of Mines for British Columbia; R. W. Brock, Director of the Geological Survey of Canada; Dr. Robert Bell, Ottawa; J. L. Retallack, of Kaslo (who is at present in Ottawa), and Thos. Kiddie, Vancouver.

The question of how best to bring about the provision of facilities for the profitable reduction of zinc ores so that the immense quantity of low-grade zincky ore occurring in British Columbia, particularly in Ainsworth and Slocan districts, was first freely discussed. Mr. Fowler gave the meeting some information relative to the present market for zinc in Canada. He quoted customs statistics showing that the imports into Canada of zinc in all forms—spelter, blocks and sheets, zinc white, oxide, etc., amounts annually to about 7000 tons, of a total value of about $752,000.. While this consumption may be small in comparison with that of some other countries, it is worth looking after. It is questionable whether it would be wise to ask the Dominion Government for aid in the shape of a bounty on zinc produced in Canada, similar to that now given on lead, or for higher custom duties on zinc and its products. The granting of a bounty on zinc ores might have the effect of destroying the existing market in the United States for Canadian zinc ores, and this without providing any other way for the disposal of such zinc ores and concentrates from this province. He advocated requesting the Dominion Government to make experiments in connection with the smelting of zinc ores by electro-thermic process. It was known to all that Dr. Haanel, director of the Mines Branch of the Department of Mines of Canada, had successfully carried out experiments in the smelting of iron by electricity. If the government would authorize similar experiments in connection with zinc, the Canada Zinc Company's plant in Nelson would be at its disposal, if required, or another plant could be provided by the government if thought preferable. The demonstration of the possibility of making the electric smelting of zinc commercially successful, would be a great boon to the mining industry of the Kootenay.

Mr. Loper directed attention to a provision in the United States tariff, under which the amount of any bounty paid would be added to the customs duty to be paid on articles or merchandise sent into that country, and he opposed the suggestion to seek government assistance in the shape of bounty. He advocated rather the proposal to ask for assistance in the electric smelting of zinc.

Mr. Greenstreet supported Mr. Loper's views, and added that if the electro-thermic smelting of zinc can be made commercially successful, then British Columbia, with its large quantities of zinc-bearing ores will be in a position to control the situation.

Mr. Aldridge thought the first step should be to ask the government to adopt a similar policy in regard to zinc in the West to that it had so successfully done in the East in connection with iron. The government will, no doubt, if properly approached, be prepared to make the necessary investigation and carry out the proposed experiments. The presence of zinc in lead ores is a detriment to lead smelting, so his company which has trouble in smelting ores in which there is much zinc, will be glad to co-operate with others interested in getting something practical done. In his opinion the sum of $50,000 would go a long way towards proving whether the smelting of zinc ores by electro-thermic

methods can be made to compete successfully with the present methods of making spelter.

Mr. Buchanan narrated the history of earlier movements in connection with seeking the aid of the Dominion government for the lead and zinc industries, pointing out that the Associated Boards of Trade of Eastern British Columbia had led in these matters, and the government had generally met them in a very friendly spirit. In connection with the establishment of the Dominion Department of Mines, the appointment of Hon. Mr. Templeman as Minister of Mines the appointment of a Zinc Commission and the naming those who constituted that commission—in all these things their representations had been acted upon by the government, so he thought a similar friendly attitude would be adopted towards them in the matter of assistance to the zinc mining industry.

Mr. Caldwell urged that the question of the desirability of asking for a bounty on zinc ores be thoroughly discussed at the afternoon session the convention would hold. He had benefitted repeatedly from the lead bounty, and thought many other small operators would find a bounty on zinc of similar assistance.

Mr. Zwicky informed the meeting what was done when the Dominion parliament was last in session towards securing $50.000 from the unearned lead bounty for use in experimenting with the electro-thermic smelting of zinc. He had no doubt the Canada Zinc company would place its plant at the disposal of the government for the purpose of making the proposed experiments.

After further discussion, Mr. Fowler again submitted that the chief object in view is to establish zinc smelting by the electro-thermic process on a commercial basis. He reminded the meeting that spelter is being produced electrically in Europe. The question is, can it be produced commercially here? The work already done by the Canada Zinc Company seems to indicate that success is possible.

It was then resolved that the Dominion government should be asked to make experiments, as advocated by several of the speakers and the following committee was appointed to draft a resolution for presentation to the government: Messrs. Aldridge, Anderson, Aylard, Buchanan, Fowler, Greenstreet, Loper, and Squire.

At the afternoon session this committee presented the following report; which was adopted:

"Nelson, B. C., Dec. 15, 1909.

"Mr. Chairman and Gentlemen of the Convention:

"Your committee appointed to draft a memorial to be presented to the honorable minister of mines upon the subject of aid to the zinc industry begs to report:

"We recommend that a memorial in the terms following be prepared to be signed on behalf of this convention by the chairman and secretary for transmission to the honorable minister.

"This convention, consisting of some 50 gentlemen, representing mining smelting and commercial interests in Kootenay, B. C., begs to submit to the honorable minister the following facts in regard to the industry of the production of zinc:

"That the smelter erected by the Canadian Metal Company at Frank has been pronounced a commercial failure and its operation as a zinc smelter has been abandoned.

"That the plant established by the Canada Zinc Company at Nelson for the treatment of zinc ores by an electrical process has been idle for one year, with apparently no prospect of its resumption.

"That for the year 1909 11,000 tons of zinc ores with average contents of 50 per cent. of zinc have been shipped from Kootenay points to the United States.

"That a very large quantity of zinc necessarily mined in connection with the production of lead ores has been wasted, or remains piled up on the dumps.

"The developments during the year, particularly upon the property known as the Big Ledge, on Arrow Lake, indicate that the supply of zinc ores in sight calling for treatment is very much larger than has heretofore been supposed.

"That the Payne tariff of the United States adopted this year imposes a duty of 1 cent per pound upon the zinc contents of ores carrying more than 25 per cent. zinc.

"That railway rates upon ores from Kootenay points to United States zinc smelters are very much higher than are the rates upon Mexican ores.

"That these conditions, which may now be considered as permanently fixed, render impossible the export to the United States of any but very high-class zinc ores, and upon these latter absorb the greater part of the profit to the producer.

"That from the returns of the Customs Department of Canada it appears that there are imported into Canada annually zinc products to the amount of over 7,000 tons, worth, according to customs valuation, over $750.000.

"That it is highly desirable that we should have established a smelting plant capable of treating our own ores and of turning out manufactured products of zinc at least to the extent of supplying our own market.

"That this convention therefore begs respectfully to request that the Department of Mines of the Dominion Government will take this matter up and conduct experimental work upon such a scale as will determine definitely the practicability of the economical treatment by electro-thermic or electro-chemical process of these zinc ores."

It was decided that a copy of the memorial contained in the report of the committee should be sent, not only to the Hon. the Minister of Mines, but as well to the Right Hon. the Prime Minister (Sir Wilfrid Laurier) and other members of the Dominion Government; A. S. Goodeve, M.P. for Kootenay, and Martin Burrell, M.P. for Yale-Cariboo; also to members of the Provincial Government for their information.

A committee, consisting of Messrs. Keen (chairman), Fowler, Greenstreet, Loper, and Beeston (secretary), was appointed to forward the memorial to the Dominion Minister of Mines, and, in case necessity shall arise, to reply to any enquiries that shall be made in connection with the subject matter thereof.

Mr. J. C. Harris, New Denver, urged the desirability of endeavouring to induce the Provincial Government to reconsider the two per cent. mineral tax with a view to adopting some more equitable method of taxing mines and mineral claims. He argued at length in favour of this course, and submitted a resolution accordingly.

Mr. Jacobs stated that in 1904 a committee was appointed by the then existing Provincial Mining Association to suggest to the Government an equitable substitute for this tax, but had failed to agree upon anything practicable. He reminded the meeting that plant, machinery, buildings, etc., on mines are not taxed, as is similar property at smelteries, lumber mills, and other industrial establishments. He mentioned the method followed in another country, in which he had

lived, in meeting the evil of unworked mining properties, against which Mr. Harris had so strongly urged action, but those were leased mining lands, and forfeiture, if the work clauses of the lease were not lived up to, was the customary penalty. He did not think mining men in this country would support such a revolutionary change, even were the Government asked to adopt it.

This resolution met with a similar fate to that of Mr. Caldwell—it was given a six months' hoist.

On motion of Mr. Jacobs, seconded by Mr. Fowler, the meeting adopted a resolution of appreciation of the valuable work the Dominion Department of Mines, especially the Geological Survey branch, has done and is doing in the West, particularly in British Columbia. The meeting was then adjourned.



T. L. WILLSON

THE McCHARLES PRIZE.

To Mr. Thomas Leopold Willson, of Ottawa, Ont., has been made the first award of the McCharles Prize. Mr. Willson was the pioneer in the manufacture of calcium carbide upon a commercial scale. He is a native of Canada. His inventions are the basis of a large industry.

The committee appointed to award this prize was made up of representatives from the Faculties of Applied Science of the University of Toronto, the Kingston School of Mining, and McGill University.

SOUTH LORRAIN.

Written for the Canadian Mining Journal by Frank C. Loring.

The pioneer company in the way of extensive improvements is the Keeley Mine, Limited. This company has erected a gas producer plant, furnishing power for a 10-drill compressor, 50 h.p. electric hoist, pumps, etc. Mine buildings are extensive and electric lighted. Entire plant is in excellent shape. Development consists of shaft 130 feet deep, with about 300 feet of drifts, shaft 100 feet deep, also many open cuts and trenches. Three carloads of ore have been shipped. These figures are approximate.

The Wettlaufer Mine has a 5-drill compressor, two 60 h.p. boilers, and other machinery to correspond, and extensive, well-constructed buildings, all electric lighted, capable of accommodating 80 men. Development consists of a shaft 140 feet deep, and about 500 feet of levels. Shipments to date, all since July, are 80 tons of first-class and 30 tons of second-class ore. This mine has a large quantity of ore in reserve, and will be a steady shipper.

The Montrose, Harris Lorrain, Lounsbury, and Murray have steam plants. Among other mines in operation are the Newman, Little Keeley, Keeley-Jowsie-Woods, Haileybury Silver, Clear Lake, William, Maiden and other properties with which I am not familiar. All of these are in the Keewatin greenstone or diabase rocks, and generally not further than two claims from lines of contact.

Work has been materially stimulated during the past year by the remarkable development on one of the mines above mentioned, as well as sensational surface discoveries on other properties.

Some of the veins in South Lorrain are characterized by great strength, sometimes being traceable for three or four claims. They often follow well-defined lines of faulting. They should consequently be deep seated, and although there is at present slight evidence as to depth at which ore can be found, there are possibilities in excess of some of the mines in the superficial Huronian slates and conglomerates. The advent of comparatively cheap electric power during the next few months will greatly stimulate development. There is evidence of much more extensive operation for the future.

Summer transportation is by steamer to Silver Center, on Lake Temiskaming, thence by wretched wagon roads to the mines. No effort has been made to assist the miners in maintaining good roads. During the winter snow roads from Haileybury and Cobalt, or Temagami, are used.

Personal and General

Major R. G. Edwards Leckie will spend the winter in Vancouver, B.C.

Mr. C. H. Macnutt has assumed the general management of the Poderosa Mining Co., Ltd., in Chile.

Mr. J. D. Hurd has resigned his position as general manager of the Crow's Nest Pass Coal Company.

Messrs. Eugene Coste, R. W. Leonard and G. R. Mickle have been elected members of the Institution of Mining and Metallurgy.

The following gentlemen were elected to membership in this institute at a council meeting held on Dec. 3rd:—

Members

Adsit, L. M., Eustis Mining Co., Eustis, Que.
Annable, H. W. C., Grisham House, Egham Surrey, England.
Bateman, G. C., Supt. Hudson Bay Mines, Ltd., Cobalt, Ont.
Frecheville, Wm., 35 Queen Victoria St., London, E.C., England.
Lathe, Frank E., Granby Con. M. S. & P. Co., Grand Forks, B.C.
Macaulay, D. A., International Coal & Coke Co., Coleman, Alta.
McLellan, J., Skidegate, B. C.
Miles, Arthur D., Sudbury, Ont.
Passow, F. M., Eustis Mining Co., Eustis, Que.
Rogers, R. P., Box 587, Cobalt, Ont.
Shillington, Robt. T., Haileybury, Ont.
Wilson, David G., Supt. Crow's Nest Pass Coal Co., Hosmer, B.C.,
Winckler, A. Lange, Box 609, Gow Ganda, Ont.
Young, Jacob W., Mgr. Cobalt Central Mines, Cobalt, Ont.

Student

Rayner, Geo. W., Thorold, Ont.

Yours faithfully,
H. Mortimer-Lamb,
Secretary

Book Reviews

Index of Mining Engineering Literature. By Walter R. Crane, Ph.D. 8vo., 812 pages. Cloth, $4.00 net. Morocco, $5.00 net. John Wiley & Sons, New York; Renouf Publishing Co., 61 Union Avenue, Montreal.

Professor Crane has made a place for himself in technical literature. He possesses industry, erudition, and ambition. But we fear that, in the parlance of the vulgar, he has bitten off more than he should have.

The elaborate analytical index issued last year by the American Institute of Mining Engineers purported merely to cover the transactions of that society. It was elaborately complete. Professor Crane's index, it is claimed, covers eighteen engineering publications—and more also.

Professor Crane's index is neither complete nor exact. He has confined his references to periodicals with which he happened to be familiar. And his field has been narrow. Not a few of the most useful periodicals are not indexed at all. To our sorrow, for instance, we find that the Canadian Mining Journal is not indexed at all. Also we find that our predecessor, the Canadian Mining Review, is indexed under an inaccurate title. Other sins of omission and of commission we have noticed. Therefore we feel justified in stating that Professor Crane should not have rushed into print; he should have held his manuscript by him for another five years.

Possibly the author's initial mistake is indicated in his preface. "It [the index] represents," says Mr. Crane, "the unaided labour of the author for a period of about five years." We contend that the author was guilty of a lapse in judgment in trying to bring out any such volume by himself. To this may be attributed the imperfections of the book.

However, having said our worst concerning Professor Crane's "Index," we may be permitted to say that in several respects it is very worthy of commendation. Particularly praiseworthy is the subdivision of subjects. Incomplete as each section must necessarily be, it will prove instructive to the engineer to find, grouped under heads, numerous references to subjects such as "Mill Machinery," "Animals in Mines," "Ventilation," "Tunneling," etc., etc.

We have, perhaps, said our best and our worst of the book under discussion. At worst it represents the faithful though inaccurate labours of a diligent student and reader; at best it is a compact work of reference for the engineer who reads and wishes to remember. It will do no harm to add this book to the reader's library.

CORRESPONDENCE

NASCENT GOLD AGAIN.

Probably more than the usual number of men with questionable processes for the recovery of gold and silver are at present abroad in the land. One of these, Mr. Eden, recently visited the School of Mining, and proposed that he should demonstrate his method. He claimed that it would extract more gold from an ore than any of the ordinary assay or metallurgical methods.

As such an opportunity might not come our way again, we thought it advisable to give his process a fair trial. We thought it our duty to give the public as convincing proof as we could that there was nothing in Mr. Eden's claim. We approached the subject with as nearly unprejudiced minds as was possible under the circumstances.

His method, as used here on a laboratory scale, was to take 1 A.T. of pulverized ore, add 10 c.c. of his solution, and a small quantity of mercury, and rub all together in an agate mortar for a few minutes; then to dissolve the mercury in nitric acid, and thus recover the gold.

The following is a statement of the tests made, by whom made, and the results obtained:—

Tuesday, Nov 23rd—A test made by Mr. Eden, without supervision of any kind, on a sample of Larder Lake ore, finer than 100 mesh, gave 1.25 oz. per ton.

Wednesday, Nov. 24th—Tests made on same sample as above:—

(1) Fire assay (by McKay)—average of five, checking satisfactorily—0.202 oz. per ton.

(2) Mr. Eden's method (by McKay)—0.28, 0.16, 0.19 (2 A.T. gave 0.38 m.g.), 0.05 (omitted), and 0.11 oz. Average of four results, 0.185 oz. per ton.

Total weight of four beads, 0.98 m.g. After adding silver and parting, 0.95 m.g.

These five samples were weighed alternately with the five taken for fire assay. Mr. Eden expressed his satisfaction with the way in which the tests were carried out.

(3) Mr. Eden's method (by Eden, with close supervision), 0.20 oz. per ton.

Tests made on sample of Belmont ore:—

(1) Result of mill run by students on two tons of ore, of which this was a sample, made some weeks earlier, 0.226 oz. per ton.

(2) Mr. Eden's method (by Eden, closely watched), (2 A.T. gave 0.26 m.g.), 0.13 oz. per ton

Tests made on slimes from above mill run:—

(1) Fire assay (by McKay), 0.03 oz. per ton (3 assays).

(2) Mr. Eden's method (by Eden, closely watched), (2 A.T. gave 0.03 m.g.), 0.015 oz. per ton.

A gentleman who was with Mr. Eden throughout these tests was given a sample of this Larder Lake ore, which assayed, as above stated, $4 per ton. He wrote us that, in Toronto, he, using Mr. Eden's method, got results of $17, $15, and $12 per ton, respectively, on three 1 A.T. samples.

A glance over the above results will show that although it was possible to obtain almost any quantity of gold on unsupervised tests, yet in no case did we get a greater saving of gold than might be expected from amalgamation with the aid of intimate contact between the pulp and the mercury. Needless to say, this was all we expected to prove.

Kingston, Dec. 20th, 1909. G. J. McKAY.

Editor Canadian Mining Journal:

Sir,—The following extract from the proceedings of the Select Standing Committee of the House of Commons on Mines and Minerals, recently issued, should not pass without a challenge. This extract reads:—

"Mr. Congdon.—I would like to ask the Minister if he thinks it desirable to endeavour to get a conference with the different provinces with the view to securing, to a certain extent at all events, uniform laws. Although it is impossible to get them entirely uniform, it would be of enormous advantage if the backbone, so to speak, of the legislation with regard to mining, was similar throughout the Dominion. There is one matter especially that is worthy of consideration; take the Yukon, for instance, occasionally a geologist comes in there, he spends the summer there, but he will not tell any one that he has discovered anything. About two years later we discover in some report that he has found something that is valuable—after the information has absolutely ceased to be of any value to any one. It seems to me that one of the most important things to be done in that connection would be to have one man in your department whose duty it would be to collect all the information in regard to that particular section of the country, who would spend most of his time in that country, and who would not wait for the publication of his report before giving out any information, but who would publish it as he goes along. Then it would be of some use to the people for whom it is intended. My own experience of geologists is that they are so infernally careful of their reputation that they are of no use to themselves or any one else, and that is the case with mining experts generally as a rule. They are very careful about making any definite statements that there is mineral of value there; it does not hurt a man's reputation if, after he has reported adversely, a property should turn out to be of some value, but if he should report favourably and it should not turn out to be valuable, it would injure his reputation. The whole of those geologists who have gone out from the department are so frightened of their reputations that they will not give out any information until they get back here and spend a considerable amount of time in eliminating every valuable feature from their report until they get something so commonplace that when it is published it is no good to anybody. I believe that in the Yukon, say, if there was a man of experience in the rock mining industry sent in there and allowed to remain there and to give out information to the people, and I believe the same is true of other sections of the country, such a man would be of invaluable service to the mining industry; more valuable than all the other portion of the Geological Department has been. I would call attention to the valuable work of Mr. A. H. Brooks, of the United States staff last year in the American territory. Although he was working in the American territory, he has done more good to the Yukon territory than all the men we have had in there, simply because his life is devoted to pointing out the value of the resources of the northern country, and of course there is not much difference between the Yukon and Alaska."

Mr. Congdon praises the work of A. H. Brooks in Alaska for the U. S. Government. What has this, good as it is, to do with the Canadian Yukon. His reports and information are given after mature consideration, very much in the same way as those of our own men. I think Mr. Brooks himself would hasten to disclaim the praise of Mr. Congdon.

When the people poured into the Yukon in 1898 they had with them, if they cared to carry them, Dr. Dawson's maps and report of 1887. A special revised edition of this being hastened for delivery in 1898. In that same year two parties, under Tyrrell and McConnell, were sent into the Yukon, and from that day to this field exploration has been especially active, followed each winter by reports which conveyed useful information to the general public, who paid for getting it.

If our Canadian geologists gave judgments in the field to more or less local interests, it would be hard to draw the line as to how small a coterie might receive such news. Moreover, as the Minister, Mr. Templeman, pointed out, the officers have no option in this matter. Nor is it desirable.

As to the deliberation used in getting out reports, mineral wealth is more than a summer harvest; it will keep a while, and these same reports will become very useful to those stable mining concerns and prospectors who stay in the business.

If those who call for redhot reports would heed them when they appear, we should not have the troublesome inflations of the Kootenay, Yukon and Cobalt. Who should be better able to criticize the work of the Geological Survey than the members of the Canadian Mining Institute? Yet we find that Institute steadily supporting and trying to magnify their work.

My own travels have been so continually through districts where the work of the survey is appreciated, and so dependent upon the reports and maps issued from the Geological Survey that Mr. Congdon's attitude amazes me. In fact, I do not think he would find condemnation of this work a good plank in the platform of any mining constituency in Canada.

An allusion is made to "mining experts." These may be, what they may be, the common "mining expert" is only too ready to be the opposite of "infernally careful." Experience in the boom camps of Canada shows him to be only too ready to talk and to be as infernally dishonest as the geologists would be if they followed the plan of giving early information on the spot.

J. C. GWILLIM.

Kingston School of Mining.

SPECIAL CORRESPONDENCE

ONTARIO

Cobalt, Dec. 18.—Two more properties in the North Cobalt district have recommenced operations. These are the Red Rock and Green-Meehan, which are now operated by the same company, known as the Cobalt Consolidated Silver Mining Company. During the past summer all the work was confined to surface prospecting, and it is understood that some good indications were discovered. These will be developed by a continuation of the underground workings. It had been the intention of the management to wait for the power which is being brought in, but as so many false reports have been sent out regarding the date of its arrival, it was decided to start work with their own steam plants.

Recent developments on the Lawson have shown that the course recently pursued by the new directorate in cutting the dividend was warranted. A short time ago an upraise was started from the 88-foot level on the main vein, commonly known as the "Silver Sidewalk." This upraise was continued to the surface, and it was found that the rich silver values as seen on the surface did not extend to a much greater depth than fifteen feet. The action of the directorate in cutting the dividend so soon after coming into control aroused a storm of criticism from all over, but it has been shown that this course was probably the wisest that they could have pursued. Some high-grade ore, however, has been found on the 88-foot level of the Lawson No. 5 vein. The failure of the phenomenal values of the "Silver Sidewalk" to extend to depth should not be taken as a criterion for estimating the value of the contents of the other veins, as it is necessary to carry out an extensive course of development work. Unfortunately, progress in this direction has been greatly retarded by the failure of the power companies to deliver air.

In sinking the shaft on the Silver Cross property, the diabase was encountered below the Keewatin at a depth of 123 feet.

Good reports are coming from the Beaver. A short time ago they shipped a car of high-grade ore, and they will have another ready before long. The vein from which this ore is being taken has been in the past extremely irregular, but lately it has been very regular, and has carried high-grade values throughout. Another property which has lately resumed shipments is the Townsite. This company was reorganized some months ago, and working capital furnished by English capitalists. Since that time the outlook has been steadily improving, and now the management is considering the erection of a mill to treat the large tonnage of milling ore that they have in the mine.

In connection with the recent purchase of 54,550 shares of the treasury stock of the Trethewey Mining Co., A. E. Osler & Co. have issued a statement as to the reserves of the Trethewey. The report states that the ore in sight is estimated at about five million ounces. Reports like this, however, should not be considered too seriously, as the man sent by the brokerage house to look into the property did not even see underground.

Some good ore is being taken out of the new vein found on the Maiden Silver property in South Lorrain.

Another rich ore shoot has been struck in the No. 14 vein on the Crown Reserve. For some time past the silver values have been small, but in the ore shoot just encountered they run several thousand ounces per ton. On the Silver Leaf property a large amount of development work is being carried on with favourable results. The old Silver Leaf shaft on the Crown Reserve boundary will shortly be connected with the Crown Reserve workings.

Work has been started on the foundations of the sampling plant which is being put up by a firm of local engineers. This plant will handle both low and high grade ore, and if the smelters will agree to abide by its results, it would prove to be of great assistance to the mining companies, as they will then be able to find out the value of the ore before it is shipped. This will be particularly advantageous with regard to low-grade ores, as on the value of its silver contents depends very often the smelter to which it will be sent.

A few days ago the thaw-house at the Farah was blown up, but fortunately no one was injured. This is the third dynamite explosion that has occurred within the last six weeks, the others being of a similar nature. None of them, however, was attended by any fatalities.

The district of South Lorrain is beginning to come in for a good deal of attention lately, influenced largely by the shipments made from the Keely and the Wettlaufer. A total of four cars of ore has been shipped by the latter property for this year, and it is probable that more or less regular shipments will now be maintained, as developments on the 100-foot level have shown the veins to continue fully as good as on the upper levels.

In drifting on the main vein from the No. 6 shaft on the 75-foot level of the O'Brien mine, a very rich shoot of ore was found. The vein had been lean for some distance, but at a distance of 500 feet from the shaft the values came in again. The wall rock is also well mineralized, which will give considerable tonnage of ore for milling purposes.

A concern known as the Ontario & Quebec Reduction Company is putting up buildings for a plant on the shores of Lake Temiscaming, to treat the high-grade ores of Cobalt. It is stated that the capacity will be 25 tons a day. The company is financed by Montreal capitalists. The Nipissing Central Railway when in operation will connect the mines and smelter.

A good many of the Gillies Limit claims purchased in the recent sale are now being actively developed. It is understood, however, that many of the purchasers are already regretting the high prices paid for these lots, as it is believed that they were out of proportion to their value. Development is, and will be, retarded, however, on account of the lack of power, but as soon as the power companies are in a position to distribute air and electricity, development will be carried on on a large scale, and underground work will be started on many of the claims now lying idle. Although the Hydraulic Company has promised air for the middle of January, it is very improbable that they will be able to deliver it till about a month or two after that date, as there still remains a large amount of rock work to be done in the 1,000-foot tunnel between the intake and outlet shafts.

The Waldman has struck its big vein in the east drift, and from that point an upraise will be started. The shaft on this property is now down 90 feet, and drifts are being run on the 75-foot level. The new plant on the Wyandoh is being rapidly installed, and there will now be on the ground a six-drill compressor and two 60 h.p. boilers. It is stated that the plant will be in operation about Christmas time.

The Mount Royal Silver Company has called a special meeting for Dec. 22nd to discuss the advisability of issuing 200,000 shares of stock at 25 cents. At the present time there are 700,000 shares in the treasury. The money raised by the sale of stock will be used to buy machinery to develop some of the veins found on the surface. This property is situated at Elk Lake.

A short time ago a deputation waited on the Premier of the Province to ask for a reduction of the excessive royalties which some of the mines are forced to pay. In the past the royalties were based on the gross value of the ore as it came from the mine. In future, however, the royalty will be based on the net profits accruing to those companies that were so fortunate as to have their royalties reduced. The Government has announced

that they have decided to make some alterations with the mining companies in the townsite of Cobalt and also Chambers-Ferland, and instead of having a flat rate of 25 per cent., they will charge a royalty of 25 per cent. on the net profits of the mines, which will be ascertained under the provisions of the Supplementary Revenue Act. The mines that will be benefitted will be the Townsite, Nancy Helen, City of Cobalt, Wright Mining Company, Railway Reserve, J. Harris, McCrae, Ontario Development and Mining Co., Chambers-Ferland, and the Cobalt Station Grounds. All of these properties, with the exception of the Chambers-Ferland, pay royalties to the T. & N. O. Commission. The Chambers-Ferland will pay directly to the Ontario Government. The properties affected that are shippers, and therefore directly benefitted by the reduction, are the City of Cobalt, Cobalt Townsite, Nancy Helen and Chambers-Ferland. It would appear that the Government has made these reductions without going very deeply into the rights or wrongs of the case, and only those companies are affected that are unable to pay dividends under the present excessive charges.

The chief topic of interest at the present time in this district is the new gold discoveries around Porcupine Lake. The country has been staked for miles, and as far as can be seen, it would appear that there will be a stampede into this country similar to the one into Gowganda a year ago. So far the lack of transportation facilities has discouraged many from going in, although a large number of prospectors have gone in on foot. Supplies are being concentrated in Matheson, so that they will be available when the road, which is going through to Night Hawk Lake, is completed. A large number of dog teams and horses are already on the ground, and more are arriving daily. A deputation of prospectors and miners interviewed the T. & N. O. Commission at Matheson, and were assured that every facility will be offered them for handling the freight and passengers from that point. Many sales have already been reported, and several well-known concerns have acquired property in the new district. A party of Pittsburgh men have purchased six claims for twenty thousand dollars, and a force of men will be sent in at once to develop these claims. The big firm of McArthur & Co., of Glasgow, Scotland, has also purchased six claims for a large sum, and already men and supplies are being sent in. This company proposes to sink four shafts to a depth of 200 feet each. The Timmins Syndicate has also left for this district with thirty men to erect camps on the Hollinger claim, and the O'Brien interests have also sent in a gang to help get the road in shape and take in supplies. Gifford Gold Fields, Limited, is also preparing to develop its holdings and has made provision for sending in men and the necessary supplies. It is understood that during the winter several companies will install plants. The development of this new section is being looked forward to with unusual interest, and unfortunately gold mining in Ontario has usually proved to be a rather unprofitable investment. This, however, has been due, to some considerable extent, to mismanagement, which unfortunately is so often apparent in gold mining. Many of the properties which will be developed this winter are, however, under the control of men familiar with mining in this district, and good results can be expected if it is possible to obtain them.

It is unfortunate for the Gowganda district at the present time that the Bartlett mine should have made such a poor showing. The wide publicity which was unfortunately given to this property last winter was responsible to a considerable extent for the boom which resulted, and the ensuing depression was much greater in consequence. If this property had been properly worked it might have had a good chance, but as it was, a plant which cost in the neighbourhood of $125,000 to install was put in before even a test pit of any extent had been sunk. The company is now unfortunately rather short of funds, and it is understood that unless money can be raised in some manner, work is likely to be discontinued.

BRITISH COLUMBIA.

Rossland.—The mining outlook here is certainly brighter than it was a few months ago. The Le Roi is continuing to make weekly shipments of good ore, although the output is not large. The lessee of the Velvet Portland mine has already shipped 71 tons of ore that will return over $32 per ton while shipments from the Le Roi 2, Ltd., and the Consolidated group continue to run up a good average. The output of the camp is 4,600 to 5,000 tons per week.

The two diamond drills at work in the depths of the Le Roi have encountered some good ore, and drifting on these prospects is the present order of things.

The shaft of the Josie claim of the Le Roi 2, Ltd., is now down to the 1,300 foot level. It will be driven about 50 feet more when the work of drifting on and opening up the ore from the 950-level downward will be started. The mill at the Le Roi 2, Ltd., is treating 260 tons of second class ore per week regularly.

A good find of free gold has been made in the ledge now being worked in the I. X. L. mine here by Evans & Brokenshire. The ledge is about two feet wide and some rock has been extracted carrying coarse gold. The operators are in hopes that they are approaching one of the bonanza shoots that were frequently found in the property in early days..

Phoenix.—The ore shipments from the B. C. Copper Co. Mother Lode mine reached a new record figure during the week ending Nov. 27th, the company sending 11,616 tons to the Greenwood smelter from that property. The week following the Oro Denoro mine dropped from the shipping list. The crew has been reduced while certain development work is being done.

The eighth and last big furnace at the Grand Forks smelter of the Granby Co. was put into commission last week, completing the work of augmenting the eight furnaces started early in the year. By this means the capacity of the smelter has been increased from 1,000 tons per day to 4,000 to 4,500 tons. No doubt, with this complete equipment, the Granby will make some record shipments and smelter runs in the near future.

There is a rumour afloat here that the men behind the Granby Co. are making an effort to secure control of the B. C. Copper. Co. (which now controls the New Dominion Copper) and thus place all of the big copper producers of the Boundary proper under one control. It is said that the proposal has been made by the Granby in the Eastern States of one share of Granby stock for ten shares of B. C. Copper, equivalent to nearly $10 per share for B. C. Copper. This proposal was not enticing enough to lure the control from the present owners who say, however, that they might entertain an offer of about double that amount.

It is a difficult matter for the ordinary individual to see what great advantage would be gained from this move, aside from a reduction of certain expense items, the benefit of large areas of ground for future use, that is known to contain prodigious low-grade ore bodies, and those many advantages that accrue from having such low-grade properties under one able management. It may be the New York copper clique want to make the Granby one of the big going concerns. It would prove the placing of the old Dominion Copper relics a step farther away from those dissatisfied shareholders who still keep feebly rapping away at what seems a hopeless cause. The thing has not taken any perceptibly tangible form as yet, however, and when a little more is known of the real situation, much that is now nebulous may be cleared up.

Application has been made in the Supreme Court at Vancouver that the money in the hands of the liquidator of the Dominion Copper Co. be paid into court and the liquidator released, on the ground that he failed to advertise for creditors.

Diamond drill exploration has been started on the Rawhide claim of the New Dominion Copper Co. This is the first work that has been done in this mine since the old company ceased work when in financial trouble.

In the Argo tunnel at Greenwood a 20-inch galena ledge was cut last week 260 feet from the portal. The compressor from the Crescent mine is being moved to a point near the mouth of the Phoenix-Greenwood adit and machine drills will be working in that tunnel in a couple of weeks in place of hand drills as of late.

During the month of November the Granby smelter treated over 120,000 tons of copper-gold ore, equivalent to approximately 31,680,000 lbs. copper per annum. There is no good reason, however, at the present time, why the Granby smelter is not treating nearly 100,000 tons per month, and it is possible the figures will reach this mark in December. This ore, which yields about 22 lbs. copper per ton, (it was 21.81 for the year ending June 30, 1909), can be mined, smelted, converted to blister copper and loaded on the cars at Grand Forks for approximately $2.50 per ton. The unsteady coke supply has in the past been the bane of local smelters—the Granby has forfeited itself in this direction by investing over a million dollars in the Crow's Nest Pass Coal Coo. This, no doubt, had something to do with the C. N. P. Co. continuing to work while the other mines were tied up with strikes last spring.

Nelson.—On the 15th of December a convention of mining men and delegates from the surrounding associated boards of trade will be held in this city to consider the several phases of the zinc situation as it presents itself to local zinc-lead miners, with a view to improving and aiding this industry. The chief market for the product of local mines, at the present time, is found in the United States, the freight charges to distant zinc smelters amounting to about $10 per ton, and the duty entering the States being practically double this amount. The points that will especially be touched upon and discussed will be the establishment of a commercial zinc smelter in this district; encouragement of zinc manufactories in Canada; the invocation of Dominion Government aid toward experimental work in electrical and other zinc smelting; bounty on zinc mined; and the increase of duty on manufactured zinc products from foreign countries.

The Provincial Government has aided the Nelson experimental electric smelter with from $20,000 to $25,000. The local men interested say that if they had the money on hand they could make the plant a commercial success. The zinc problem in this district is a difficult one. Concentration is only partly successful. Ore and concentrates now have to be shipped to Kansas, Missouri, and even Germany, for treatment. As depth is gained in the lead mines of the district, the zinc becomes blended with the silver and lead, whereas on the surface it often runs in narrow veins and is somewhat easier to cope with.

The influence of the big zinc pools, the competition of big producers and other factors all count against the growing industry of the Slocan-E. Kootenay district, in addition to the troubles they have at home, and it would be a laudable move on the part of the Government if it would take action to foster the industry. There is no doubt but that it would be amply repaid in the years that are to come.

A 20-ft. vein of good milling ore has been opened up on the limited property of the Highland-Buckeye Mining Co. The ore was located at 200 ft. depth in the shaft. A 250 gallon pump is being installed to cope with the heavy influx of water on this ground. This is characteristic of many local properties and has been found a costly inconvenience. A tramway is to be built from the United mine to the Highland mill.

GENERAL MINING NEWS.

NOVA SCOTIA.

Sydney, N.S., Dec. 15.—The steamer Cape Breton, of Glasgow, left here to-day for Prince Rupert with 6,800 tons of steel rails. Besides this, it is understood that several foreign ships will take cargoes of rails from Sydney to Prince Rupert.

The Dominion Iron & Steel Company have been for some time negotiating for a modification of the order-in-council prohibiting foreign vessels from engaging in the coast trading trade to enable these foreign ships to engage in the Sydney-Prince Rupert trade. To that extent a modification has been secured.

Halifax, N.S., Dec. 17.—Thos. Cantley, general manager of the Nova Scotia Steel Company, positively refused to tell the prices realized in Montreal in 1909. Mr. Cantley's reason for declining to reply to the question was that he would be seeking to get contracts for the sale of 300,000 tons of coal in that market within a few weeks and to give this information would mean that he would seriously injure his company. Eventually after counsel on both sides had argued the matter at length, the stipendiary ruled that the information seemed necessary and must be given. Mr. Cantley still was obdurate. Application was then made for his committal to jail, and then witness rose and reiterated his previous statements. He said that if the strong American competition that they were meeting in the St. Lawrence now could learn their prices beforehand, it might mean that the Nova Scotia Company would lose their contracts. Holding these views and without meaning any disrespect to the court, he must still decline to answer. Counsel for the prosecution still pressed the motion for Cantley's committal to jail, but the stipendiary suggested that the answer be written out, sealed and placed in the custody of the court.

This was eventually agreed to by Mr. Cantley, but not until he had been definitely assured that no one but the stipendiary would see the document.

G. H. Duggan, second vice-president and general manager of the Dominion Coal Company, was a witness to-day. He had with him a quantity of correspondence between his company and the Cumberland Railway and Coal Company during the past three months, which he was subpoenaed to produce. The letters were submitted to the magistrate, and it was found they did not relate to matters covered by the inquiry.

Mr. Duggan also produced letters between his company and the Nova Scotia Steel Company. Two of these referred to some English coal coming to the St. Lawrence, and were tendered to show there was some agreement between the two companies. A long discussion of counsel followed as to admission of the letters.

NEW BRUNSWICK.

Fredericton, Dec. 20.—The Canadian Antimony Co., Ltd., has closed its mines at Lake George. There was a bad fire at the mines some time ago, and that, coupled with the poor outlook of the market, has caused a temporary shutdown.

ONTARIO.

Sudbury.—Work on the stamp mill of the Canadian Exploration Company at Long Lake has been vigourously pushed, and it is expected that stamps will be dropping before Christmas. The success of this enterprise will be of much importance to this district. Mr. R. W. Brigstocke is engineer for the company, and has given his personal attention to the equipment of mine and installation of plant.

Toronto, Dec. 17.—As a result of representations of large deputations of mining men who have waited on the Minister of Mines, the Ontario Government has decided to grant a measure of relief to certain mining companies now operating on the townsite of Cobalt and vicinity. It was found on investigation that these mines could not be operated under the excessive royalty exacted.

The Government has therefore decided to reduce the royalty from 25 per cent. on gross output to 25 per cent. on net profit of the mines, which is to be ascertained under provisions of the Supplementary Revenue Act.

The companies affected are Townsite, Nancy Helen, City of Cobalt, Wright Silver Mining, Railway Reserve, Jackpot Mining, J. Harris McCrae, Ontario Development, Cobalt Station Grounds and Chambers-Ferland. All the companies in question obtained their lands from the T. & N. O. Commission.

Toronto, Dec. 18.—Ten men were arrested in connection with the Cobalt ore stealing conspiracy. On Thursday two arrests were made, and yesterday eight more were made, six in Toronto, and two in Cobalt. Shortly after 8 o'clock Inspector of Detectives Duncan received word from Chief Geo. Caldbrek, of Cobalt, that two of the many men who were being looked for there had been apprehended.

By what the police learned from the men arrested in Toronto yesterday, it would appear that Dr. J. E. Wilkinson, President of the J. E. Wilkinson Refining Co., who is on remand and out on bail for $20,000, purchased from men in town as well as from men in Cobalt. The local men in the "Ward," who, it is alleged, were buying from the go-betweens who came down regularly from Cobalt, admitted yesterday that they sold their ore to Wilkinson, and the cheques found in Wilkinson's office on Lombard Street after his arrest Thursday afternoon go to show that he had paid out a good amount of money to the men who are now under arrest.

The men arrested in Toronto were:—

Nicholas Zojotz, Austrian, miner, charged with receiving stolen property.

Dynamtis Antras, Austrian, miner, charged with receiving.

Jacob Cohen, 78 Agnes Street, Hebrew, charged with receiving.

Morris Robshensky, 93 Elizabeth Street, Hebrew, charged with receiving.

William Jansen, Cobalt, bartender, charged with selling stolen property.

Jaakka Heikkik, Cobalt, miner, charged with selling stolen property.

The men arrested in Cobalt last night were: J. H. McGale, hotelkeeper, charged with receiving; H. A. Vanwinkle, insurance agent, charged with receiving.

Toronto.—Dr. J. E. Wilkinson, whose name is implicated in the ore-stealing incident claimed to be ignorant of the recent change in the Criminal Code, Section 424. The change is as follows:—

"Everyone is guilty of an indictable offence and liable to two years' imprisonment who

"(a) Being the holder of any lease or license issued under the provisions of any act relating to gold or silver mining, or by any persons owning land supposed to contain any gold or silver, by fraudulent device or contrivance defrauds or attempts to defraud His Majesty, or any person, of any gold or silver or money payable or reserved for such lease, or, with such intent as aforesaid, conceals or makes a false statement as to the amount of gold or silver procured by him; or,

"(b) Not being the owner or agent of the owner of mining claims then being worked, and not being thereunto authorized in writing by the proper officer in that behalf named in any act relating to mines in force in the province in which the offence is alleged to have been committed, sells or purchases, except to or from such owner or authorized person, any rock, ore, mineral, stone, quartz or other substance containing gold or silver, or any unsmelted or untreated, or unmanufactured, or partly smelted, partly treated, or partly manufactured gold or silver: or

"(c) Purchases any rock, ore, mineral stone, quartz or other substance containing gold or silver, or any unsmelted, or untreated, or unmanufactured, or partly smelted, partly treated, or partly manufactured gold or silver, except from such owner or authorized person, and does not, at the same time, execute and triplicate an instrument in writing, stating the place and time of purchase, and the quantity, quality of gold and silver so purchased, and the name or names of the person or persons from whom the same was purchased, and within ten days file the same with the clerk of the county or district court of the county or district in which the purchase was made, or with the officer with whom in the said county or district bills of sale or mortgage of personal property are filed or deposited."

BRITISH COLUMBIA.

Nelson.—A convention of mine owners and others interested in the production and marketing of zinc ores to discuss ways and means of improving the marketing and disposing of the products, will be held in Nelson on Wednesday, Dec. 15th. The presence of zinc in ores, especially in the Kootenay district (except in a few special cases) has been a detriment rather than a benefit to mine owners. At the same time the only market is practically in the United States, the average freight being $10 per ton, and the duty about the same, making a charge of some $20 per ton to place the zinc ores of this district at the smelter.

It is felt that the time has arrived when these conditions might be improved, and that some action towards promoting this might be brought about by a conference of those interested.

In the first place, in order to present the question in all its bearings it will be necessary to have some authentic information regarding the present production of zinc ores and other matters in connection therewith, and this can be gathered at such a meeting.

The matters which present themselves as being worthy of discussion if a meeting can be convened are:—

1. The establishment of a zinc smelter in this country.

2. The establishment of home manufactories of zinc products.

3. The asking for government aid for assistance in experiments.

4. The asking for a bounty on zinc similar to that at present in force for lead.

5. The asking for the increase of the duty on zinc ore products, such as spelter oxides, etc., which now come into this country, principally from the United States, either free of duty or at a low tariff.

MINING NEWS OF THE WORLD.

EUROPE.

Spain.

In view of the likelihood of the Spanish oil fields assuming an important position in the world's production, some remarks by Senor Don Claudis Sanz, of the Company Petrolifera de Villamartin, are of considerable interest. The property is situated less than two kilometres from Villamartin, and Senor Sanz was able to report that the work being carried on is meeting with excellent results. Boring is in progress, and at depths of 75 to 110 metres and also from 250 to 300 metres petroleum has been proved to be good and abundant.

Roumania.

For the first nine months of the current year the production of oil in the Roumanian fields amounted to 956,614 tons, while for the corresponding period of 1908 the output was only 866,762 tons.

Turkey.

The Sublime Porte has well received the proposition of the Minister of Mines concerning the suppression of all duties for the obtainment of mining concession Firmans. This will contribute towards the progress of the mining industry in the country.

Russia.

Recent reports of activity in the oil district of Maikop in Southern Russia have been quickly followed by the flotation of the Anglo-Maikop Corporation, Ltd. The capital is £200,000, only take up such as are approved. Reports on the properties are of a highly favourable character, and already the company has received a good offer to purchase a single plot over which it holds an option.

Another concern formed to deal with oil properties in Russia is the Russian Eastern and General Petroleum Trust, Ltd., which has just been registered with a capital of £50,000 in £1 shares. At present it is only a private company, but no doubt the public will be invited to participate in due course.

SOUTH AFRICA

The suggestion made by Mr. Reyersback, a member of the firm of Wernher, Beit & Co., before the Chamber of Mines at Johannesburg, recommending the discontinuance of monthly returns of the output and labour, met with a storm of protests. Particularly effective is the signed statement of a group of prominent London Stock Exchange firms, which in part is as follows:—

As dealers for many years in the African mining section of the Stock Exchange we shall be obliged if you will spare us space to protest against the preposterous proposal of Mr. Reyersbach, at the late meeting of the Chamber of Mines at Johannesburg to discontinue the monthly returns of output and labour.

In the note published in a financial paper Messrs Wernher Beit & Co., appear to favour Mr. Reyersbach's proposal, which they say would, if adopted, be beneficial. We are strongly of the contrary opinion, and consider that it would be highly detrimental to the interests of the shareholding public. The mere suggestion of it coming from such a source came as a coup de grace to an otherwise demoralized market, and the only parties to whom in our opinion it might be beneficial are the large mining houses who are every day dealing in the shares of the companies, in competition with the members of the Stock Exchange, whilst in many cases partners in the various mining firms are acting as directors of the companies in whose shares they deal.

The shareholders and the dealers on the Stock Exchange would be left in the dark as to the position of the mines for twelve months, whilst the outside mining firms were continually supplied with the latest developments, which they would doubtless make use of for their own benefit.

A committee was formed last year of technical representatives of the mining groups of the Rand for the purpose of conducting experiments in connection with the metallurgy of the Rand. The object was to test promising devices and methods on producing mines, the cost of the investigations being borne by the groups. One of the questions taken up this year by the trials committee has been the economic ore reduction by means of gravity stamps and tube mills. The trials carried out at the Simmers East mine upon the combined duty of gravity stamps and the tube mills have shown that by enlarging the size of the screen mesh the efficiency of the combination was regularly increased until the limit with stamps weighing 1,400 lbs. was reached with a mesh of nine holes to the square inch, when a duty of 15 tons per day was recorded. It was found that on a larger quantity of material being put through the overflow was unsatisfactory in grade with respect to subsequent operations. Conducted within the average range of the appliances as used upon the Rand, the experiments have been of incalculable value, not only from the practical point of view, but also in the matter of mathematical data referring to the subject, which have been prepared at some length by Mr. Stadler. The investigation has been a long and costly one, but the committee are pleased to be able to say that the results have quite come up to their expectations. There still remains much work in improving the efficiency of the stamps and tubes separately.

RHODESIA

The general position is again brighter and the outlook more promising on developments at numerous points. Exploration work is being actively prosecuted over wide areas, and business in claims is again brisker.

The Rhodesia Exploration Company has secured a large number of claims in the Enterprise district on a line of auriferous schist formation extending several miles. Excellent milling and assaying results have been obtained. The acquisition is regarded as important generally and of particular value.

A line of country extending eighteen miles has been pegged on the Rusapi tin belt, 80 miles to the south-east of Salisbury. The assays are stated to give an average of 1½ per cent. over a width of 110 ft. The belt is in kopje formation and only the simple and inexpensive method of quarrying will be necessary in mining. Bunches of ore have given high assays.

AUSTRALIA

The State Colliery at Powlett River is working. It is estimated that in a month's time it will produce 400 tons daily.

It is understood that the Victorian railways are ordering coal in England.

The Commissioners announce that they will be able to handle the grain traffic during the approaching harvest without further curtailment of services, even on holidays.

The coal lumpers have struck as a protest against the arrest of their leaders. The Government has rejected a suggestion

made by the Lord Mayor that it should take over and work certain mines.

The question of the establishment of State smelting works in Queensland has lately been occupying attention, and the Chief Inspector of Mines has been instructed to report upon the proposals which have been put forward. Owing to the more or less scattered nature of the mineral deposits in Queensland, there are in some districts no treatment works at all available for small quantities of silver, lead or copper ore, and the main objects to determine are whether material assistance to the mining industry will follow as a result of the establishment of smelting works, and whether this industrial field can be entered by the Government without financial loss. The bulk of the State's annual output of gold concentrates results from the treatment of Charters Towers and Ravenswood ore.

UNITED STATES.

California.

The gravel-mining districts in Eldorado county are being more actively worked.

Montana.

An effort is to be made to introduce legislation that will lessen accidents, improve sanitary conditions, and generally regulate the operations of the larger mines of the State. The State Mine Inspector, in his annual report, asserts that of the forty-seven fatalities recorded, the greater number were due to carelessness on the part of the miners.

The strike of the switchmen on the Great Northern and the Northern Pacific is still on. As both roads run into Butte, the mines depending upon these roads, about twelve in all, have been forced to close.

Missouri and Kansas.

During November the Kansas mines produced 3,487,650 lbs. zinc and 302,470 lbs. lead, having a total value of $97,467.

Arizona.

The United States Smelting, Refining and Mining Company has purchased the entire holdings of the Arizona-Mexican Mining and Smelting Company, which consists of a copper and lead smelter at Needles, Ariz., with a number of developed and semi-developed mines tributary thereto.

In addition to the holdings of the Arizona-Mexican Mining and Smelting Company, the United States Smelting, Refining and Mining Company has acquired a large number of claims in the same neighbourhood. The smelter is so situated as to handle the ore of Southern and Central Nevada, Southern California, Southern Utah and Northern Arizona more economically than any other plant. The ores in the mines that have been taken by this company are mainly silver and lead, and some copper.

Company Notes

The Right of Way Mining Company has declared another dividend of 6 per cent. on the old stock, which is equivalent to .02 per cent. on the new capitalization. Books close on Dec. 20, and dividends are payable on Jan. 1.

CROWN RESERVE MINING CO., LIMITED.

Dividend No. 6.

Notice is hereby given that a special bonus dividend of 10 per cent. has been declared and will be payable on the 20th of December, 1909, to shareholders of record the 10th of December, 1909. Transfer books will be closed from the 11th to the 18th of December, both days inclusive.

Dividend No. 7.

Notice is hereby given that the regular quarterly dividend of 6 per cent. for the three months ending the 31st of December, 1909, and a bonus in addition of 9 per cent. for the same term, making a total payment of 15 per cent., has been declared, and will be payable on the 15th of January, 1910, to shareholders of record the 31st day of December, 1909. Transfer books will be closed from the 1st to the 14th of January, both days inclusive.

STATISTICS AND RETURNS

BRITISH MINERAL OUTPUT IN 1908.

The report on mines and quarries in the United Kingdom for 1908 has just been issued, and places the total value of minerals mined during the year at £130,003,670. During that period 261,528,795 tons of coal were mined with a value of £116,598,884. Of this over 65,500,000 tons were exported.

For the 36 years from 1873 to 1908 inclusive, the total value of the coal output was £2,361,701,000, while the value of other minerals was £500,021,000. The exports of coal have been steadily increasing during the 36 years. In the period 1873 to 1877 the amount exported was 13.8 per cent. of the total output. In the third 1903 to 1907 the exports had increased to 61.1 per cent., while in 1908 the exports declined to 32.6 per cent.

The depression in trade in 1908 was marked, and had its influence on the mineral output for the year, which was £2,275,418 less than in the year 1907. Of the total decrease in the value of minerals produced in 1908, coal accounted for £3,928,530. The amount of coal retained for home consumption was 176,222,650 tons, or a little less than four tons per head of the population.

The blast furnaces for the manufacture of pig iron consumed 18,842,464 tons, as compared with 21,119,547 tons in 1907.

NIPISSING NOVEMBER OUTPUT

The Nipissing company's output of ore for November had an estimated value of $177,731. Nearly half of the ore was mined from the Kendall vein. The monthly production and shipments for five months were:

	Ore Mined	Ore Shipped
November	$177,731	$222,294
October	178,197	167,075
September	150,668	240,270
August	152,449	201,817
July	150,078	116,428

President dividends at the rate of 30 per cent. call for the payment of $150,000 per month.

COBALT ORE SHIPMENTS.

The following are the shipments from the Cobalt camp for the week ending December 17th, and those from January 1st, 1909, to date:—

	Ore in lbs. Dec. 17.	Ore in lbs. Since Jan. 1.
Buffalo	41,826	1,094,017
Beaver	51,470	101,470
Carnegie	.....	63,410
Chambers-Ferland	.....	961,010
City of Cobalt	.....	1,204,927
Cobalt Central	43,120	815,267
Cobalt Lake	.....	141,340
Cobalt Townsite	.....	54,369
Coniagas	.....	1,504,378
Crown Reserve	102,504	5,940,217
Drummond	.....	1,962,100
Foster	.....	187,800
Hudson Bay	.....	1,287,220
Keeley	.....	96,000
Kerr Lake	180,360	2,555,641
King Eward	42,500	275,522
La Rose	524,896	13,209,166
McKinley-Darragh	.....	1,980,535
Nipissing	257,781	12,313,116
North Cobalt	.....	40,000
Nova Scotia	.....	480,810
Nancy Helen	.....	124,700
Peterson Lake	.....	324,040
O'Brien	64,100	2,791,753
Right of Way	64,491	2,917,846
Silver Queen	.....	684,844
Silver Cliff	.....	241,820
Stewart H. J.	.....	62,392
Timiskaming	.....	1,806,000
Trethewey	.....	2,010,823
Wettlaufer	116,700	224,700

Ore shipments to Dec. 17th from Jan. 1st are 57,457,293 pounds, or 28,728 tons.

Total shipments for week ending December 17th are 1,489,748 pounds, or 744 tons.

The total shipments for 1908 were 25,463 tons, valued at $10,000,000.

B. C. ORE SHIPMENTS.

Nelson, December 4th.—The following are the details of ore shipments and smelter receipts for the week and year to date:—

Ore Shipments.

Boundary—	Week.	Year.
Granby	25,020	968,036
Snowshoe	3,687	148,259
Mother Lode	11,528	298,414
Other mines	.....	8,218
Total	40,235	1,422,927
Rossland—		
Centre Star	2,646	164,854
Le Roi No. 2	603	28,597
Le Roi No. 2 (Milled)	260	12,320
Le Roi	105	10,748
Velvet	23	61
Other mines	....	260
Total	3,637	216,840
Slocan-Kootenay—		
Queen (milled)	420	19,950
Granite-Poorman (milled)	250	11,850
Whitewater Deep (milled)	700	33,400
Kootenay Bell (milled)	70	3,330
Second Relief (milled)	145	6,890
Nugget (milled)	110	5,230
Bluebell (milled)	900	42,800
Silver King	60	3,217
St. Eugene	319	19,498
Alice	24	78
North Star	132	2,606
Blue Bell	83	4,507
Van Roi	65	1,049
Granite-Poorman	33	416
Standard	68	508
Richmond-Eureka	100	2,539
Eastmount	34	166
Whitewater Deep	21	2,901
Whitewater	22	1,442
Ferguson	33	164
Rambler Cariboo	21	944
Other mines	..	12,686
Totals	3,610	176,171

Total shipments for the week, 47,482 tons; and for the year to date, 1,815,938 tons.

Smelter Receipts.

Granby, Grand Forks	25,020	968,486
Consolidated Co. Trail	8,173	393,881
B. C. Cop. Co., Greenwood	11,528	305.947
Le Roi, Northport		12,761
Total	44,721	1,681,075

B. C. Ore shipments, week ending Dec. 11, 1909.

ORE SHIPMENTS.

Boundary.

	Week.	Year.
Granby	25,554	993,590
Mother Lode	11,792	310,206
Snowshoe	2,821	151,080
Oro Denoro	100	7,633
Other Fines		705
Total	40,267	1,463,214

Rossland.

	Week.	Year.
Centre Star	4,273	169,127
Le Roi No. 2	364	28,961
Do. milled	260	12,580
Le Roi	101	10,849
Other Mines		331
Total	4,998	221,848

Slocan-Kootenay.

	Week.	Year.
St. Eugene	438	19,936
Blue Bell	179	4,696
Richmond-Eureka	197	2,736
North Star	34	2,640
Whitewater	148	1,590
Rambler-Cariboo	21	930
Ruth	95	930
Ohio	9	9
Meteor	14	14
Pay-Day	8	8
Golden Cup	6	6
Blue Bell, milled	900	43,700
Whitewater, milled	700	35,100
W. Deep, milled	420	20,370
Granite-P., milled	250	12,300
S. Relief, milled	145	7,069
Nugget, milled	110	5,340
K. Bell, milled	70	3,495
Other Mines	.....	20,659
Total	3,844	181,554
Grand total	49,109	1,866,616

SMELTER RECEIPTS.

	Week.	Year.
Granby	25,554	994,081
Consolidated Co.	8,771	403,562
B. C. Copper Co.	11,892	317,839
Le Roi		12,761
Total	46,217	1,728,243

The Consolidated Mining & Smelting Company of Canada, Limited, ore received at Trail Smelter for week ending Dec. 11, and year to date, in tons, follow:

Company's Mines—

Centre Star	4,273	169,127
Snowshoe	2,821	151,080
St. Eugene (concentrates)	438	19,936
Richmond Eureka	197	2,736
Other Mines	1,042	60,683
Total	8,771	403,562

The imports of petroleum into Germany in the first nine months of this year are estimated at 634,476 tons, of which 493,604 tons were from America, 93,966 tons from Galicia, 26,238 tons from Russia and 20,668 tons from Roumania. During the corresponding period of last year the quantity imported was 684,047 tons.

TORONTO MARKETS.

Metals.

(Quotations from Canada Metal Co., Toronto.)

Dec. 22.—Spelter, 6½ cents per lb.
Lead, 3.75 cents per lb.
Antimony, 8½ to 9¼ cents per lb.
Tin 36 cents per lb. (market advancing. We look for higher prices.)
Copper, casting, 14 cents per lb.
Electrolytic, 14 cents per lb.
Ingot Brass, 9 to 12 cents per lb.

Dec. 22.—Pig Iron, (Quotations from Drummond FcCall Co.)
Summerlee, No. 1, $24.00, (f.o.b. Toronto).
Summerlee, No. 2, $23.50, (f.o.b. Toronto).
Midland; No. 1, $21.50 (f.o.b. furnace).
Coal, Anthracite, $5.50 to $6.75.
Bituminous, $3.50 ao $4.50 for 1¼ inch lump.

Coke.

Dec. 17.—Connellsville coke, (f.o.b. ovens).
Furnace coke, prompt, $2.80 to $2.90 per ton.
Foundry coke, prompt, $3.00 to $3.25 per ton.

Dec. 17.—Tin, (Straits), 33.05 cents.
Copper, prime Lake, 13.50 to 13.75 cents.
Lead, 4.60 cents.
Electrolytic copper, 13.37½ to 13.50 cents.
Copper wire, 15.25 cents.
Spelter, 6.30 cents.
Sheet zinc, 8.50 cents.
Antimony, Cookson's 8.37½ cents.
Aluminium, 23.00 to 24.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, 29.50 to 33.25 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $52.50 per 75-lb. flask.

SILVER PRICES.

	New York cents	London pence
December 8	51⅝	23¾
" 9	51⅞	23⅞
" 10	52	24
" 11	52	23 15-16
" 13	52⅝	24 3-16
" 14	52⅞	24 5-16
" 15	52⅜	24⅛
" 16	52⅝	24 3-16
" 17	52⅝	24 3-16

Nova Scotia Steel had a good month during November.

November was indeed the banner month in the company's history.

The output was 81,200 tons. Exceeding the previous record by about 4,000 tons.

The output of pig iron was 5,400 tons; steel, 6,500 tons.

Coal shipments to date are about 125,000 tons ahead of last year.

SAFETY = SPEED = SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" OF THE ATLANTIC

FASTEST and FINEST
in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records
between Liverpool and Canadian Ports

---

900 Miles on Enclosed and Sheltered Waters

LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent,
Board of Trade, - MONTREAL.

MINING BOOKS

Dredging for Gold in California

by D'Arcy Weatherbe

220 pages, indexed, illustrated. $4.00 postpaid

It is acknowledged by experts that modern dredging owes much to California, for in the Oroville and Yuba districts the successful extraction of Gold has stimulated mechanical ingenuity.

California methods are being adopted elsewhere. In "Dredging for Gold in California," Mr. Weatherbe describes in detail the California practice. The book is well illustrated with diagrams, drawings and photographs and gives invaluable data on working costs.

A Guide to Technical Writing

by T. A. Rickard

127 pages. Indexed. $1.00 postpaid.

"This manual is intended to help those who wish to write clearly on technical subjects. Rules are useful, but the understanding of the reason on which the rule is based is better. No man can apply a rule until he understands when to disregard it."
—From the Preface.

Through the Yukon and Alaska

by T. A. Rickard

Beautifully illustrated with over 175 half-tone cuts and maps.

408 pages. Indexed. $2.50 postpaid.

This book is an account of a journey through the Yukon Territory and the District of Alaska during the summer of 1908, and is a non-technical description of a region of great technical interest. The scenery, people, and industries of the north are described by a traveler trained to observe and write in an interesting manner.

Recent Cyanide Practice

by T. A. Rickard

350 pages. Indexed, illustrated. $2.00 postpaid

A compilation of the best and most trustworthy articles on the subject by authors that are leaders of this particular branch of metallurgy. Describing in detail the latest improved machinery and devices, and giving invaluable data concerning working costs.

The Metallurgy of the Common Metals

by L. S. Austin

Second Edition, entirely re-written and enlarged, illustrated, indexed.

500 pages $4.00 postpaid

A simple comprehensive treatise on the metallurgy of gold, silver, copper, iron, lead, and zinc ores. Of all the numerous books on metallurgy this is the best for those desiring a general knowledge of all branches of the art. It will appeal particularly to the worker in one branch who wishes to know the essential facts about other sorts of ore reduction. It is a good text-book for universities and technical schools.

Aaron's Assaying

by C. H. Aaron

Part I—Gold and Silver Ores. $1.00 postpaid.
Part II and III—Gold and Silver Bullion, Lead, Copper, Tin, Mercury. $1.50 postpaid.

A standard work in Assaying and thoroughly up to date. The result of years of experence and teaching by a competent assayer. These Books are technically accurate in their description of the most approved methods of assaying.

Hints on Amalgamation

by W. J. Adams

Third Edition, Revised and Enlarged. Pocket Size. Flexible Leather Cover.

120 pages. $2.00 postpaid.

A book in which the experienced amalgamator will find many valuable 'hints' and that will enable the novice to learn correct methods of current practice. If every mill-man would thoroughly assimilate the contents of this little volume it would keep him from making many costly 'breaks'.

Fire Assay

by L. S. Austin

88 pages. $1.00 postpaid.

There are many books on Assaying, but none are better calculated to serve as a ready reference for the assayer seeking the more commonly recognized methods for the determination of Gold, Silver and Lead in Ores and Metallurgical Products as Prof. L. S. Austin's Fire Assay.

Journeys of Observation

by T. A. Rickard

Handsomely Illustrated. On Heavy Coated Paper.

500 pages. Author's Edition $5.00 Cloth $3.50

This book contains the observations made by a traveler who happened to be a mining engineer with the facility to write in a lucid and entertaining manner. The descriptions relate to two of the most interesting mining regions, namely, Colorado and Mexico. In both cases the local coloring, the picturesque element, the geological structure, and the industrial conditions, are all interwoven into a fascinating account of mining development and metallurgical progress.

BOOK DEPARTMENT Canadian Mining Journal

Confederation Life Building, Toronto

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Campbell & Deyell
DeMorest, Stull & Low
Evans, J. W.
Gwillim, J. C.
Gillespie, G. H.
Hassan, A. A.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Ramsay, J. D.
Roland, W.
Scott, O. N.
Tyrrell, J. B.
Willmott, A. B.
McGee, Boyd

Astley, J. W.

Quebec

Hardman, J. E.
Hersey, Milton L.

Nova Scotia

Brown E. Percy

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

Nova Scotia

McCallum, A. L.

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

BARRISTERS, SOLICITORS, ETC.

Ontario

Bartram, Wadsworth & Sherry

Ontario

Ryckman, Kerr, MacInnes & Mahon

British Columbia

Hallett, I. H.

Ontario

McPherson, Laug & Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N.Y.

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

WILLMOTT, A. B.
M.A., B.Sc.
Consulting Mining Geologist
Sault Ste. Marie, Canada
Consulting Geologist
Lake Superior Corporation

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

J. D. RAMSAY
MINING ENGINEER
Room 1305, Traders Bank Building
TORONTO, CANADA.

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

CARTER, W E. H., B.A., Sc.
Consulting Mining Engineer
85 Front St. East, - Toronto, Ont.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 James St. Montreal

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA, ELK LAKE, TORONTO
Bartram, Wadsworth & Sherry
J. B. Bartram, W, R. Wadsworth, C. J. Sherry.
Continental Life Building, Toronto, Ontario
Solicitors for { Imperial Bank of Canada, Elk Lake / Royal Bank of Canada, Gow Ganda
Cable Address, "Barwad," Western Union Code

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

GOWGANDA PORCUPINE LAKE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98
Porcupine Claims—Write Matheson Post Office

A CROWN MINERAL PROPERTY

Suppose the Government should say to you there is a property worth $10,000. We will sell it to you for $10,000, payable in 20 annual instalments and won't charge interest on deferred payments. In event of your death at any time during the 20 years, we guarantee to cancel the balance due and execute a warranty deed to your wife, or if she prefers, we will pay her $10,000 in cash. If you live to complete all payments, we will pay you $10,000 cash, plus interest earned on your annual deposits. Chances are you would jump at it. We are making just such an offer backed by assets of over $45,000,000. Better investigate it.

ROYAL INSURANCE COMPANY Limited OF LIVERPOOL, ENGLAND Founded 1845

Full particulars on application to

A. R. HOWELL, Superintendent
Royal Insurance Building, Montreal, Que.

OR

W. H. LEACOCK, Inspector
Royal Insurance Building, Toronto, Ont.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

FOR SALE—Three 125-ton Copper Smelting Furnaces. Four Connersville Blowers; capacity 72 cu. ft. per revolution; direct connected to Erie Engines. Three Converter Stands and fourteen Shells, 84 x 126, for electric drive.

Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONTARIO.

FOR SALE—One Double-Drum Hoist; drums 8 ft. diameter, 6 ft. 3 in. wide; frame 24 ft. x 11 ft. 6 in.; cylinders 14 x 18; capacity 2½ tons at 700 ft. per minute. One 100 H. P. and one 75 H. P. Boiler, both tested to 100 lbs. pressure. One Northey Sinking Pump, 8 in. x 4 in. x 12 in. One Worthington Duplex Pump, 20 x 10¼ x 10. One 40 H. P. Jenckes Machine Company Engine, 10 x 14. Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONTARIO.

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated. Price $1.00.

MINERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price $1.00.

DOMINION COAL CO., MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price $1.00.

Every one interested in the mineral industry of Canada should have a copy of those books in their library.

BOOK DEPARTMENT
Canadian Mining Journal
TORONTO

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite,
etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

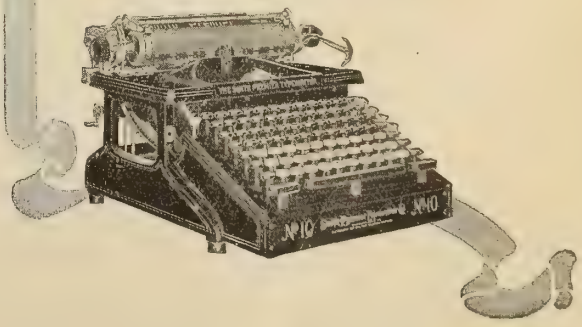
Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860 **Published Weekly**

Controlled by T. A. RICKARD
Associate Editors Courtenay DeKalb, H. Foster Bain

With all orders for yearly subscription to the

Mining and Scientific Press

(renewals excepted) received before January 1, 1910, mentioning this advertisement and accompanied by cash, we will give the paper **FREE** for the remainder of the year 1909. Be sure to mention THIS ADVERTISEMENT.

SUBSCRIPTION RATES PER YEAR
Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

Published weekly at

667 Howard Street, San Francisco, California

Send for Sample Copy and Catalogue of Technical Books.

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibrelzing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

SOLIGNUM

Preserves wood under any conditions. For MINING TIMBERS it is invaluable. **Solignum** goes right into the wood. **Solignum** treatment works out ⅓ price of paint.

Write for Booklet with Particulars to

F. STURGEON *34 Yonge St., Toronto*

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.



An Accurate Ore Test on any metal in 10 minutes For Five Cents.

Thats what the Mining Man or Prospector can have, provided he has a Way's Pocket Smelter Outfit. Anybody can make his own tests right in his office or in the field on **any ore.** Think of what this means to a prospector "miles away from nowhere" or to the mining man who must make dozens of tests a day.

Write for folder giving full information about **Way's Process** and describing both field and laboratory outfits.

WAY'S POCKET SMELTER CO.
Box 954, South Pasadena, Cal.

THE COST OF MINING

AN EXHIBIT OF THE RESULTS OF IMPORTANT MINES THROUGHOUT THE WORLD.

By JAMES RALPH FINLAY. - - *415 pages, 6 x 9, illustrated, $5.00 net, postpaid*

MINING costs and the factors governing their determination are of prime importance to every mining engineer, stockholder and superintendent.

This is the first important attempt to investigate them and to give a broad view of the economics of mining. It is based in part upon mining reports and in part on special investigations and information on costs that have not heretofore been made public.

A careful analysis of these data has hitherto been lacking and out of the recent world-wide discussions on this subject has grown the inspiration for this work. The author has had twenty years' practical experience and aims to give here a rational perspective of the business of coal, iron, lead, zinc, copper, gold and silver mining, exhibiting facts in their proper proportion.

It shows the inevitable influence on methods and costs of development of natural conditions, such as climate and degree of altitude, with their powerful effect on human life and effort; transportation, facilities for marketing the product, etc.

By means of detailed cost analyses based on the statistics in the reports of mining companies, the author places before the reader information covering practically the entire output of the world. The chapters on coal mining sketch the essential features of this, the simplest form of the industry. In iron much attention is given to the results and statistical history of the United States Steel Corporation, which accounts for 55 per cent. of the output of this country, The discussions of zinc and lead mining cover results obtained by companies typical of the operating conditions under which 80 per cent. of the American product is secured.

In gold and silver examples from all parts of the world are given in order that all classes of conditions may be included.

CONTENTS

I. Value of Mining Property.
II. Factors governing Variations.
III. Partial and Complete Cost.
IV. Statistics of Coal Production.
V. Cost of Mining Coal.
VI. Cost of Mining Lake Superior Iron.
VII. Occurrence and Production of Copper.
VIII. Lake Superior Amygdaloid Copper Mines.
IX. Conglomerate Copper Mines of Lake Superior.
X. Copper Mines on Fissure Veins in Montana Australia and Arizona.
XI. Various Copper Mines of Arizona and Mexico.
XII. Copper Mines in Various other Districts.
XIII. The Copper Mining Business in general.
XIV. Lead.
XV. Silver-Lead Mining.
XVI. The Cost of Silver-Land Smelting.
XVII. Zinc Mining.
XVIII. Occurrence and Production of Gold.
XIX Quartz-Pyrite Gold Mines.
XX. Cripple Creek, Kalgoorlie and Goldfield.
XXI. Silver Mining at Cobalt and Guanajuato.

FOR SALE BY CANADIAN MINING JOURNAL,

Confederation Life Building, Toronto, Canada.

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ainsworth, Wm., & Sons xiv
Ackroyd & Best, Ltd xv
Allan, Whyte & Co. xxvii
Astley, J. W. xx

B

Beatty, M., & Sons, Ltd. ix
Baszanger, Jacques & Co.....xi
Belliss & Morcom, Ltd viii
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply..... xxvii
Bartram, Wadsworth & Sherry xx
Behrend Concentrators Ltd..... xi
Brown A. H..... xx

C

Canada Metal Co..... xv
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute xiv
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Canadian Northern Ontario Ry..xxi
Curtis & Harvey, Ltd.....xxvii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xiii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks viii
C. L. Constant Co., outside back cover

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus xii
Drummond, McCall & Co.....xii
Dominion Coal Co., Ltd. xiv
Dietzgen, Eugene, Co., Ltd.... xvi
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables.....iv
Davis, John & Son..... xvi
Dessau's, S. Sons.....vii

E

Evans, J. W xix

F

Fleck, Alex., Ltd. viii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gillespie, Geo. H. xix
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v
Grand Trunk Ry xxix

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iii
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C xx
Laurie & Lamb viii
Lymans Ltd.....xiii
Link Belt Co. xii
Leckie, J. Edwards xx
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Metal Shingle & Siding Co.... xiii
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxi
Nova Scotia, Province of.....xxvi

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros. .....vi & vii
Patterson Mfg. Co. xii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx
Royal Insurance Co. xxi

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co.....viii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Sydney Cement Co., Ltd..... xiv
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,, Ltd xi

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Seperating Co. x

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

Or WM. FLEET ROBERTSON, Provincial Mineralogist, VICTORIA, B.C.

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905. Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

WHY IS IT

THAT SALES OF

MORTON'S

"B C"

Drill Steel

ARE INCREASING EVERY DAY?
MUST BE IT IS BETTER MATERIAL,

Gives Best Satisfaction

AND THE DRILL

Lasts Longer.

COULD ANYONE EXPECT MORE?

IN STOCK WITH

E. G. PRIOR, Victoria, B.C.
CANADIAN RAND CO., Cobalt.
BAINES & PECKOVER, Toronto.
ANGEL ENGINEERING & SUPPLY Co. St. John, Nfd.

Canadian Representative

D. W. CLARK, P.O., Box 521, **Toronto.**

GRAND TRUNK RAILWAY SYSTEM

The Longest Continuous Double Track Railway in the World Under One Management.

The Great Double Track Route Through Canada.

Fast passenger service from the Atlantic Ocean to the head of the Great Lakes. The line taps all the principal commercial centres in Canada and reaches the important points in the States of Maine, New Hampshire and Vermont, the principal towns and cities in the Provinces of Quebec and Ontario, and many important places in the States of Michigan, Indiana and Illinois.

The "International Limited" (Canada's Railway Greyhound)

The Finest and Fastest Train in the Dominion

Runs every day in the year leaving Montreal at 9.00 o'clock in the morning for Toronto, Hamilton, Niagara Falls, Buffalo, Detroit, Chicago and intermediate points.

Write for copy of "Trains 3 and 4" descriptive of the route from Chicago to the sea, to J. Quinlan, Bonaventure Station, Montreal, or to J. D. McDonald, Union Station, Toronto.

W. E. DAVIS, Passenger Traffic Manager, MONTREAL.

G. T. BELL, Assistant Passenger Traffic Manager, MONTREAL.

GEO. W. VAUX, General Passenger Agent, MONTREAL.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
N. J. Holden Co.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
A. M, Ellicott Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
A. M. Ellicott Co,
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.
Drummond, McCall & Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.

Crossings (Diamond —
Montreal Steel Works, Limited

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cement—
Sydney Cement Co., Ltd.
Link Belt Co.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
The Hardy Patent Pick Co.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.
Peacock Bros.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Drummond, McCall & Co.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Peacock Bros.
A. M. Ellicott Co.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Eugene Dietzen Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Drummond, McCall & Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.

Girders, Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
A. M. Ellicott Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Peacock Bros.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
The Hardy Patent Pick Co.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Metal Shingles—
Metal Shingle and Siding Co.
Pedlar People.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
The Hardy Patent Pick Co.
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.

Pipe (Cast, Wrought, Spiral, Riveted)—
Drummond, McCall & Co.

Roofing, Steel—
Metal Shingle & Siding Co.
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Peacock Bros.
Canadian Cleveland Drill Co.
N. J. Holden Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.

Rails (steel)—
Montreal Steel Works, Ltd.
Durmmond, McCall & Co.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
The Hardy Patent Pick Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
The Hardy Patent Pick Co.

Structural Metal Work—
Dominion Bridge Co.
Drummond, McCall & Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Eugene Dietzgen Co.
Keuffel & Esser Co.

Steel (Tool)—
Montreal Steel Works, Ltd.
Drummond, McCall & Co.
Morton & Co.
Thos. & Wm. Smith
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Smith, Thos. & Wm., Ltd.
Drummond, McCall & Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

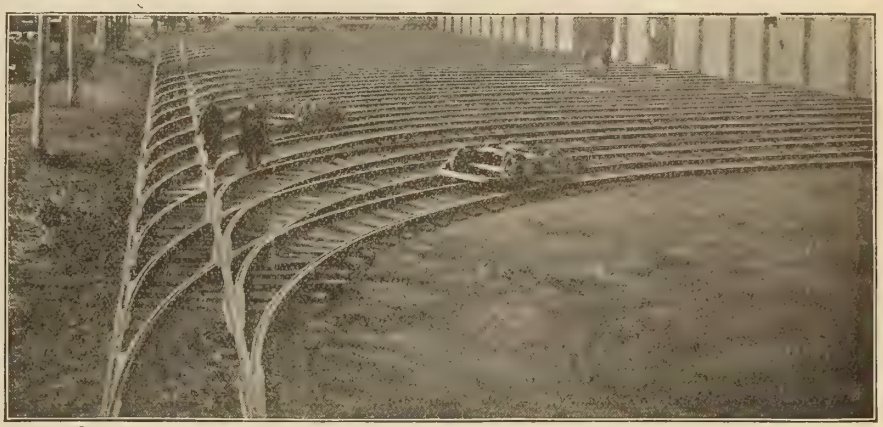
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse Motors for Mines

Westinghouse Mine Motors are noted for great strength of parts, large self-oiling bearings that seldom need attention, large overload capacity, low operating temperature and high efficiency.

We illustrate a Westinghouse Induction Motor driving a Deep Mine Sinking Pump. Westinghouse Alternating and Direct Current Motors are fully described in Circulars 1068 and 1118; ask for copies.



Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.

Address nearest office: HAMILTON.
922-923 Union Bank Bldg., WINNIPEG.

252 St. James Street, MONTREAL.
158 Granville Street, HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

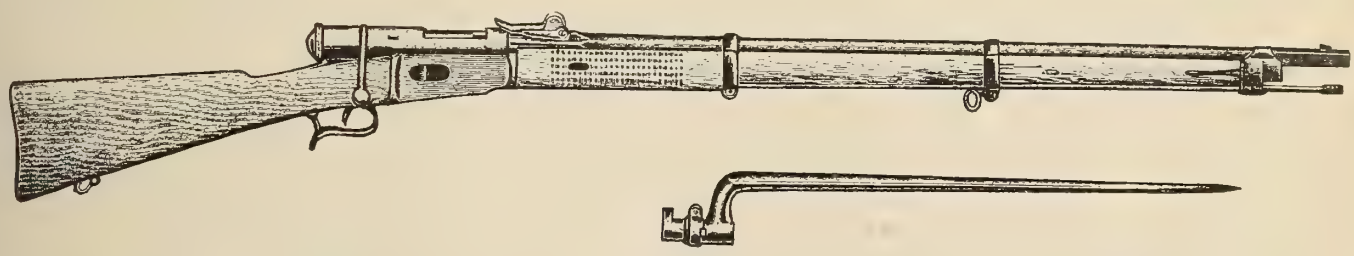
PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

A Great Chance to Buy a Great Rifle

IF IT COST a manufacturer $20.00 to make a certain rifle, and he offered it to you, guaranteed perfect, for less than $5.00, you'd hardly believe your ears, would you? Well, that's just what we're offering you—and here's the explanation. ¶ The Swiss Government, having lately decided to change the type of their army rifle, just took whatever they could get for the former kind—which was not very much for each rifle on account of the immense quantity they had to dispose of. And this is the rifle that we're able to sell at such a ridiculous price.



THE ACCOMPANYING CUT IS TAKEN FROM AN ACTUAL PHOTOGRAPH

This is one of the most accurate rifles ever used in Europe, and helped to make the Swiss a nation of sharp-shooters.

¶ It is a *repeater,* holding 12 cartridges in the magazine and one in the chamber.
¶ The *action* is the reliable military bolt type and works quickly and smoothly.
¶ The *barrel* is rifled and is sighted for long ranges.
¶ The front *sight* is open and the rear sight is adjustable for elevation.
¶ The *ammunition* is .41 calibre, and may be bought from us for $2.50 per hundred.

Complete with bayonet and cleaning rod, $2.95

THE ROBERT SIMPSON COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

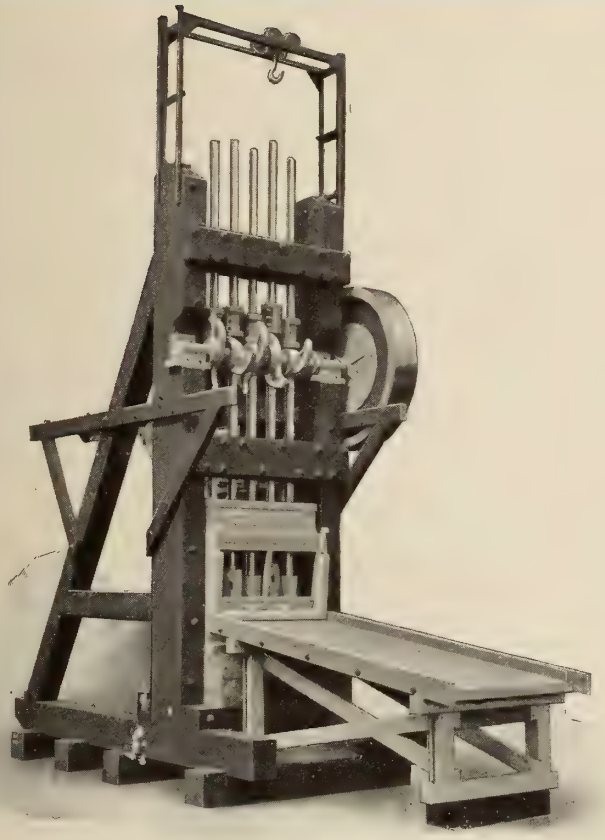
42 Broadway, New York City

Mining and Metalurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

THE CANADIAN MINING JOURNAL

31 TORONTO No. 2



STAMP MILLS

OF ALL CAPACITIES

Standard Stamp Mills

With stamps weighing from 650 pounds to 2000 pounds each.

Three Stamp Prospecting Mills

With stamps weighing from 250 pounds to 300 pounds each. These mills can be supplied and packed so that no piece exceeds 175 pounds in weight.

Two Stamp Mills

With stamps weighing from 650 pounds to 2000 pounds each.

One Stamp Mills

With triple discharge mortar and stamps weighing from 1050 to 1800 each.

We are the Sole Canadian Agents for Fraser & Chalmers, Ltd., who are the most experienced and most up-to-date stamp mill builders in the world.

IN STOCK

We are the only firm in Canada carrying standard and prospecting stamp mills in stock.

We will be glad to answer any enquiries.

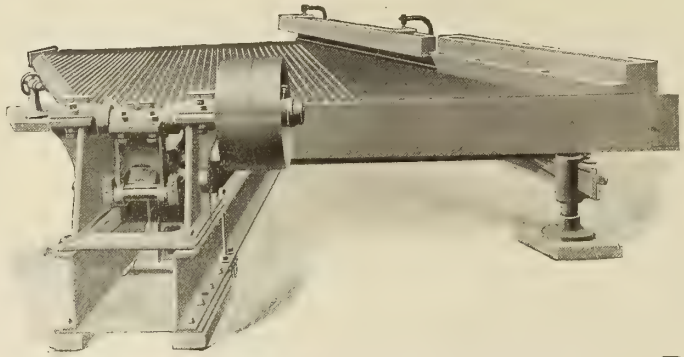
MUSSENS LIMITED

Head Office: MONTREAL

Branches TORONTO, 73 Victoria Street
COBALT, Hunter Block
WINNIPEG, 259-261 Stanley Street
VANCOUVER, 614 Hastings Street West

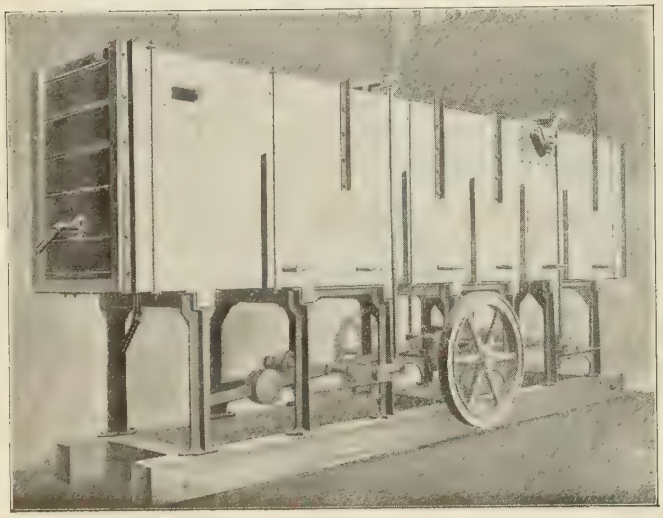
MINING MACHINERY

OF ALL DESCRIPTIONS



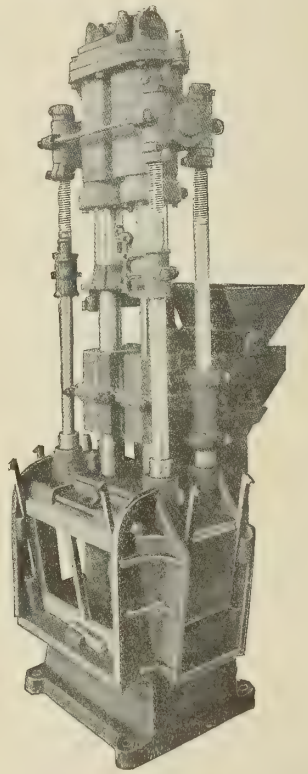
OVERSTROM CONCENTRATOR

Redesigned and improved with new and important features. 40 tons of ore with 10 tons of concentrates secured per day from one table. See Bulletin 1421.



HANCOCK JIG

Requires less power, less water, less space and fewer screens than any other. See Bulletin 1403.



TREMAIN STEAM STAMP

Specially designed for Prospector's work. See Bulletin 1408.

ALLIS-CHALMERS-BULLOCK

LIMITED

WORKS - - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

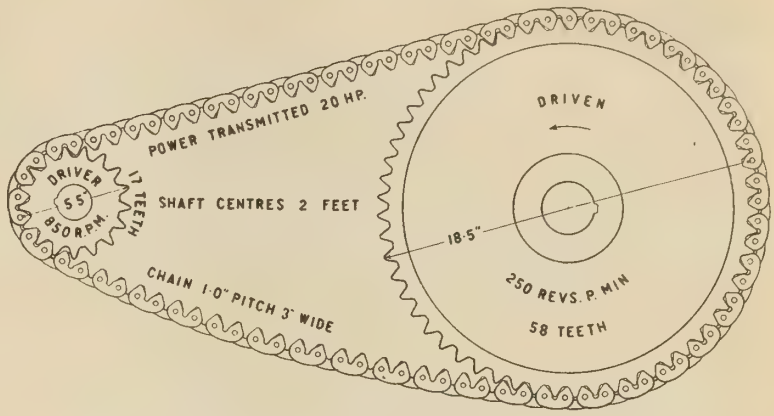
COBALT CALGARY

RENOLD PATENT SILENT

MANCHESTER, ENG.,

CHAINS

Are Superior to Belts



TYPICAL SMALL SILENT CHAIN DRIVE

Require less space, prevent slipping, save power, give maximum production. Have a long life and a breakdown never occurs.

ARE ESPECIALLY ADAPTED TO THE HARDEST SERVICE

Canadian Agents

JONES & GLASSCO., MONTREAL

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.

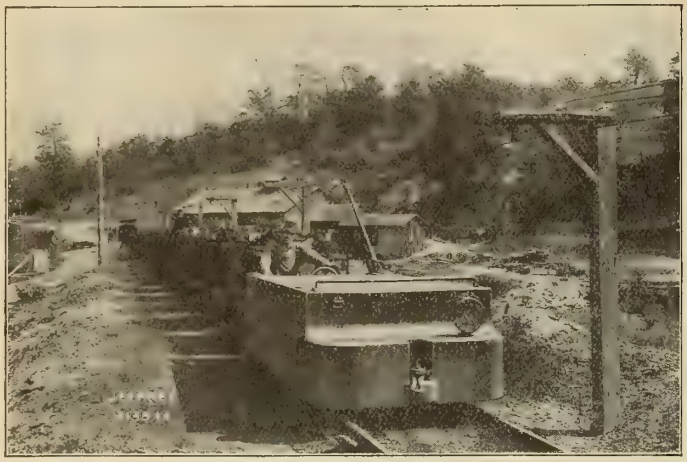


Write us for Bulletin A

CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 522, Cobalt, Ontario



JEFFREY

Electric Locomotives

Comparative cost of maintenance of Jeffrey locomotives with other locomotives has been made by a number of the largest users of electric locomotives in the United States resulting in the establishment of Jeffrey locomotives as standard equipment. Write for Bulletin X15.

WE BUILD

Complete Coal Mine Equipments.

INCLUDING

Electric and Air Power Coal Cutters and Drills, Car Hauls, Coal Washeries, Coal Tipples, Revolving and Shaking Screens, Elevating and Conveying Systems, Crushers, Ventilating Fans, Hoists, Pumps, Cages, Larries, etc.

General Catalogue, X 81

The Jeffrey Manufacturing Company

COLUMBUS, OHIO, U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance Street

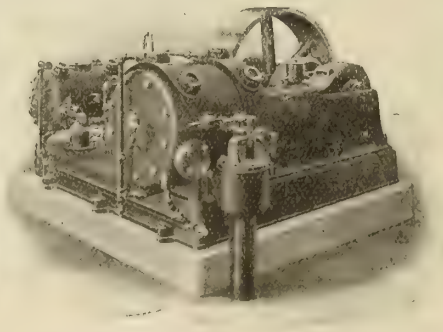
DURING 1910

Sullivan Machinery will stand more than ever for efficient service. In buying a "Sullivan" drill, compressor or coal cutter you may be confident that it embodies **the best** in materials, in workmanship, and in engineering knowledge.

SEND FOR SPECIAL CATALOGUES



Rock Drills
Diamond Drills



Air Compressors
Pick Machines



Coal Mining Machines
Hoisting Engines

SULLIVAN MACHINERY CO.

Birmingham, Ala.
Butte, Mont.
Cobalt, Ont.
Denver, Colo.
El Paso
Joplin, Mo.

CHICAGO, ILL.
CLAREMONT, N. H.

New York
Pittsburg
Rossland
Salt Lake
San Francisco
Seattle
Spokane
St. Louis

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Successfully used at the following

EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908

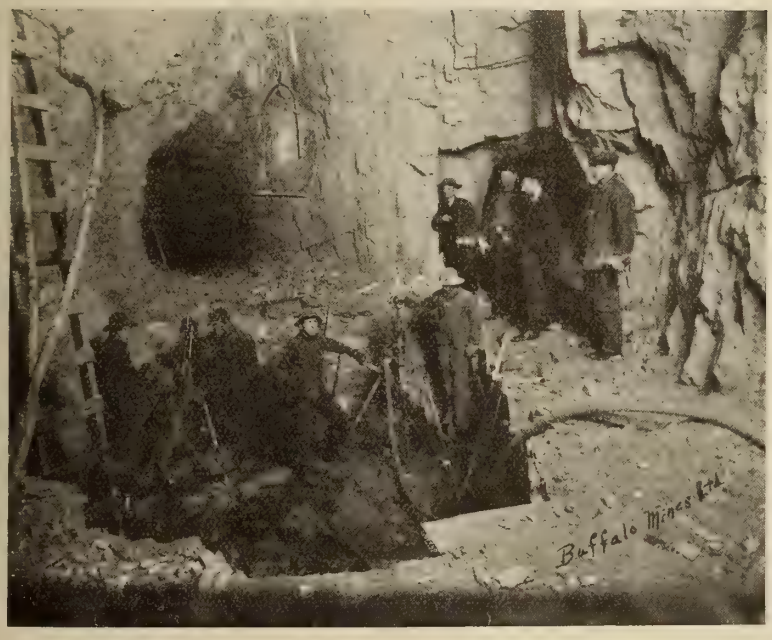
IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English,
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE

Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND



RAND

"Little Giant"

Rock Drills

¶ Built in sizes ranging from 2" to 5½" Cylinder diameter, for all work from boulder breaking to submarine drilling.

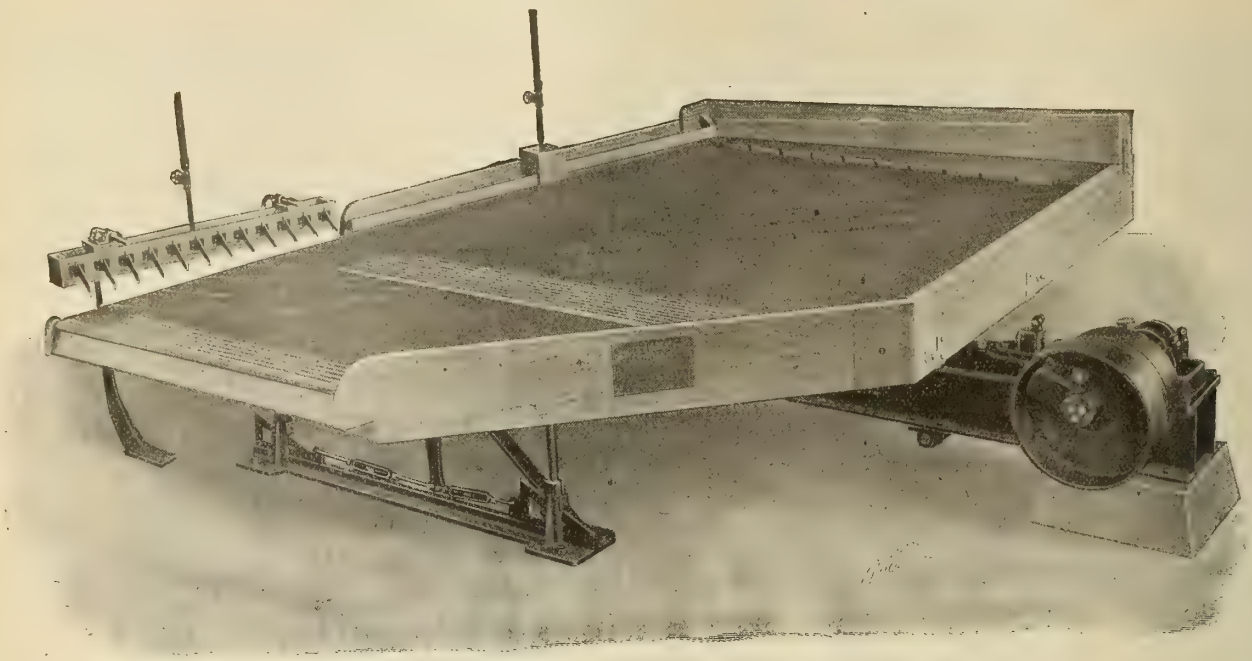
¶ Our claim that the Rand drill is the best in the market is proven by the sale of more of this type than of all other makes combined.

¶ Prices and catalog on request, or ask to have one of our representatives call.

CANADIAN RAND CO., LIMITED

Montreal, Canada

TORONTO, COBALT, HALIFAX, WINNIPEG, ROSSLAND, MONTREAL.



24 Additional Improved No. 3 Deister tables are being installed in the new addition to the Goldfield Consolidated Mines Company's mill as the result of efficiency in operation and small cost of maintenance of a previous installation of 70 tables.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have recently been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillipine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faros Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere
	French Cochin-China	

NO DELAY IN ISSUING FULL PARTICULARS ON APPLICATION

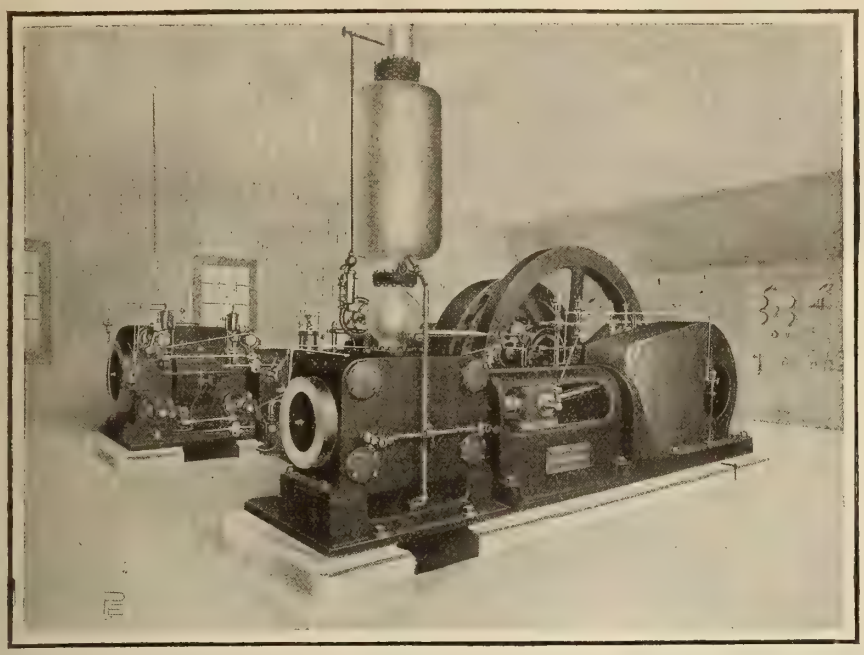
The Canadian Laboratories

Chemical and Physical tests of all Materials.

Mining properties examined and reported upon.

Write for prices for Ore analysis.

37 Melinda St. Toronto



POWER PLANTS
FOR
MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.

CENTRIFUGAL PUMPS
FOR MINE WORK
AND FOR ALL KINDS OF SPECIAL SERVICE

Built

HORIZONTAL and VERTICAL

For

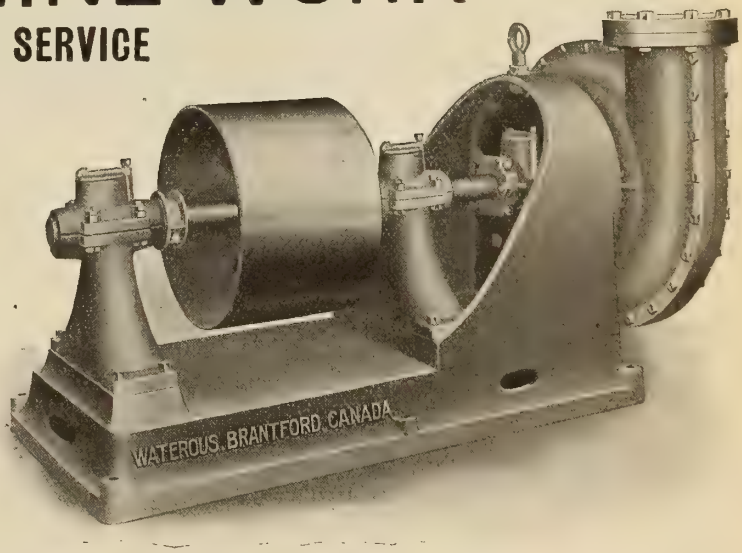
DIRECT and INDIRECT DRIVE

In

Sizes with Discharge Opening up to 16 inches in diameter.

These pumps are carried in stock and can be supplied promptly.

Send for bulletin No. 200 for full description and specifications.

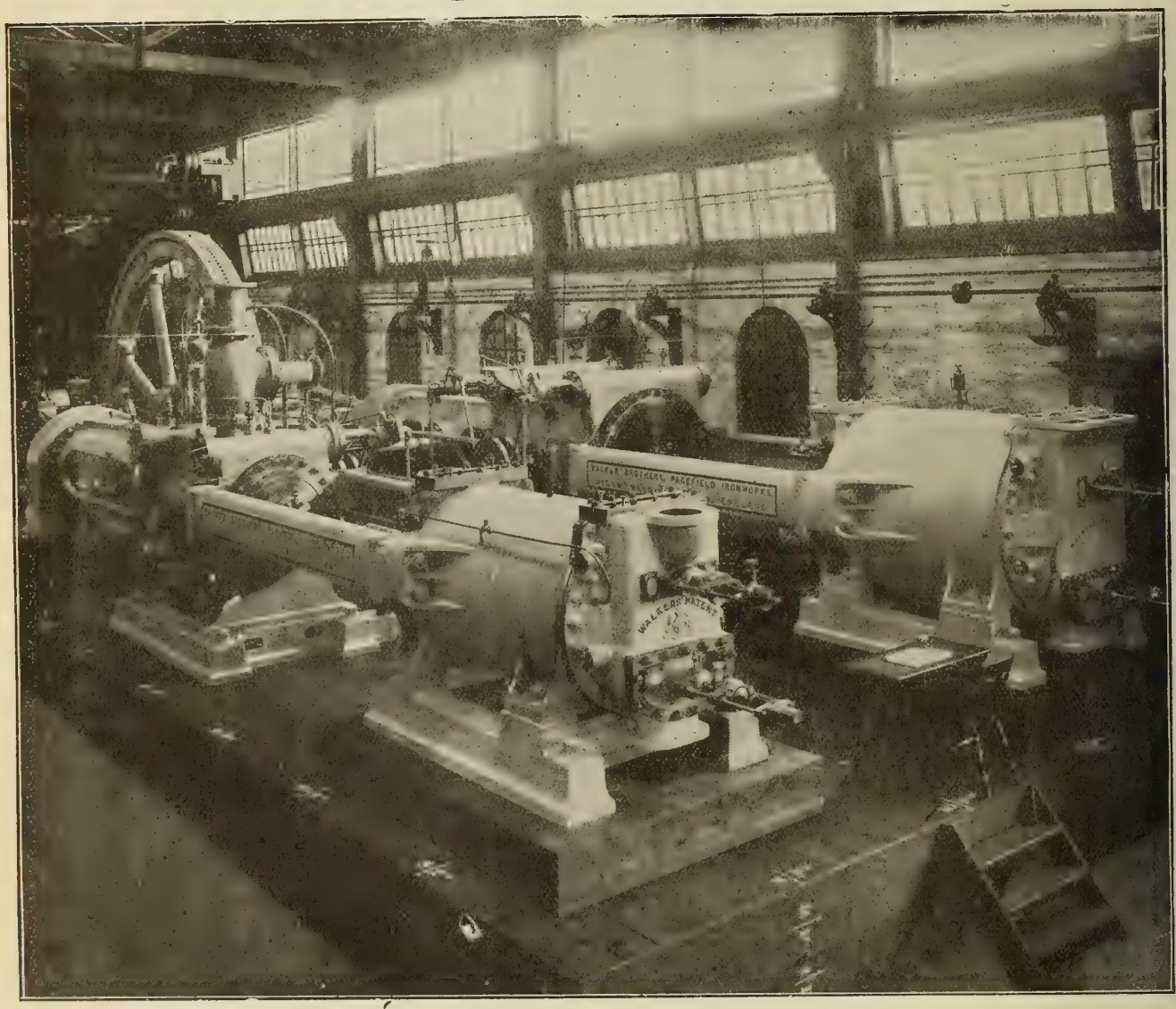


WATEROUS ENGINE WORKS CO.
LIMITED

BRANTFORD, CANADA

Walker Brothers (Wigan) Limited

Wigan, England



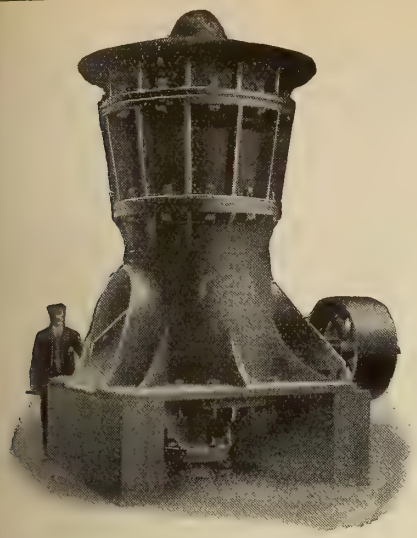
Largest Air Compressors in Canada

are of WALKER BROTHERS (Wigan) LIMITED manufacture.

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Informatiom and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

We personally break all our carbons

Goods sent on approval for selection

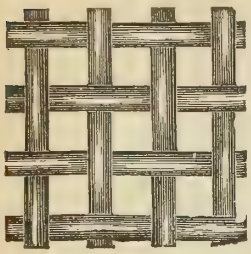
CARBONS
Black Diamonds)
and BORTZ for
DIAMOND DRILLS



S. DESSAU'S SONS
Importers
180 B. Broadway,
N. Y.

Carbon for all mechanical purposes

Bortz for all mechanical purposes



SCREENS

FOR MINERS AND EVERY OTHER USE.

Write for Special Catalogue.

Perforated Metals and Steel Wire Cloth

The B. GREENING WIRE CO., Limited

HAMILTON, Ont. MONTREAL, Que.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

BELLISS

Engines, Air Compressors

Ask for Catalogue.

CANADIAN AGENTS

LAURIE & LAMB

Consulting and Contracting Engineers

211-212 Board of Trade Building, MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

Aluminum Powder

Manufactured By

THE

CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

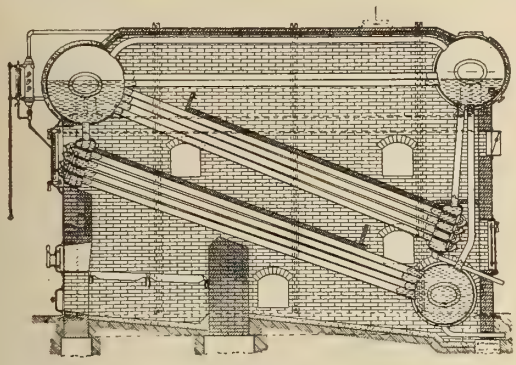
Works, Valleyfield, Quebec

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Robb Water Tube Boiler



Straight tubes. Perfect water circulation.
Dry or superheated steam.
Half the usual number of handholes.

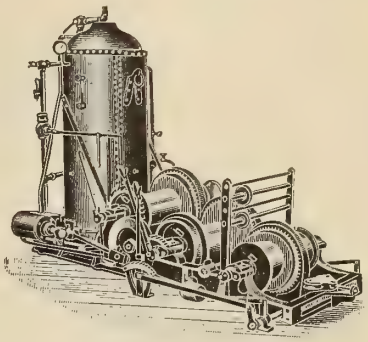
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
Calgary Block, Calgary, - -	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors' Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

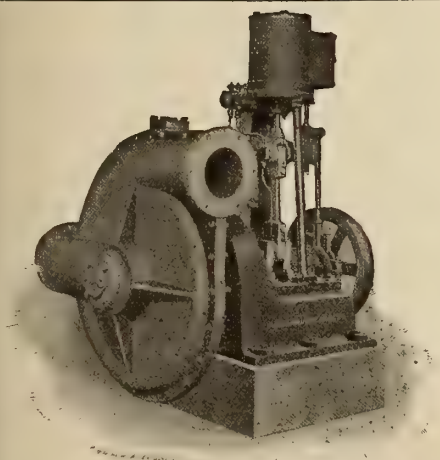
Agents: E. LEONARD & SONS, Montreal, Que., and St. John, N.B.,
R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



Morris Machine Works
BALDWINSVILLE, N.Y.

Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

New York Office—39-41 Cortland Street

AGENCIES
Henion & Hubbell, 223-231 North Jefferson St., Chicago, Ill.
Harron, Rickard & McCone, San Francisco, Cal.
Zimmerman-Wells-Brown Co., Portland, Ore.
H. W. Petrie, Toronto, Ont.

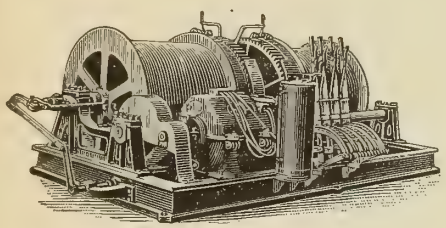
Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market





Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines

CANADIAN PACIFIC RAILWAY

THE SHORTEST, CHEAPEST AND BEST ROUTE
TO
GOWGANDA
IS
Leave Toronto 10.10 p.m. daily, Ar. Gowganda 9.00 p.m. next day.

THROUGH FARE $15.80

Through sleeper to Sudbury; dining car on C. N. O. train to Gogwanda Junction. Stops made at Phoenix for lunch and Elkhorn for dinner by stage line.

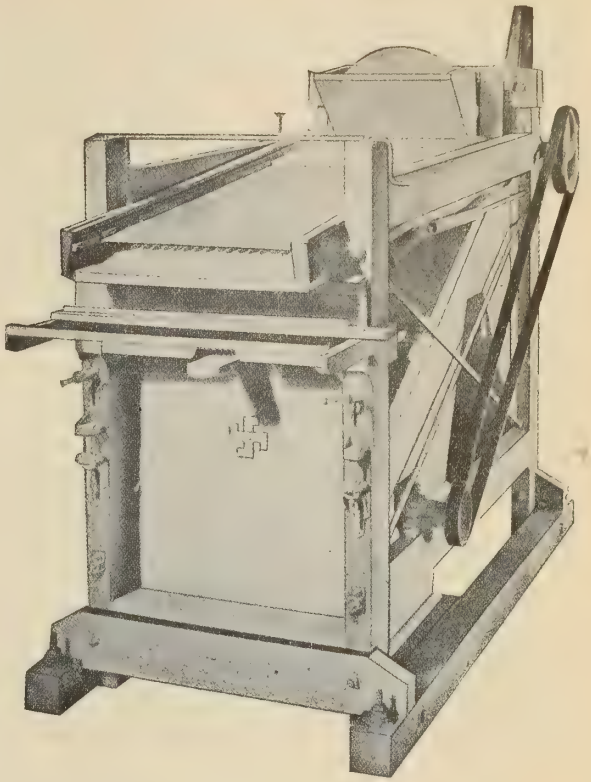
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

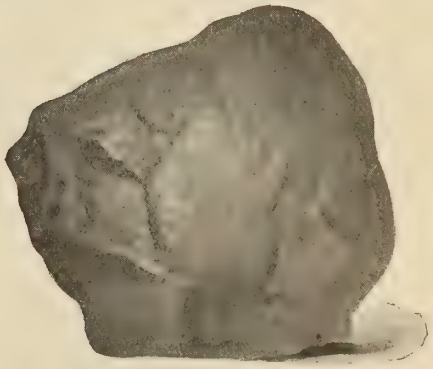
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



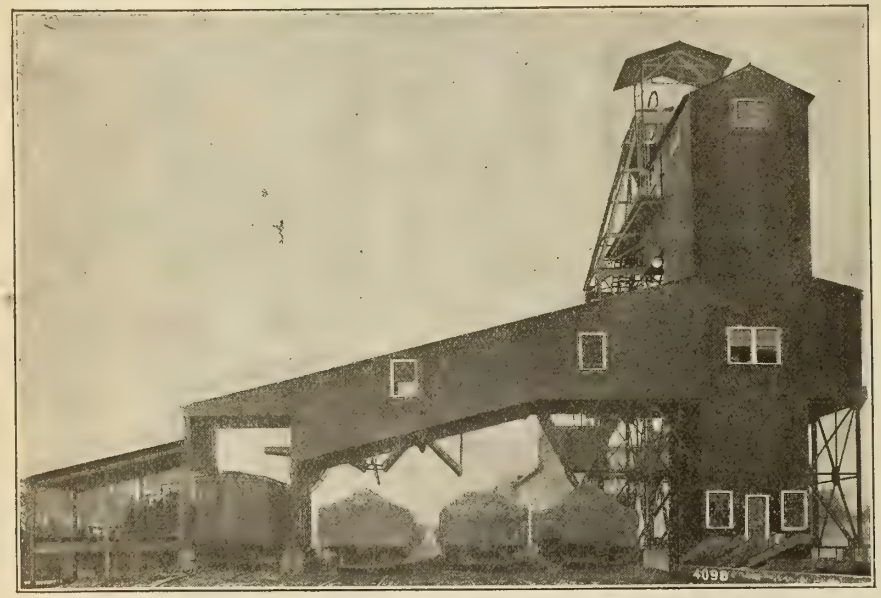
Largest carbon ever found. ¼ actual size.

NOTE. We personally break (in this country) our carbons, thereby enabling us to determine accurately their quality. We deal only in very best quality and are always ready to ship goods on approval and for selection to responsible parties. Write us.

"LINK-BELT"

COAL TIPPLES

CONSTRUCTED OF WOOD OR STEEL



Steel Coal Tipple built for the Franklin Construction Co., Benton, Ill.
Equipped with "Link-Belt" Shaking Screens, Weigh Hopper, etc.

Our manufactures include

Conveyors, Car-Hauls, Screening Plants, Complete Washery Equipments, Box-Car Loaders, Weigh-Boxes, Etc.; Original, "Ewart" Link-Belt, "Dodge," "Monobar," "Ley," and other Chains; ➤FLINT-RIM➤ Sprocket Wheels, Small Rollers and Truck Wheels for Conveyors, Carriers and Cars.

CATALOGS

Link-Belt Company

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK, 299 Broadway
ST. LOUIS, Missouri Trust Building
NEW ORLEANS, Wilmot Machinery Co.
PITTSBURGH, 1501-2 Park Building
SEATTLE, 139-440 New York Block
DENVER, Lindrooth, Shubart & Co.

DRUMMOND, McCALL & CO.

MONTREAL TORONTO LONDONDERRY, N.S.

Wrought Iron and Steel Pipes

All Sizes and to any Pressure

Iron and Steel Boiler Tubes
Red, White and Blue Brand Mining Steel
Full stock always on hand.

Cold Drawn Seamless Steel Boiler Tubing

"KERVA" BRAND
For Stationary, Marine and Locomotive Boilers

Pressed Steel Floor Plates
Raised Diamond and Ribbed Pattern

BRATTICE CLOTH

Tarred, Airproof, also Fireproof. Quality Guaranteed. All Sizes for Direct Import.
Sample Books on Request.

LARGE STOCKS CARRIED IN MONTREAL FOR IMMEDIATE SHIPMENT

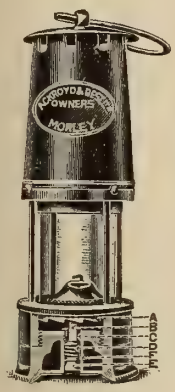
ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F). Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

1910

We shall appreciate your enquiries and orders for Assay Apparatus and Chemicals during the year 1910.

LYMANS, Limited

(ESTABLISHED 1800)

MANUFACTURING CHEMISTS

Importers and Dealers in Chemical and Assay Apparatus

MONTREAL,



RIGHT OF WAY MINE, COBALT, SHOWING BUILDINGS ROOFED AND SIDED WITH OUR ACORN QUALITY CORRUGATED GALVANIZED SHEETS.

Acorn Quality Corrugated Galvanized Sheets

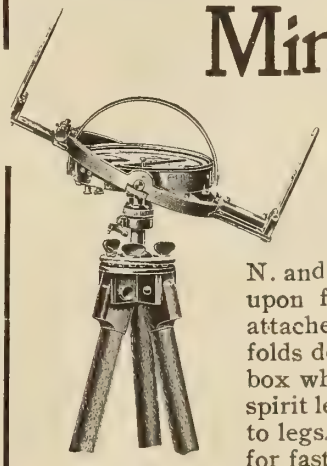
Satisfy every requirement for mining construction work. They are fireproof, durable and economical. Buildings may be erected more quickly by using our Corrugated Sheets than by any other style of construction.

Our ACORN QUALITY Corrugated Galvanized Sheets will stand the **British Government Acid Test** for Admiralty and other public service. This guarantees lasting service in the most trying conditions, and that is what mining men want.

We can furnish **Corrugated Leaded Sheets** and Painted Sheets for special purposes. We give prompt attention to enquiries. Write us at once for prices and information.

METAL SHINGLE & SIDING Co LTD.
PRESTON & MONTREAL

Casartelli's Patent Mining Dial



SIGHT limb moves on axes cast on the compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indces attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Telescope attachment if desired.

The Simplest Mining Dial made—the most efficient—most durable—quite the **best.** Proof of this in Catalogue F—free on request.

Sizes 5 inches and 6 inches.

JOSEPH CASARTELLI & SON
Scientific Instrument Makers
43 Market Street, Manchester, Eng.



OUR TYPE B.F.

Mountain and Mining Transit

With Interchangeable Auxiliary Telescope has 5 inch limb with veriners at 30° with telescope, reading to 1 minute magnetic variation plate, 1 minute plate levels, 30 seconds telescope level, 10-inch 25 power main and 8-inch 20 power auxiliary telescopes, 5 inch vertical circle with guard and veriner reading to 1 minute, stadia, gradienter and extension tripod.

Its Equal Can Only Be Produced In

THE PRECISION FACTORY

Nearly 4,000
BRUNTON PATENT POCKET TRANSITS
are in use by Civil and Mining Engineers, Mine Managers and Geologists
EVERYWHERE

Closed for the pocket it measures 3½ x 3½ x 1½ ins. Case of Aluminum, weight 8 ounces.

Send for Bulletin B & B x 16
to
WM. AINSWORTH & SONS
Denver, Colo., U.S.A.

CANADIAN AGENTS
Lyman Sons & Company,
380 St. Paul St., Montreal.
B. C. Assay & Chemical Supply Company,
Vancouver, B. C.



Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

CANADIAN MINING INSTITUTE

NOTICE OF CHANGE OF ADDRESS.

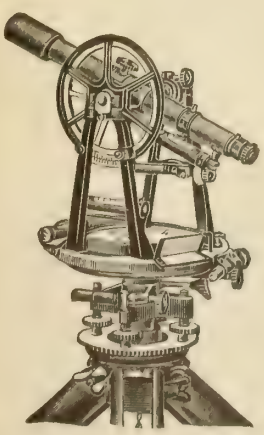
The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.
Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.
The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196



C. L. Berger & Sons

37 WILLIAMS STREET
BOSTON, - MASS.

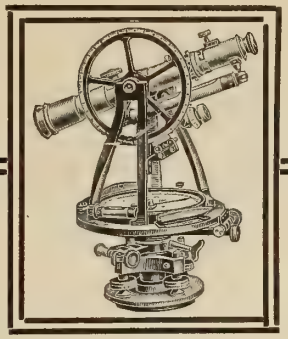
SPECIALTIES:
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

RAMPART CEMENT

Perfectly Sound. Never swells or bursts.
Reliable for all purposes for which hydraulic cement is used.
Fineness 92 per cent. through a 200 mesh sieve.
Strength up to standard specification and permanent.
Used by the leading Mining Companies of the Maritime Provinces.

Sydney Cement Co., Ltd.
Rampart Brand
SYDNEY, NOVA SCOTIA, CANADA



K & E
Engineering Instruments

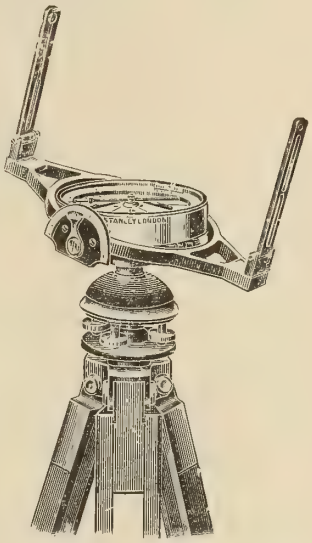
The superior design, high quality of material, workmanship and finish which characterize our Surveying Instruments, account for their use on nearly every important engineering enterprise.

When in the market for a new surveying outfit, we will be pleased to quote on your requirements, as we can furnish every requisite of the engineer for field or office.

Send for our Solar Ephemeris for 1910.
Our complete Catalogue sent free on request.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

STANLEY, LONDON



The cheapest and strongest simple dial yet made.

The largest manufacturers of Surveying and Drawing Instruments in the World.

—

Please send for our J65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

—

All genuine instruments bear our "trade mark STANLEY."

W. F. Stanley & Co., Limited
Great Turnstile, London, England

THE
Bennett Fuse

Crown  **Brand**

MANUFACTURED BY

William Bennett, Sons & Co. Limited
CAMBORNE, CORNWALL, ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.
VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION

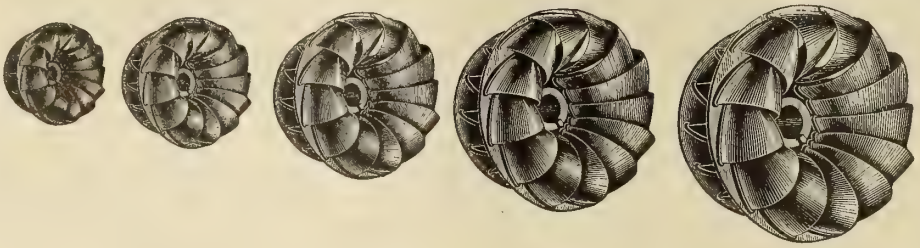
We Are Headquarters For



Ingot Tin, Lead, Spelter, Copper, White Cotton Waste, Brass Castings.

Write for Prices

The Canada Metal Co., Ltd., Toronto



The Improved Turbine

Parties having Water Powers they are desirous of utilizing will be furnished with reliable information as to the best means of making them available for the purpose intended.

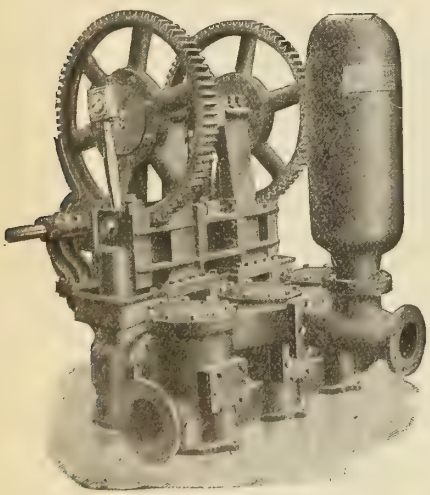
A Competent Engineer will be sent to any point for consultation and the Survey of any Water Power proposition with report thereon.

CATALOG ON REQUEST

The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland

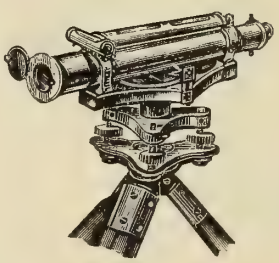
Works: Sherbrooke, Que. St. Catharines, Ont.



POWER AND STEAM PUMPS, CENTRIFUGAL PUMPS, ROTARY AND VACUUM PUMPS.

The SMART-TURNER Machine Co. Limited, Hamilton, Ont.

DAVIS



Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers

(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 BEAVER HALL HILL MONTREAL

Eugene Dietzgen Co.

Limited

10 SHUTER STREET, -:- TORONTO



Manufacturers of

Instruments of Precision, Mining, Surveying, Mathematical. Drawing Materials.

CATALOG ON REQUEST

LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, January 15, 1910 No. 2

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

During the year ending with March 1st, 1908, 91,750 copies of "The Canadian Mining Journal" were printed and distributed, an average of 3,822 per issue.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

	Page.
Editorials	33
(a) Opportunities for Mining Ventures and Investments in Canada	33
(b) Porcupine	34
(c) Government Positions	34
(d) The Giddy Harumfrodile	35
(e) A Good Example	35
(f) Editorial Notes	35
Legal Notes	35
The Year in the Province of Quebec, by H. Mortimer-Lamb.	36
Mining in British Columbia in 1909, by E. Jacobs	38
The Cost of Coal in Nova Scotia	44
The Asbestos Industry	50
The New Porcupine Gold Fields, by A. M. Hay	53
Tonnages at Trail	56
Personal and General	57
Special Correspondence	57
General Mining News	60
Mining News of the World	61
Company Notes	62
Statistics and Returns	63
Market Reports	64

OPPORTUNITIES FOR MINING VENTURES AND INVESTMENTS IN CANADA.

Canada has derived much advertisement from her unequalled mines of asbestos, of nickel, and of silver. One effect of this has been to throw into the background many most interesting mineral areas that, on their merits, should command attention.

The magnitude and diversity of Canada's mineral resources can only be grasped by those who are constantly in touch with mining and prospecting in all their branches. To attempt to draw up an inventory is impossible. But it is appropriate to allude to a few of the sound ventures and investments that are open in unadvertised regions of the Dominion.

We shall preface our remarks with the statement that there is great need of more exact statistics and data regarding the markets for mineral products. Official statistics are meagre. The process of searching out these things is costly and wearisome to the individual. At present, however, it devolves upon each investor to do his own investigating.

Without considering geographical order, we shall proceed to enumerate several fields which, in our opinion, should prove profitable to investors.

Eastern Ontario, particularly the northern parts of the counties of Hastings and Frontenac, is dotted with small prospects, abandoned mines, and not a few paying mines. The accepted opinion as to the gold mines of this Province is that they are not payable. This has not been proved. From private reports that we have read we have formed the deliberate judgment that several of the gold mines can be worked at a profit. And, apart from any question of management, conditions have so improved that costs are no longer prohibitive. But gold is only one of a dozen possibilities. Feldspar, talc, corundum, marble, iron pyrites, and iron ore are being produced on a small scale. The beautiful decorative stone, sodalite, is found in workable quantities. Copper pyrites has been mined. The introduction of cheap hydro-electric power means net profits in many instances.

The gold mines of Nova Scotia, like those of Ontario, require systematic proving. In the opinion of not a few competent judges, the Nova Scotian mines as a rule can be made to pay if worked as nature intended them to be worked. Here, as elsewhere, it is essential that each property be examined on its own merits. This is all the more necessary as the history of the camps has not been properly preserved. The rich tungsten prospects, the gold-bearing antimony ores, the manganese deposits, the gypsum, all await the advent of well-directed capital. Although a small province, Nova

Scotia has been prospected only in the most irregular and unsystematic manner.

The Portland Canal district, in Skeena Mining Division, British Columbia, is rapidly coming to the front. Veins of gold-silver-lead and silver-lead-copper ores hold the promise of good returns. United States investors were early on the spot. The district is large and easy of access by water. Sheep Creek, the gold-milling camp in the Nelson district, has often been mentioned in these columns. Here the chances for those who know something about gold mining are good.

While in Quebec there is much for the investor, there is even more for the prospector. The copper and gold of the eastern townships have been only scantily exploited.

New Brunswick holds out vague inducements. Rich iron-ore deposits are being opened. Antimony, manganese, gypsum, oil and gas, and, possibly, gold should be looked into.

We have omitted mentioning the vast hinterlands of Ontario and Quebec; the tremendous stretch of territory in north-western Canada; the copper and antimony of Cassiar; the gold-quartz of the Yukon. We have not touched upon the coal of Alberta and Saskatchewan. We have confined our attention to easily accessible tracts, lying mostly in the settled portions of the Dominion.

It must always be borne in mind that there is no royal road to success in mining. In pointing out the general fact that good opportunities do exist practically all over Canada, we are giving expression to a conviction that is being strengthened every day. But it is necessary to repeat the assertion that money and time must be spent in investigating not only the deposits, but in investigating also commercial conditions, especially in reference to the market. Not many men are fitted to undertake such work. Other things being equal, it is probable that Canadian specialists, familiar with local conditions, can get the best results. This is true in dealing with minerals, or mineral products, that have a limited market. Some of the minerals mentioned above are marketable in the United States and in Europe. Some of them can be disposed of only in Canada. But in all cases the present market can be largely expanded.

PORCUPINE.

As usual, the discovery of a new gold district has caused an acceleration of the public pulse. Not since, almost fifteen years ago, Ontario went wild over gold in the Lake of the Woods region, has there been such a revival of local interest in the mining of that metal. Porcupine pervades and permeates everything.

And interest in Porcupine is not confined to Ontario. Montreal has taken a hand in the game, New York has asked for cards, and London has made a few side bets. Meanwhile, men and supplies are being hurried over the short winter trail at a tremendous rate.

Before uttering a word or two of warning, we wish to state that to the best of our belief the Porcupine discoveries have much to recommend them. Several prospects are promising. The superficial extent of a few of the bodies is unusually large. Rich pockets are not infrequently encountered. Altogether, the field is worthy of serious attention. This is all that any person is warranted in saying. On the other hand, no good can result from inflated newspaper reports. They may improve circulation, but they hurt the camp.

The fact that the first important discoveries were made just before snow fell precludes the possibility of properly estimating the potentialities of the region. Something will be learned from this winter's work; but certainly not enough to determine finally either the extent or the value of the ore bodies.

Meanwhile, since exact data as to the character of the new goldfield are almost entirely lacking, our provisional opinion must be influenced by the history of other more or less analogous occurrences. We shall disregard the past record of Ontario gold mining camps, a dismal record, and assume that Porcupine is unique, so far as Ontario is concerned,—a quite reasonable assumption. We shall also assume that the gold-bearing quartz will be found in very large quantities. Starting with these assumptions, and guided by the records of certain large gold-mining camps in other parts of the world, it is probable that success at Porcupine will mean the opening of large workings in low-grade ore.

Now, very few people understand what equipping and working a low-grade gold mine means. We shall not attempt to expatiate upon the subject here. But the kernel of the matter may be expressed thus: It may take years of time and millions of dollars to bring a low-grade gold mine up to the point where net profits can be realized.

Of course, "low-grade" is a term that is very loosely applied. Ore carrying $2.50 per ton in gold is undoubtedly low-grade. Ore assaying as high as $10 or $15 per ton may fall into the same category. We believe that the bulk of the Porcupine ore now exposed will range between these figures. In making this statement we are disregarding altogether high assay returns from picked specimens.

There may be a glorious future in store for Porcupine—or there may not. Larder Lake was "boomed" to death. Let us see that Porcupine gets a fair show.

GOVERNMENT POSITIONS.

The mining engineer or the geologist who accepts from a government an official technical position, accepts also a large, though not clearly defined, moral obligation.

Probably in no position are there more opportunities for graft and malversation than in an administrative governmenal mining billet. The low salaries

usually paid heighten the temptation. And temptation comes in particularly inviting and insidious forms.

The government mining official is so placed that he gets early news about new discoveries, promising developments, and all the constant changes that make up the history of prospecting and mining. Since he is a public servant, he must regard all such news as absolutely confidential until it can be made public through official channels. His first obligation is to the public.

But there are always those who are keen to pay a price for early and exclusive tips. Requests for such tips may come from persons of great political power. Refusal on the part of the official may lose him his place, or may create dangerous enemies. But to magnate, friend, or foe, the answer must always be the same—a blank, unqualified refusal.

Added to unyielding integrity the official in question should possess an uncommon amount of discretion and a wide knowledge of commercial mining. In more than one Canadian province he must combine the functions of technical adviser, explorer, geologist, information bureau, inspector, and "glad-hand" artist. In fact, he is expected to do the work of a regiment for the pay of a private.

In all this there is evidence of needless stupidity. A province that employs a good technologist to look after its mining interests, and does not give him a free hand and an adequate staff, is throwing away time and money. The most efficient technologist is of little use if he has to waste half his time in attending to office routine that could be done much better by a young clerk. He can only prove his value with the aid of a suitable appropriation and a corps of assistants.

To drive home these obvious truths we may add that there is not a mining province in Canada that would not be fully justified in spending ten times its present appropriation in exploiting the mineral lands within its boundaries. This is equally true of the Federal Government.

"THE GIDDY HARUMFRODITE."

Two peculiar instances are on record that illustrate the unwisdom of permitting special interests to dominate large coal mines. In its early years the Dominion Coal Company was saddled with a contract whereby it supplied the Everett Gas Company with coal at a price too low to leave any margin of profit. The contract was arranged by a person who had very large holdings in both companies.

During 1908 the dividends of the Crow's Nest Pass Coal Company were reduced by almost 50 per cent. In 1909 no dividends were paid. This decline coincides with the assumption of the control of the collieries by the J. J. Hill interests. The majority of the Crow's Nest Pass stock has been for two years in the hands of the Great Northern Railway and the Granby Consolidated Smelting Company.

This is not an age of Christian charity. Mr. J. J. Hill and his associates, in buying their way into the Crow's Nest Pass Coal Company, were animated by no altruistic motives. Their quite obvious desire was to obtain cheap coal and coke. If they can do this without disregarding the minority shareholders, all well and good. At present it seems that they are doing something else.

A GOOD EXAMPLE.

Most praiseworthy is the spirited resolve of the Daily News, of Nelson, B.C., to spare no pains in giving the public an early and authoritative review of British Columbia's progress during the past year. Its Annual Review number, January 5th, is excellently prepared. The section that deals with mining comes from the pen of Mr. E. Jacobs, that indefatigable and accurate journalist. British Columbia is fortunate in possessing such an enlightened paper as The Daily News, and such a competent observer and critic as Mr. Jacobs.

EDITORIAL NOTES.

Silicious ores, carrying low percentages of finely divided chalcopyrite, are particularly difficult to concentrate without undue loss. Several deposits of this kind have been worked in Ontario and in British Columbia, almost uniformly without commercial success.

The late Dr. Ludwig Mond, throughout his life an unremitting worker, found enough leisure to cultivate a hobby. He was extremely fond of oil paintings, and he succeeded in gathering together one of the finest private collections of pictures extant, mostly the work of Italian artists.

We must congratulate our New York contemporary, **The Engineering and Mining Journal**, upon its improved appearance. The changes in the cover-design have not destroyed its distinctiveness; the paging is much more convenient; and the general make-up is brighter and more attractive.

The cost of producing copper at the plant of the British Columbia Copper Co. was reduced during November, 1909, to 7.35 cents per pound. The cost per pound during the preceding month was 8.8 cents.

LEGAL NOTES.

Judgment was given at Vancouver on December 17, in the damage case of Cope vs. Wellington Collieries, before Mr. Justice Clement and a jury, for the plaintiff, and the damages awarded amounted to $2,400, with costs. The plaintiff sued for damages for the death of his son in an explosion in the collieries at Extension, on January 27th, 1909. Evidence was concluded last night at 5.30 o'clock, and the jury gave its verdict in less than half an hour. Messrs. McNeil & Bird appeared for the plaintiff, and Messrs. C. V. Bodwell and M. Hill for the defendant company.

THE YEAR IN THE PROVINCE OF QUEBEC.

By H. Mortimer-Lamb.

Although as yet production returns are not available, there can be little question but that Quebec's mineral yield for the year will represent a substantial gain over that of 1908. The twelvemonths, in fact, has been a period of notable industrial activity and progress, evidence of which, however, will only be partially disclosed by the statistical records.

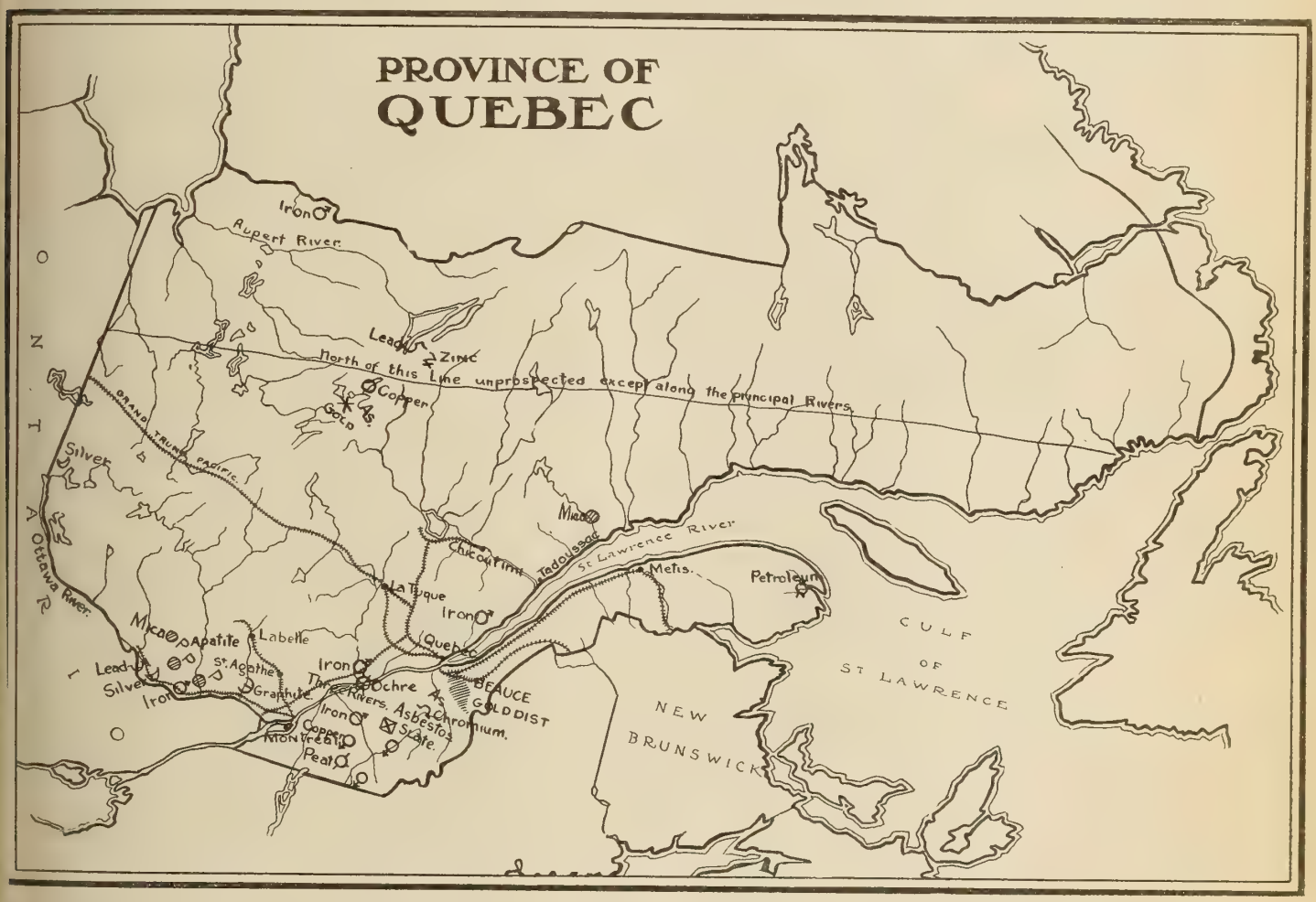
The most important event of the year, having reference to the future of the industry in the Province, was the repeal by the Provincial Legislation in April last of the Quebec Mining Act of 1892, and the passage of a new law, the provisions of which are likely to stimulate to an eminently greater degree exploration and legitimate mining endeavour in this field. The old regulations, which, by the way, were based on ancient French law, were radically dissimilar in principle to those in force in other Provinces of the Dominion, where the aim of legislation in general has been primarily to promote and encourage prospecting and mineral development. The Quebec Mining Law, on the other hand, while apparently liberal in intention, was more favourable to the speculative acquisition and idle holding of large tracts of territory than conducive to bona-fide endeavour; and, in consequence, many are inclined to attribute the tardy progress in the development of the mineral industries of the Province in recent years—a tardiness the more apparent when contrasted with the rapid and great advances in other sections of the Dominion—to this cause alone. Whether or not this contention has any foundation in fact yet remains to be proved; but since geologists are agreed concerning the economic potentialities of the area, and it is, moreover, a well-known fact that there exists in the world no finer class of prospectors than the French-Canadian, it is puzzling to account for the very moderate growth of Quebec's mining industry, unless the explanation of unsuitable or defective laws be accepted as adequate. The amended regulations meanwhile go into force with the new year, and it will be interesting to note to what degree they will affect or influence conditions and activity during the coming prospecting season. The disposition of the present Provincial Government, and especially of the Minister who represents the mining interests, to promote the welfare of the Quebec industry is also apparent in the projected reorganization of the Mines Department. The last incumbent of the office of Superintendent of Mines was most inadequately paid for his services. He was appointed to the post very many years ago, at a time when mining in the Province was of little account. His salary was small and although the duties of the office steadily grew more burdensome, the pay of the Inspector (as was until lately this officer's designation) was not commensurately increased. Finally, in July last at the close of twenty-eight years' service Mr. Obalski resigned the Superintendentship in order to engage in private practice as a consulting mining engineer in Montreal. Meanwhile it is satisfactory to learn that, after some little delay and difficulty, a worthy successor to Mr. Obalski has been found in Mr. T. Denis, a distinguished officer of the Dominion Mines Department, who only a week or so ago accepted the vacancy and will shortly assume the duties. It is also understood that conditions under which Mr. Denis accepts direction of the office are much more favourable than formerly, and that he will be given every facility and assistance in modernizing the Department and in extending the scope of its efficiency and usefulness.

Asbestos.—However one may deplore the greed of promoters as exemplified in the gross over-capitalization of the Asbestos Mergers, and regret that a fine industry should be saddled with so unfair a handicap, it must nevertheless be admitted that the immediate effect of these promotions has been to create remarkable activity throughout the Eastern Townships. Never was there such a busy time-heavy production, new mills going up everywhere, others projected, extensive mineral development under way, and territory over-run by prospectors. Thus at the moment no less than twenty-six cyclones are being installed in the several new mills, and these should all be in readiness for operation within the next few months. As to tonnage shipments of asbestos and asbestic during 1909, there is some difference of opinion whether or not any considerable increase over those of 1908 will appear in the returns since several of the important producing properties have been accumulating or adding to their stocks and have accordingly restricted their actual shipments. Mr. Obalski, however, is of the opinion that the shipping returns will show an increased tonnage output of from fifteen to twenty per cent. for the year, a good enough record in itself but likely to lose in significance when in turn it is compared with what may be expected during 1910.

Referring most particularly to the year's developments in the asbestos area, mention should first be made of the re-opening of a mine near Thetford, dormant for nearly fifteen years, formerly owned by the Thetford Mining Company, but since acquired by the Jacobs Asbestos Company. Here eminently successful development operations have been undertaken, the results justifying in fact the erection of a mill which is now in course of construction. Other new properties also undergoing development in this vicinity are the Clarke, near the Poudrier Road, owned by a Montreal syndicate, and the Demers, situated a mile to the east of the town of Thetford. All the large producing Thetford mines have, of course, been in full operation, night work having been inaugurated at the Amalgamated Asbestos Corporation's King Brothers' Mine here, search lights being employed to give illumination in the pit—an innovation, which by the way is also being introduced by the Asbestos & Asbestic Company at Danville. One important result of the promotion of the Black Lake Consolidated was the re-opening of the Union and the development of the adjoining property, the Southwark; and a mill, which it is hoped will be ready for operation in the spring, is now being erected to serve both mines. Prospecting work in this district has also been prosecuted by the Imperial Asbestos Company.

In East Broughton, a very complete mill has been erected on the Frontenac, while the Beaudoin and Audet Company has opened mines at Robertson. It is also interesting to record that the Berlin Asbestos Company, operating near Broughton, having constructed, regardless of expense, four miles of branch railway to connect its property with the Quebec Central, and likewise erected a mill, is now about to search for asbestos.

At Danville, a new mill has been recently completed, and is now in operation, and with this additional equipment the Asbestos and Asbestic Company is in a present position to handle between fifteen hundred and two thousand tons of rock daily. In the vicinity of Danville, prospecting has been active, a small power plant having been installed for the development of one prospect in the 9th Range of Cleveland, while development has been in progress on an adjacent property in the 8th Range, and on a third property in the 5th Range of Shipton. The Champoux property, near St. Adrien, 6th Range of Ham, has been acquired and is being developed by a Montreal syndicate near Morceaux. Operations have been restricted to development on the Chicago and Charpentier, and on an adjoining lot to the south west. The only at all depressing intelligence, if it be considered as such, is that after lying idle for the last two years or so the plant ot the Asbestos Mining and Manufacturing Company's mine at Crysotile, Wolfstown (formerly known as the Peters Mine) has been dismantled and sold. To sum up briefly, prospecting and development have been general throughout the asbestos area from Brome to the Vermount.



Copper.—There are those who confidently believe that one of these days, and possibly at no very distant day, Quebec, or rather the eastern townships, will become contributors to the copper production of Canada. As a matter of fact, a very fair output has been maintained by one or two mines for many years past, and it is not generally realized that, taking into consideration the amount of capital actually invested, these properties have returned to their owners a larger percentage of profit than any copper mines operating in the Dominion. With the exception of perhaps three properties, the Eustis, Nichols and Naughton, there has been practically no attempt to systematically exploit the resources of the district; and this is the more regrettable since the surface indications are so generally promising, and the economic conditions so exceptionally favourable for the establishment of a flourishing industry. Nevertheless, as the result largely of the introduction of more modern methods of mining at the Eustis, it is expected that the past year's copper production will show an increase of perhaps a hundred per cent. over the 1907 returns—and this notwithstanding that the Nichols mine was operated for only part of the year. The Eustis Company meanwhile is developing a new property, adjoining the Eustis, and known as the Hepburn, while development has also been actively prosecuted on the Suffield and Marrington, owned by Mr. A. O. Naughton; and on the Lake Memphremagog, a prospect owned by Mr. G. E. Smith. Elsewhere, a copper prospect near Weedon, in the vicinity of Quebec, is being exploited, while also development is reported to have been undertaken on copper properties located on the north shore of Chaudiere River.

Gold.—The revival of placer mining activity in the valley of the Chaudiere is worthy of special notice, and the result of developments now proceeding is awaited with very considerable interest. As is well known, the Chaudiere was twenty years or so ago a very rich and

active gold-producing district, but after yielding well for some time operations were finally abandoned. A Montreal syndicate, however, acquired in 1909 the mining rights over 72,000 acres of the Seigneury Regaud de Vaudreuil, in Beauce County, intending to prospect for copper. Effort in this direction was not successful, but during the late summer auriferous gravel, which promised well, was discovered on a branch of the Gilbert River. Operations were commenced on October 1st, with the employment of a force of thirty-five men, who have been engaged in sinking to and drifting on bed rock. The gold is found lodged in the crevices of the bed rock—a black-clay slate in the gravel for a distance of three feet immediately overlying the bed rock, and also in a band, about four feet thick, of over-burden. The bed rock is said to yield values averaging $4.95 per cubic yard, and the over-burden 77 cents. At the beginning of December, about 4,800 square yards of pay ground had been developed here, but since then additional territory of equal value has been opened. The syndicate has also made successful tests of the gravels of the La Plates River, at a spot approximately three-quarters of a mile from the confluence of that stream with the Chaudiere. The gravel from this spot which is presumed to be the locale of an ancient river channel, has yielded returns of from $3.22 to $80.82. The conditions for hydraulicking are moreover exceptionally favourable, since abundant water from the neighbouring high falls may be relied on to give an ample supply under pressure to carry on continuous operations during the working season. Nuggets have also been taken this year from ground on the Ruisseau des Meules, which locality promises well, although when formerly worked much difficulty was occasioned by quicksands. The syndicate, meanwhile, is engaging the services of an expert gold-gravel engineer from California, and propose to commence actual mining operations in the spring.

There is little to record in respect of gold quartz developments. A stamp mill, however, has been erected at Megantic, while some prospecting and other activity is reported from the northern section of Pontiac, where on the Union Abitibi mine a ten-stamp mill has been erected.

Chrome and Iron.—The chief event during 1909 in connection with the chrome industry was the absorption of the Dominion Chrome Company and of the Black Lake Chrome and Asbestos Company by the Black Lake Consolidated. Otherwise, the year so far as this industry is concerned has been somewhat featureless. Production will probably show a decrease. A plant, however, is now being installed at Coleraine to utilize the Behrend process of concentration on a larger scale than has yet been attempted.

The utilization of the black magnetic sands from the north shore of the St. Lawrence has long been a subject of discussion. Matters have recently been somewhat advanced by experimentation. Shipments of the sands for this purpose have been made to Niagara and elsewhere during the year, but results as yet have not been made known.

Operations by the Canada Iron Corporation at Radnor and Drummondville have been conducted as usual, and it has been announced that the company proposes to establish a foundry at Three Rivers.

Other Minerals.—A new discovery of graphite is reported to have been made at St. Jovite, situated 60 miles north-west of Montreal, on the Montreal and Nomining branch of the C.P.R. The property has been acquired by a syndicate that is opening it and installing machinery. Some of the flake material, in which the deposit is rich, has already been marketed in the United States. No important developments are reported from Buckingham.

A first shipment of some 200 tons of magnesite was made in 1908 from a property near Calumet, Granville County. This production was increased in 1909, while the mine has also been extensively developed.

Excellent reports concerning the condition of the cement industry are received, and a largely-increased production for 1909 is assured, the three mills having been in continuous operation and producing at the rate of 5,000 barrels daily.

MINING IN BRITISH COLUMBIA IN 1909.

A Review of the Year's Work and Progress.

Written for the Canadian Mining Journal by E. Jacobs.

The aggregate value of the mineral production of British Columbia for 11 years to the end of 1909 is nearly $350,000,000. Allowing that the accompanying estimate for the year 1909 shall be proved by the revised returns to be approximately correct, the actual aggregate will be 347,804,000, or but $2,196,000 short of the larger total first mentioned. Of this aggregate, gold represents $126,317,000, silver $30,081,000, lead $23,298,000 copper $55,242,000, miscellaneous metals $991,000, coal and coke $102,782,000, and building materials, etc., $9,093,000. The proportions of value are metalliferous minerals $235,929,000, and non-metalliferous $111,875,000.

The value of production in 1909 is estimated at $24,426,500, as shown in some detail in the tables herewith. As the yearly average value for the four years 1905-1908 was $24,294,000, it is evident that notwithstanding the comparatively low average prices of silver, lead and copper, production last year was well maintained; in fact showed an increase in quantity on the whole. For the better appreciation of the increase in value it should be borne in mind that the prices at which metals have been calculated for the years 1909 and 1908 respectively, are as follows, those in brackets showing where there was any difference between the two years: Gold, placer, $20 per oz.; gold, lode, $20.67 per oz.; silver, 49 cents (50.2 cents) per oz.; lead, 3.8 (3.78) cents per lb.; copper, 12.9 (13.2) cents per lb.; zinc, 5 cents per lb.; coal, $3.50 per long ton; coke, $6 per long ton. Silver is less 5 per cent., and lead 10 per cent., of the New York average market prices, as shown by "Engineering and Mining Journal" quotations for ten months. Prices for coal and coke are those ruling generally in the Province.

QUANTITY AND VALUE OF MINERAL PRODUCTS FOR 1908 AND 1909.

MINERAL PRODUCT	CUSTOMARY MEASURE.	1908.		1909.	
		Quantity.	Value.	Quantity.	Value.
Gold, placer,	Ounces.	32,350	$ 647,000	30,000	$ 600,000
Gold, lode,	Ounces.	255,582	5,383,880	250,000	5,167 500
Total gold,	Ounces.	287,932	5,929,880	280,000	5,767,500
Silver,	Ounces.	2,631,389	1,321,483	3,000,000	1,470,000
Lead,	Pounds	43,195,733	1,632,799	46,000,000	1,748,000
Copper,	Pounds	47,274,614	6,240,249	41,000,000	5,289,000
Zinc,	Pounds	.....	270,000	10,000 000	500 000
Total metallic			15 394,411		14,774,500
Coal,	Tons of 2240 lbs.	1,677,849	5,872,472	1,940,000	6,790,000
Coke,	Tons of 2240 lbs.	247,399	1,484,394	277,000	1,662,000
Building materials, etc.			1,100,000		1,200,000
Total value of production			$23,851,277		$24,426,500

PRODUCTION OF MINERAL BY DISTRICTS AND DIVISIONS.

NAME	DIVISIONS		DISTRICTS	
	1908	1909	1908	1909
CARIBOO DISTRICT			$ 405,000	$ 390,000
Cariboo Mining Division	$ 355,000	$ 350,000		
Quesnel " "	30,000	25,000		
Omineca " "	20,000	15,000		
CASSIAR DISTRICT			298,234	267,319
EAST KOOTENAY DISTRICT			4,802,680	4,991,446
WEST KOOTENAY DISTRICT			5,448,224	5,851,670
Ainsworth Mining Division	422,181	932,134		
Nelson " "	462,836	678,604		
Slocan and Slocan City Mining Division	676,580	1,073,080		
Trail Creek (Rossland)	3,713,392	3,023,711		
Other parts	173,235	144,141		
LILLOOET DISTRICT			13,779	10,000
YALE DISTRICT			7,649,963	6,710,413
Osoyoos, Grand Forks and Greenwood Mng. Divisions	7,545,380	6,426,609		
Similkameen and Nicola	101,583	280,804		
Yale Mining Division	3,000	3,000		
COAST DISTRICT			5,233,397	6,205,652
(Nanaimo, Alberni, Clayoquot, Quatsino, Victoria.)				
			$23,851,277	$24,426,500

Reviewing separately the production of the different minerals, the following comment is submitted:—

Gold.—There seems to have been a general decrease in the production of placer gold, the two larger producers of this metal—Cariboo and Cassiar districts—both showing a smaller yield. The estimated decrease in the former is about, $10,000 and in the latter $27,000. Nearly all the lesser placer gold camps were also short as compared with 1908, so it is probable the general shortage is attributable to a restricted supply of water, with a resultant shorter period of gravel washing operations. In Cariboo provision is being made for extended operations during the 1910 season, chiefly on the properties of John Hopp, situated near Barkerville, and the leases held by Philadelphia people, represented by Howard W. Dubois, who are constructing a 20-mile ditch and flume from Swift River to the Quesnel Forks neighbourhood, preparatory to hydraulicking on a large scale.

The Guggenheim hydraulic gold properties in British Columbia, in the Quesnel Forks and Atlin camps respectively, were not worked during the season on the large scale that had been expected, so those added little or nothing to the year's total yield of placer gold.

The decrease shown in the production of lode gold was largely in Rossland camp, a result of the suspension of production at the Le Roi mine, pending the carrying out of systematic exploration with a view to finding new ore bodies of a payable grade in the deeper levels of the mine. The Centre Star group of the Consolidated Mining and Smelting Company of Canada, Limited, made a slightly larger production of gold than in 1908,

while the Le Roi No. 2 produced in 1909 from its Josie mine, about as much as in the year immediately preceding. There was no change of importance among the smaller mines in Rossland camp.

An advance was made in Nelson district, the year's increase having been about 12,000 oz., mostly from Sheep Creek camp, in which several mines are being developed with promising results. This camp is expected to become one of the important lode gold producers of the Province, with at least half a dozen mines yielding profitable returns. At Ymir the only mine that contributed to the district's total for the year was the Yankee Girl, operated by a New York company, organized during the year.

The Boundary district, as in earlier years, made a fairly large production of gold, which in the mines of that district is in association with copper. It is noteworthy that the greater part of the lode gold produced in British Columbia is from ores that are smelted, there being only two mining divisions in which gold ores are milled to any considerable extent, viz., in Nelson and Osoyoos. The Hedley Gold Mining Company's Nickel Plate mine is in the latter division; this was sold during the year to the organizers of that company, so the Yale Mining Company, which was one of the late Marcus Daly's companies, is no longer mining in the Similkameen country of British Columbia. Arrangements are being made to do much development work in 1910, following extensive diamond drilling done in 1909. Additions are being made to power plant at both the mine and the 40-stamp mill; at the mill re-grinders and filter press are being added to complete the cyaniding plant.

Developments on Texada Island are resulting in an increased output of lode gold from two or three mines there, the gold occurring in an ore also containing silver and copper to an extent which admits of a return being received from the smelter of about $20 per ton, for first-class ore, after deduction of freight and treatment charges.

Silver.—A production of approximately 3,000,000 oz. of silver is an advance of 368,000 oz. on the output of 1908. Nearly half of this increase was made in Ainsworth camp, in West Kootenay, the Blue Bell mine on Kootenay Lake, contributing about 38,000 oz. more than in 1908; the Whitewater and Whitewater Deep mines, situated between that lake and the Slocan mining division, adding about 58,000 oz. to its 1908 total, and the various other mines in the division together making up about 75,000 oz. of the total increase. In Slocan division the Richmond-Eureka mine, owned by the Consolidated Mining and Smelting Company of Canada, Limited produced 197,000 oz., which was 37,000 oz. more than in 1908; while the Van Roi, an English-owned property, produced about 38,000 oz. more than in the year previous.

The production of East Kootenay mines was nearly 100,000 oz. less than in 1908, attributable mostly to the Sullivan group not having been worked, and as to the remainder to a smaller yield from other mines in the district. Several mines in Nelson division contributed to the total decrease, as also did the Silver Cup, in Ferguson camp, Lardeau, and the Marble Bay and Cornell mines, on Texada Island. The finding of much native silver in bornite ore at between 900 and 1,000 feet depth in the Marble Bay mine was one of the most interesting features of the year's mining in the Coast district, the more so since the first-class ore also contained about $10 in gold to the ton.

The average silver content of the ores of the big Boundary mines appears to have been of slightly lower value than in earlier years. The difference per ton was not considerable, but the aggregate silver content of the total tonnage—nearly 1,600,000 tons— mined and smelted was distinctly noticeable.

The outlook is that next year there will be a further increase in the quantity of silver produced in the Province, for substantial progress made in 1909 in the Ainsworth and Slocan districts may be expected to be maintained, while better results are looked for in East Kootenay. Boundary mines will increase their tonnage also, and in the Coast district new mines in the Portland Canal district will begin producing. British Columbia's record of silver production was made in 1897, with an output of 5,473,000 oz., while that of 1901 was 5,151,000 oz.

Lead.—The increase in production of this metal was about 2,804,000 lbs. It is probable the revised returns will show the year's total to have been in excess of the estimate of 46,000,000 lbs. possibly by another million pounds. In past years production has ranged as high as 63,358,000, which was the total for 1900, the next highest year's total having been that of 1905, with 56,580,000 lbs. The stimulating effect of the bounty paid by the Canadian Government on lead produced in the Dominion can easily be seen when the statistics of production during recent years are examined. Production for 1903, the year immediately preceding the granting of the bounty, had fallen to 18,089,000 lbs, but since 1904 it has not in any year been lower than 43,000,000, while it has gone up to 56,580,000, which was the quantity produced in 1905. The amount of bounty paid is determined by the price of lead in London, it being on a sliding scale, commencing when the quotation is about £17 and increasing to 75 cents per 100 lb. of lead in the ore when the London price becomes lower, so as to ensure to the Canadian producer a minimium price of £17 per ton inclusive of bounty. As London quotations ranged from £12 3s 9d to £13 15s during 1909, the full bounty was paid to Canadian producers.

East Kootenay produces more than half the lead mined in British Columbia. Its total for 1909 was less by between 3,000,000 and 4,000,000 lb. than that of 1908, partly owing to a suspension of production at the Sullivan Group mine and partly to a decreased output of this metal from the St. Eugene and North Star mines.

The output of mines in Ainsworth mining division was doubled, the figures being about 5,000,000 for 1908 and in excess of 10,000,000 lb. for 1909. More than half of this increase was made by the Blue Bell mine, with a production of about 6,466,000 lb. in 1909 as against 2,600,000 lb. in 1908. The Whitewater and Whitewater Deep mines produced about 3,355,000 lb., as compared with 2,000,000 in the preceding year. The Cork mine, on the south fork of Kaslo Creek also contributed to this increase, though in much smaller degree.

Slocan mines did not produce as much lead as in 1908, the falling off having been approximately three-quarters of a million pounds, the chief losers being the Rambler-Cariboo and Standard mines, both with a materially reduced production. Richmond-Eureka and Van Roi both considerably increased their output, the former with a total of about 1,357,000 lb. to the extent of approximately one-third, and the latter from 594,000 lb. in 1908 to 1,788,000 lb. in 1909.

In Nelson division the Yankee Girl, at Ymir, was a new producer, with between 300,000 and 400,000 lb. to its credit, while the Iron Mountain Company's Emerald mine, situated near Salms, advanced its production from about 400,000 lb. in 1908 to 764,000 in 1909. The La Plate, on Rokanee Creek, near Nelson, formerly pro-

ducing silver-lead in considerable quantity, was idle all the year.

Work has been resumed on the Sullivan group, so East Kootenay may be expected to have shortly the benefit of production from that mine.

Incidentally, it may be mentioned here that the Consolidated Mining and Smelting Company of Canada, Ltd., during 1909, increased the lead smelting capacity of its works at Trail, also enlarged its electrolytic lead refinery. Two lead stacks have each an average smelting capacity of 150 to 170 tons per day, which is more than sufficient to keep the refinery supplied with all the lead bullion it will be able to deal with when enlargements now being made shall be completed. So generally only one will be kept in operation. Steel water jackets have been substituted for iron in these two furnaces; the number of tuyeres increased to 22; a 50-ton bullion pot has been installed, thus admitting of the molten lead bullion flowing continuously from the stack, instead of being tapped off at intervals; and provision has been made for moulding the lead into anodes at the furnace instead of re-melting it and moulding them in the refinery. An improved mechanical feed has been installed at the furnaces. The number of Huntington-Hoberlin circular roasters for lead has been increased to seven and of converting pots to 15. The lead refinery has been enlarged to a daily capacity of about 120 tons of refined lead. The number of electrolytic tanks is now 596, these being housed in a building 600 feet in length.

It is noteworthy that the gradual building up of a lead smelting and refining industry at Trail has resulted in the establishment in Canada of three lead corroding plants—two in Montreal, Que., and one in Vancouver, B.C.—and a lead pipe and shot factory in Vancouver. The market in Canada for lead is expanding, but it is not yet sufficiently large to absorb all the lead made at Trail, consequently a considerable quantity is still shipped to the Orient and some to Australia.

Copper.—Returns obtained to date indicate a decrease in production of copper in 1909 as compared with 1908 of about 6,274,000 lb. It is considered probable though that when the official returns shall be received it will be found that the actual output has been from 1,000,000 to 2,000,000 lb. more than the quantity included in the accompanying estimate. Of the present estimated decrease, about 1,500,000 lb. is directly traceable to the suspension early in the year of production at the Le Roi mine, Rossland. There was, also, a comparatively small decrease in the production of copper by the Consolidated Mining and Smelting Company's Centre Star group, in the same camp; but this was in part compensated for by an increase in that of the Le Roi No. 2 Company's Josie mine. The small mines of Rossland camp did not contribute any quantity of copper worth noting.

In the Boundary district the Granby Company's mines led with a production estimated at between 23,000,000 and 24,000,000 lb. Those of the British Columbia Copper Company with only about 6,500,000 lb. show the effect of three months' idleness consequent on a strike of miners at the collieries from which this company usually obtains its supply of coke for smelting. The result is a considerable decrease in the quantity of copper produced by that company. On the other hand, the Consolidated Company's Snowshoe mine, with 3,775,000 lb., appears to have made a gain of about 2,500,000 lb. as compared with 1908. The Dominion Copper Company, which made a small production early in 1908, did not in 1909 send any ore from its mines to the smelter.

Comparatively big tonnages and low mining and smelting costs are prominent features of the copper producing industry of the Boundary district. The Granby Consolidated Mining, Smelting and Power Company, in its last annual report for its fiscal year ended June 30th, 1909, stating its costs, including all expenses, at $3.20 per ton of ore, which, after deducting the value of the gold and silver contents of the ore, made the cost of producing copper ten cents per pound. The manager reported the metals extraction for the year to have averaged 21.81 lb. of copper, 0.2724 oz. of silver, and 0.0434 oz. of gold per ton of ore.

The Granby Company lately completed the improvements to its smelting plant that were commenced in the previous year. The maximum treatment capacity of the smeltery is now about 4,500 tons of ore per diem, as evidenced by a recent full week's run giving an average of 560 tons per day per furnace for seven furnaces then in blast. The eighth enlarged furnace has since been blown in. The British Columbia Copper Company's smelting and converting plant being quite modern and only in use a comparatively short time, was not changed in 1909. Enlargements of two of the three 700-ton blast furnaces are to be made next year, in order to provide for the bigger tonnage of ore to be available when railway connection with a mine the company has opened in Wellington camp, Boundary district, shall have been completed; also for ore from the New Dominion Copper Company's mines, which it is stated will be treated at the B. C. Copper Company's smeltery. There does not appear to be any probability of New Dominion Copper Company's smelting works at Boundary Falls being used again.

On the Coast, too, preparation has been made for smelting a larger tonnage of copper ore, the Tyee Copper Company having installed a second blast furnace at its works at Ladysmith, Vancouver Island. There was no production of copper ore on Vancouver Island in 1909 worth mentioning, but the Tyee Copper Company kept its works operating on ores from other parts. During twelve months ended August 31st, 1909, approximately 45,000 tons of ore were smelted at these works, and matte containing about 3,500,000 lb. of copper was produced. This was the largest production of copper by this company in any similar period since the fiscal year ended April 30th, 1905. Besides that from mines in the British Columbia coastal district, ore was received from as far north as Latouche, Alaska, and south as Salina Cruz, Mexico. The new furnace, installed in 1909, is 48 x 160 in. at the tuyeres. Its capacity is estimated at about 12,000 tons of ore per month.

Work has been continued at the Britannia mine, on Howe Sound, and latterly about 100 men have been employed at mine and mill. Extensive exploration of the enormous ore bodies occurring in the mine has been in progress all through the year, but no regular production of ore has been attempted. Some known ore bodies have been found to carry a considerable percentage of zinc, so for the purpose of determining in a commercial way whether the iron and copper can be separated from the zinc, a roaster, cooler, and Wetherill magnetic separator have been installed. At the mill, which has been re-modelled, the improvements made have been with the object of bringing its capacity up to 500 tons per day. Experimental work in saving the chalcopyrite contained in the highly silicious gangue characteristic of Britannia ore is being continued. There is little probability of active production in the near future, the

present intention being to determine definitely both the approximate tonnage of ore available and the best means of preparing it for smelting. The work being done at the Britannia is most important and valuable to the copper mining industry of the lower coast of British Columbia, where there is much ore carrying excess of silica.

On Texada Island, the development of a comparatively large shoot of bornite ore of generally high grade, occurring in the Marble Bay mine, has been continued with much success. The copper runs high in the sorted ore and even when a large proportion of second-grade ore was shipped the average return in copper from between 11,000 and 12,000 tons was 4 per cent. A neighbouring mine, the Cornell, reports an average copper value of 6.2 per cent. from 11,000 tons of ore, and this beside gold and silver to the value of about $17 per ton.

In the northern part of the British Columbia coastal district there is much promise of a substantial production of copper being established ere long. Among other new properties recently officially reported on by Mr. Herbert Carmichael, assistant provincial mineralogist, are the Red Cliff, distant about 20 miles from the head of Portland Canal, and the Hidden Creek group, on Observatory Inlet, a branch of Portland Canal. On one of the Red Cliff group, Mr. Carmichael found ore some 8 ft. in width. Bands of ore in the mass, 5 to 8 in. thick, were found to contain copper from 6 to 18 per cent., together with gold and silver up to $37.00. This official also reported as occurring on the Hidden Creek group a large exposure of ore which "has been cleared off to a large extent by surface stripping and shows a height of 300 ft. of mixed pyrite and chalcopyrite ore, carrying 4½ to 5 per cent. copper." The establishment of a smeltery in the vicinity is proposed.

Of the numerous mineral claims on Moresby Island, of the Queen Charlotte group, on which ores containing more or less copper have been found, few have shipped any considerable quantity to the smeltery, so that the commercial value of the ore has not yet been proved.

Iron and Zinc.—Iron mining in British Columbia, at no time of great importance, has been practically at a standstill during the last two or three years. There have been many enquiries relative to the Puget Sound Iron Company's large deposit of iron on Texada Island, and the property has been bonded by some United States men, but no steps have yet been taken by them in the direction of mining the ore. In past years about 30,000 tons of this ore were shipped to Puget Sound, Wash., and smelted in a charcoal furnace erected at Irondale, near Port Townsend.

A company has been organized with the object of establishing iron and steel works at or near Vancouver or New Westminster, the latter within 20 miles of the mouth of the Fraser River, but the plans of those in charge of this enterprise are not yet matured.

There has been more activity during 1909 in connection with the mining of zinc than for several previous years. Zinc has been produced commercially at four or five mines, while at others tailings from silver-lead concentrating plants are being stored for treatment later, when zinc separating appliances shall have been provided. The largest producer of zinc in British Columbia is the company owning the Lucky Jim mine, in the eastern part of Slocan district; much of the crude ore from this mine runs 52 per cent. zinc, so it is shipped without concentration or separation treatment. The Whitewater and Van Roi mines, the former in Ainsworth mining division, and the latter in western Slocan, both make a zinc concentrate. The Whitewater shipped during the year, 4,360 tons of zinc concentrate averaging approximately 15 oz. silver per ton and 42 per cent. zinc; the Van Roi made about 1,400 tons of similar concentrate assaying about 44 per cent. zinc and 50 oz. silver per ton. The Ruth, at Sandon, also makes a zinc concentrate from its silver-lead-zinc ore; it shipped 655 tons in 1909. The ore of the Blue Bell contains much zinc, but so far no production of the metal on a commercial basis has been made at this mine.

A group of mineral claims on Pingston Creek, opposite Haleyen Hot Springs, on which there is a large surface showing of zinc ore, was lately bonded by New York men who are commencing the development of this property.

Coal and Coke.—The production of coal and coke in the Province in 1909, it seems quite safe to assert, was the largest of any year since coal mining was commenced in British Columbia. Owing to non-receipt of the production figures of one of the larger companies, this may not be stated quite positively, but it appears reasonable to estimate the gross output at nearly 2,500,000 long tons, and the net at nearly 2,000,000 tons. However, to be on the safe side in making up the accompanying estimate, the net production, that is after deducting the quantity of coal made into coke and valued as such, has been placed at 1,940,000 long tons. Of the gross tonnage something like 1,450,000 tons were produced in what is officially known as the Coast coal mining district (Vancouver Island about 1,380,000 and Nicola 70,000 tons) and the remaining 1,050,000 tons in the Crow's Nest district, in south-east Kootenay. Deducting about 450,000 tons made into coke, an estimated net tonnage in excess of 2,000,000 tons remains. Whether this estimate will prove somewhat too high or not will be determined only by receipt of the official figures of production, but in any case the over-estimate if there be one, will not be large. The nearest approach to this tonnage of coal was that of 1907, when a net production of 1,800,067 tons was officially recorded. That year, however, the quantity of coke made was only 222,913 tons as compared with an estimated production of 277,000 long tons in 1909. The highest previous record tonnage of coke was in 1905, when it was 271,785 tons. It is quite probable, therefore, that the production of both coal and coke in British Columbia in 1909 was larger than in any previous year.

While the suggested increase of nearly 400,000 tons in the gross output of coal is to some extent attributable to the fact that three or four collieries, which by the end of 1908 had only commenced to ship coal, steadily increased their production in 1909, it is also evident from the preliminary returns received that the older and larger collieries also contributed materially to the increase.

The older collieries in the Coast district are those of the Western Fuel Company, at and near Nanaimo, Vancouver Island, and of the Wellington Colliery Company (Dunsmuirs), at Cumberland and Extension, respectively. The production of the Western Fuel Company's No. 1, Protection Island, and Brechin mines, reached to higher figures than in any other recent year. Thanks to the courtesy of the manager of this company, the information is available that of the company's gross production in 1909 of about 512,000 long tons, about 51 per cent. was disposed of in British Columbia, while 49 per cent. was exported to foreign countries in the proportion of 32 per cent. to California and 17 per cent. to other parts. No information was received in time for mention in this review of the year's results at the Dunsmuirs Collieries, but it is believed their produc-

tion was larger than in 1908, when a gross output of about 778,000 tons was made, and of this 71,000 tons was used in making coke. It is probable their 1909 output was nearly 800,000 tons gross.

The establishment by the Pacific Coast Coal Mines, Ltd., of a flourishing coal mining enterprise on Vancouver Island in 1908-9, is one of the evidences of progress on the coast. This company, which has its head office in Victoria, B.C., has coal properties at South Wellington and Suquash, both on Vancouver Island, and at Malcolm Island, off the north-east coast of Vancouver Island. Its more important operations have been at South Wellington, in the Nanaimo district, where the year's development consisted of some three miles of slopes, levels and roadways in the coal. The year's production of coal was about 45,000 tons, of which about 11,506 tons were exported, most of it to Mexico, on the west coast of which country a market for this company's coal is being developed. Latterly production has been increased to about 600 tons a day, and a ready sale is found for all coal produced.

Several other coal properties on Vancouver Island have also been worked, but as yet their production is very small. Coal measures on Graham Island, of the Queen Charlotte group, are being prospected by probable purchasers. Coal has been found in various parts of the northern country through which the Grand Trunk Pacific Railway is being built, west of the Rocky Mountains to Prince Rupert, the limits of one area discovered on the Morice River in 1908 by W. W. Leach, of the Geological Survey of Canada, were largely determined by that official during the field-work season of 1909; another area, near the headwaters of Skeena River, was examined by Chas. Fergie, formerly of Nova Scotia, for prospective buyers resident in Great Britain.

In the Nicola country, the Nicola Valley Coal and Coke Company did much development work in its Nos. 1 and 5 mines, Middlesboro collieries, and also gave attention to Nos. 2, 3, and 4. The coal opened in No. 5 is exceptionally clean and hard, and of excellent quality. The addition to mine equipment included the extension of No. 1 tipple for the handling of all coal from Nos. 1, 4 and 5 mines; erection of a boiler and compressor house, and installation therein of two 72-in. by 18-ft. steam boilers, and a Rand compound condensing steam and compound air compressor having a capacity of 2,215 c. ft. of free air per minute, complete with air receivers and necessary connections. The company's output of coal in 1909 was about 70,000 short tons. Labour difficulties restricted production during three or four months, but as the year closed, production was between 9,000 and 10,000 tons per month, an agreement with the men having been come to, and the demand for coal good. Development work was done at the property of the Diamond Vale Collieries, Ltd., also in Nicola Valley, but the production of coal was small.

The extension of the V. V. and E. Railway to Princeton, Similkameen, enabled the Vermilion Forks Mining and Development Company to commence shipping coal. The company's colliery at Princeton is only developed sufficiently to admit of a present output of about 100 tons per day, but transportation difficulties having been overcome, additional plant will be installed and production facilities be shortly increased.

Coal measures occurring near Midway, in the Boundary district, are being opened and coal taken out in small quantity.

The Crow's Nest Pass Coal Company is the largest coal producer in the Crow's Nest country. It has three collieries—at Carbonada, Coal Creek, and Michel, respectively. Its output is from Coal Creek and Michel, at each of which there are several mines producing freely. Somewhere about 900,000 tons gross of coal were mined, and about 250,000 tons of coke made in 1909. Equipment of these collieries is extensive, designed to meet the requirements of a much larger output than is at present practicable. Additions to power plant in 1909 were the installation of the three Rand-Corliss air compressors, one at Coal Creek and two at Michel. At the former colliery the machine put in is a compound condensing steam 3-stage air compressor, having a capacity of 1,300 cu. ft. of air per minute compressed to 1,200-lb. gauge pressure. A similar machine was installed at Michel, and as well a low-pressure compound condensing steam and compound air compressor having a capacity of 4,523 cu. ft. per minute.

At the colliery of the Hosmer Mines, Ltd., situated between Fernie and Michel, during 1909, there were completed the 3-compartment main and parallel tunnels, these cutting ten seams of coal, of which five, having a total thickness of 48 ft. of coal, are workable. Gross production was between 65,000 and 70,000 tons of coal, more than half of which was made into coke. The power and coal-handling equipment here is for an output of 2,000 tons per day, and the tipple is designed and built for twice that capacity. There are 240 beehive ovens, having a capacity of 400 tons of 48-hour coke per diem.

The Corbin Coal & Coke Company, which, like the Hosmer Company, commenced shipping coal late in 1908, made an output in 1909 of about 65,000 tons. Of this quantity, 80 to 90 per cent. was exported to the United States, chiefly for use in northeastern Washington. Two seams of coal are being developed. On No. 1 seam practically all the development is in coal, there being scarcely any rockwork. The main entry, dimensions 9x16 ft., was driven between 1,800 and 1,900 ft., and the counter air course, 9x12 ft., nearly the same distance. Three main raises were made from the main entry, each 355 ft., to connect with a third tunnel 200 ft. long. The main entry for No. 2 seam was driven between 150 and 200 ft. in coal. Surface improvements made during the year included the erection of coal storage bin with a capacity of 1,500 tons; trestle approach to same 350 ft. long; boiler, power and fan houses; stable and granary, hospital, and 42 dwelling houses.

One of the most valuable coal fields in the province —the northern extension of the Crow's Nest field, in which the last three aforementioned companies are operating—is being prospected with a view to the opening of coal mines in it as soon as railway transportation shall have been provided.

Other Minerals—No commercial production of any of the undermentioned miscellaneous minerals is being made, but their occurrence in British Columbia may be noted here.

Antimony ore is known to occur in the Slocan district, and its discovery in the Lillooet district was reported last summer. For some months of last year antimony was recovered from the electrolytic slimes at the Trail lead refinery, but when the market price of that metal dropped considerably it was no longer profitable to save this mineral. The finding of molybdenum on Quilchena Creek, Nicola District, was announced last September.

The deposits of mica, long known to occur at the head of Yellow Creek, Big Bend of the Columbia District, north of Revelstoke, received renewed attention last summer and autumn. Further work was done

toward developing the mica, and efforts were made to induce the Provincial Government to improve the trail to the property so as to make it accessible at least to pack animals.

A few ounces of platinum were obtained in the Tulaneen River district, but no practical work was done toward producing this metal commercially.

The cinnabar which some years ago was worked in the Savonas district has not been touched lately.

Building Materials.—Marble is being quarried and worked in a commercial way both at Nootka Sound, Vancouver Island, and in the vicinity of Kootenay Lake, West Kootenay. Several large buildings in Nelson have been constructed chiefly of marble from opposite Kaslo, while marble from Marblehead, eight miles from the head of Kootenay Lake, is being freely used for ornamental purposes in buildings and for monuments and tombstones.

Much granite, sandstone, and other building stone, of which there is an abundance and in great variety in different parts of the province, is being used in buildings, especially in the larger cities of the coast. Bricks —common, the silica brick made at Parson's Bridge, near Victoria, and the ornamental building and firebrick from Clayburn, in the Fraser Valley—are finding an increasing market in the province.

Lime from the Tacoma Steel Company's limekilns at the north end of Texada Island, is much used in Vancouver, Tacoma, and Seattle; while that from the Raymond kilns, near Esquimalt, finds its chief market in Victoria.

Portland cement is still being made in considerable quantity at the Vancouver Portland Cement Company's works on Tod Inlet, Vancouver Island, and this local product has practically driven imported cement out of the British Columbia market, its quality being excellent.

THE COST OF COAL IN NOVA SCOTIA.

Abstract of Article by the Hon. Robert Drummond—The Original Article Appeared in the Annual Review Number of the Halifax Morning Chronicle.

During the year coal prices have been maintained, and no reduction in price is possible. With the present price, which some unthinking people consider high, the smaller operators find it takes them all their time to make ends meet. Wages have also been maintained; there has been a small increase of the lower paid men here and there. The United Mine Workers of America promised our miners fabulous wages, if they would swear by the U. M. W. A. After reading the evidence of McLennan at the "conspiracy" trial some may be inclined to think that if a miner of his limited experience can make six dollars a day, the wages of some are already fabulous. After reading his evidence some coal consumers might be justified in thinking that if coal is high in price it is due to the fabulous wages paid, and yet the U. M. W. A. would seek to make the miners believe that much as they are getting, they could get them more. What a funny way they are setting about it. Trying to convict the managers of our mines of conspiracy to keep up prices, knowing they are ignoramuses if they do not—that if coal prices tumble, down tumble wages.

. . . . . .

Here, lest I forget, let me say, and I say it realizing fully what I am about, that the Dominion Coal Company has been the salvation of the coal trade of the province. When the Dominion Coal Company took over the several Cape Breton properties, most of them were on the verge of bankruptcy; they could not have stood it much longer. Coal at that time, it is true, was cheaper than to-day, but the companies were making no profits, and the miners were making no adequate wage. The coal trade of the province was all but at a standstill.

Further, let me say that if the price of coal is not even higher to-day thanks are due to the much maligned company. Were the Dominion Coal Company so minded, it could practically crush out all its contemporaries but one, and should new companies be rash enough to arise it could continue the crushing-out process, and then, competition withdrawn, it could set its own price. This, some may say, is a wild statement; it is made nevertheless in cold blood.

Those who are ignorant of conditions as they exist at the mines, may think coal is high. Those who are familiar with them know the price carries no adequate profit—all the risk and uncertainties attending coal mining considered. Mr. B. F. Pearson in his testimony in the conspiracy case, gave it as his opinion that had coal prices not advanced the smaller coal companies would ere this have been in the hands of receivers. A few years ago Mr. Pearson may have thought the coal barons were making millions. He knows better now.

Let us enquire about the alleged millions the coal barons are making. In his testimony before a Conciliation Board, the manager of the Springhill mines said his company had been losing money for years, and the board believed his testimony. The shareholders of the Eastern Coal Company were promised big money long before this, and as yet they have received not a cent. Had the Strathcona Coal Co. been making barrels of money its colliery would not have been closed down. The Maritime Coal, Railway and Power Company is digging away in the hope of some day getting some return for the money expended.

So much for Cumberland County. Now for Pictou. For the past few years, due to the exercise of the strictest economy, the Intercolonial Coal Co. has been able to declare a five per cent. dividend, but for fifteen years the shareholders went about mourning without it. The Acadia Coal Co. has not paid any dividend of late.

Coming to Inverness, the Inverness Railway and Coal Co. did not for years earn interest on its bonds; it is, however, doing that now, but little more. The Mabou mines were not a financial success. The Port Hood mines were in the hands of a receiver at least once, and later an arrangement had to be entered into. Mr. Black in Fielding's court, the other day, made two statements, the one seeming contradictory of the other. He said that he had been in the Port Hood Coal Co. and was glad to get out of it; and that he had got interest on his bonds. O! the wily fellow, and the unsophisticated lawyers: Why didn't they ask "And how much of the principal?"

Coming to Cape Breton, the General Mining Association, between 1880 and 1900, was able, in some years, to declare a dividend of 5 per cent. The Victoria Mines were a dead weight. Lingan closed down for want of a market for coal, dirt cheap as it was. The Gardner or the Reserve, or the Clyde, or the Collins, or the Toronto shafts never paid or else they would not have shut down.

I state a hard fact when I say that the General Mining Association, the McKeans, the Archibalds, the McLennans, the Kennellys and the Burchills, the barons of 1892, made more, very much more, money by giving up the coal business than ever they made in it. And there is the Gowrie and Blockhouse, Ltd. Ask the English shareholders how much they made of it, and be buried in their scorn. It is not nice to be forced to write in this fashion, but it is about time the truth were made known, no matter the consequences—to put it that way and not in Lord Milner's emphatic way.

Some are ready to declare, when told there is not a bonanza in coal mining, that it is because our mines are inefficiently managed! The answer to that is: There are no better managed mines in the world, and no more efficient and wide awake managers.

Why then is coal dearer than in the United States? Because nature has made it so. Our seams are, many of them, of high angle, they make more water, requiring expensive pumping machinery; our roofs are more tender, necessitating more and heavier timbering; and our mining laws are more exacting. In the conspiracy case, when the lawyers have come to addressing the Court, those for the defence have a glorious opportunity, when the price of coal has to be dealt with. The lawyers for the defence may ask His Honour "Which will you have, cheaper coal and the lives of the workmen held cheaply, or dearer coal and life safeguarded?" Security and safety enter largely into the cost of production of coal in Nova Scotia.

How is coal so cheap in the United States? Here is the reason—"The imperfect methods of conducting a mine, incident to the low price of coal are resulting in the death or injury of between 8,000 and 10,000 persons annually in the United States." The speaker was Dr. Holmes of the United States Geological Survey.

Let the question be put strongly and clearly, "Which is it to be"" They have cheap coal in the United States with unsafe operating conditions. Coal is dearer here and life is securer. Again let me ask, in slightly different form, those who are berating the coal barons and bewailing the price of coal: Which is it to be? United States prices with resultant loss of life and property, or Nova Scotia prices with less loss of life and less loss of property? Is it to be, talking of production, a life lost for every 50,000 tons of coal produced there, or a life lost for every two hundred and fifty thousand tons sold here?

COBALT DURING 1909.

A Review of the Past Year in Canada's Famous Silver Camp.

Written for the Canadian Mining Journal.

Whatever wild oats Cobalt may have sown in her salad days, she has settled down now in the paths of conscious rectitude, the dignified paths of productive matronhood. Beyond an occasional spasm of excitement or a rare day of depression, she no longer responds to the mesmeric charms of her Svengali—the stock-market manipulator. In more senses than one, Cobalt has house-cleaned. She takes herself seriously; she insists upon being taken seriously by outsiders. Her high elation of yesterday has to-day become tempered self-esteem. She is an international figure, and she knows it.

Cobalt takes herself seriously. The town of Cobalt, chastened by fire and by an epidemic of typhoid, has emerged a cleaner and a wiser town. The mines of Cobalt, under management that is improving month by month, are yielding returns that are more than gratifying. In a word, town and district are flourishing. One year of unequalled productiveness will, unless all signs fail, be followed by at least one other that will excel it.

The influences that have moulded Cobalt, that have brought it out of the depths of speculative chaos and have placed it on the pinnacle, are distinctly discernable. I think that first of these is the Mine Managers' Association. This body, a strong union of the leading managers and superintendents, has regulated the labour situation, has assisted in all good public movements, has promoted sound legislation, and, when the civic authorities have been found incompetent or indifferent, has stepped bravely into the breach. To the association is due nearly all the credit of grappling with the typhoid plague. Upon the association, also, fell the duty of rounding up the "high-graders" and their confederates.

Possibly, in a review of this kind, it will be better to discuss in separate paragraphs the various subjects and incidents that must be considered. However, this general laudatory mention of the Mine Managers' Association is fully deserved by that body. Moreover, I shall begin my very incomplete review with a paragraph giving a few details concerning the association.

Mine Manager's Association.

The miners' strike of 1906 might have brought very serious consequences had not a group of managers made up their minds that, since a fight appeared inevitable, they would take a hand in it themselves. The strike proved a total failure. Intemperate agitators found that, for once, they had encountered men more resolute and much more resourceful than themselves. Therefore, after exploding some oratorical fireworks, the strike leaders decamped.

From this small beginning the Mine Managers' Association grew, until now nearly all the producing mines and a number of the most important prospects are represented on its roll.

The functions of the association are manifold. It controls the supply of labour. It maintains a free employment bureau, where those seeking work may register their names, and where the records of undesirables are carefully preserved. It enforces its own schedule of wages. But, over and above these duties, the association, as a body, established, supported, and continues to support, the public hospital. When typhoid fever broke out last summer the hospital was free from debt, and had a cash balance on hand. Now, when the disease has been practically wiped out, the hospital carries a debt of more than $28,000. This debt is secured by notes from members of the association, and is being gradually removed by cash contributions from each mining company, the extent of each contribution being determined by the number of men employed by each company.

The association has been able to secure from the T. and N. O. Commission many improvements in the railroad service. Also from the Provincial Government concessions have been obtained that might not have been readily granted to individuals.

A creditable new building, designed as a home for the Mine Managers' Association and for the Employment Bureau, has just been completed. Also a new hospital is projected.

Canadian Mining Institute Branch.

The Cobalt Branch of the Institute is the strongest offshoot in Canada—at least in point of numbers. I believe that this is not altogether an advantage. The branch has not been as active as might be during the year, possibly because it has become unwieldy. There is any amount of good work that it might tackle in Cobalt. The reading of papers is not everything. If, for instance, the branch could find out what mining men actually want in the way of mining laws, it would certainly win the gratitude of many humble kickers like myself. Still, to do it justice, the branch has established a library and a fine collection of specimens.

Transportation and Other Matters.

The Temiscaming and Northern Ontario Railroad was projected as a colonization road. The men who fathered the idea of a railroad piercing the northern clay belt would have thrown the expected fit had they been told that Cobalt would bring more freight and passenger traffic in a day than they expected from the new line in a month. In fact, the present volume of freight was never figured upon in their rosiest dreams.

Cobalt has made the T. & N. O. It surprised me, and it will surprise the reader, to learn that every month between 600 to 700 freight cars enter the railway yard at Cobalt. The railway's revenue from freight alone in 1908 amounted to $471,203. The passenger revenue ran up to $366,504. Ore royalties brought in $134,820, while receipts from express, telephone, and telegraph services brought the grand total up to $1,127,885. A net surplus of $419,488 was earned.

The T. and N. O. Commission charges a demurrage rate of $3 per day on each overdue car. This is palpably unfair. The Commission has provided no facilities for handling freight. A little lesson in reciprocal demurrage would make the Commission sit up. The passenger service has been improved by the addition of dining cars to the through trains. Further improvements are needed, especially in the matter of hours of departure and arrival.

Cobalt city has a population of about 5,000 souls. In the twelvemonth ending September, 1909, the population showed a growth of 39 per cent. Immediately round and about Cobalt proper there are fully 2,500 people. Three thousand men are employed in the mines. Hence it is not surprising that each day 500 tickets are sold at Cobalt station. Incidentally, the T. & N. O. is putting up a decent station building to replace the indecent shack that had survived its usefulness for some years.

Rents in Cobalt are high. A house that cost not more than $1,000 to build rents for $25 or $35 per month—not an unprofitable form of investment. Some buildings have netted their owners 50 per cent. per annum in rent. Insurance, of course, is very high. I am informed that rates as high as 10 per cent. are charged.

During last summer the Township of Coleman spent $30,000 on roads. Now most of the mines are connected with Cobalt, and, in many cases, with each other, by means of macadamized roads. Next summer a larger sum will be appropriated.

Waterworks and a sewerage system are to be installed in Cobalt at an estimated cost of $75,000.

Labour.

There is no scarcity of labour. The general tone of the workmen has been much improved in the last two years. In efficiency it is generally conceded that Nova Scotian miners are at the top of the list. But a good local breed of miner is being developed. As in every rich camp, the pay-rolls contain names drawn from nearly every nation under the sun.

The miners of Cobalt are exceptionally well treated. The bunkhouses are clean and comfortable. The best of food is provided. Board and lodging, as provided by the mining companies, only costs 60 cents per day. Wages are high. It is a fact that most of the companies lose money in running their bunkhouses. This speaks well for the spirit of the camp.

The Mines.

Twenty-nine producing mines shipped about 30,000 tons during 1909. The silver yield of this ore aggregated 25,000,000 ounces. The record for 1908 was 19,437,875 ounces of silver from 25,624 tons of ore.

In rough figures the total ore produced from Cobalt since the first shipment ever made, is 78,000 tons, yielding in silver about 62,500,000 ounces. In dollars this represents $33,000,000—of which $15,750,000 has been paid in dividends. It may also be noted that 16 dividend-paying mines have paid almost 50 per cent. on their total capitalization.

A general survey of the camp indicates that positive ore reserves are larger now than they were a year ago. More than this, the production during 1910 will be larger than in 1909, and costs will be lower. This last is due largely to cheaper power, but partly also to better administration.

The deepest shaft in Cobalt district is No. 3, Kerr Lake. This working is down more than 400 feet. The next deepest is probably one of the Nipissing shafts, sunk to a depth of 300 feet.

Nothing in development has warranted the belief that values continue beneath certain points. Seventy-five to one hundred feet is probably the average depth of greatest vein richness. About 90 per cent. of the silver already produced has come from the Lower Huronian conglomerates and slates.

The relative shallowness of Cobalt ore bodies must not be misinterpreted. There remains yet much ground to prospect. Many of the mines are in better ore than they were a year ago. The mines immediately round Cobalt Lake have greater ore reserves than in 1908, and the ore is generally just as rich.

The Nipissing Company's property is a good illustration of the character and extent of the work done in the camp. The company's total acreage is 846 acres. In five and one-half months 24 new veins were discovered on this property by trenching—14 in conglomerate and 10 in Keewatin. The most important of these were in the conglomerate. The average depth of trenching is 3½ feet. Much of the territory has been trenched in 100-foot squares; some of it in 50-foot squares. Ultimately all likely territory will be trenched completely in 50-foot squares. This will mean, both for Nipissing and for most of the other companies, the prospecting of new territory and the re-prospecting of old. The mines in conglomerate, near Cobalt town, depend largely upon underground prospecting. One encouraging incident that occurred during the year was the fact that after sinking more than 150 feet on a barren calcite vein, one company encountered silver.

Little has been done during the year to add to power equipment—except as required for concentrating mills. In other words, the Cobalt mines are practically

equipped now, and are only awaiting for air to be delivered from the Cobalt Hydraulic Company to increase their drill capacity.

Concentrators.

There are now nine mills in operation. Their total capacity is approximately 850 tons of ore per day. Four additional mills are under construction or nearing completion. These will bring the total milling capacity of the camp up to about 1,250 tons per day. The stamp mill is now acknowledged to be a necessity.

During the past year about 130,000 tons of mill-rock were sent to the concentrators. This compares favourably with the tonnage for 1908, when 50,000 tons were dealt with.

Rock carrying from 15 to 140 ounces of silver is sent to the mills. This includes screenings. Screenings running about 140 ounces are sent to the smelter. The average mill-rock carries about 30 to 40 ounces.

It is generally conceded that one of the customs mills has achieved the best results and has led in developing the milling practice of the camp. At this mill, it is well worth noting, cyanidation is not used, and indications do not point to its adoption.

One mine has done a great deal towards improving ore-dressing by adopting devices for preliminary sorting. All the ore is sent over dumping-tables, which are fitted with screens, succeeded by picking tables, and supplied with running water. To both screens and tables a bumping motion is imparted by means of air-drill pistons. The fines fall through screens into bins. This material, carrying, say, 50 to 150 ounces of silver, is sampled and analyzed at regular intervals. The assays determine whether it is to be sent to the smelter or to the concentrator. The high-grade lump ore, containing up to 2,000 ounces of silver to the ton, is hand-picked off the bumping-table. The discards are delivered over the end of the table to the dump. All discards are regularly sampled.

By this method the silver tenor of the discards is kept under 15 ounces. Control and records of the value of screenings and discards are made possible. The management is enabled to find out promptly whether the discards are or are not worth concentrating. Handling is simplified and much time is saved. Nine of these devices are in operation. Nipissing, La Rose, and Chambers-Ferland are the mines using them.

Smelters.

The service offered by the smelters is undoubtedly better and more prompt now than it was a year ago. There has been no material change in the schedules of rates, but the market for ores is wider, and competition is keener. A number of the smelting companies have representatives at Cobalt.

It is curious that, although the camp could easily supply all the cobalt needed in the world several times over, yet the total returns from sales of ores of cobalt, since the beginning of the camp hardly exceed $500,000. This is a question that calls for attention. The arsenic problem also is important.

THE YEAR IN ONTARIO.

By Thos. W. Gibson, Deputy Minister of Mines.

Of the great primary industries, the chief in Ontario has always been agriculture. Lumbering has come next, and until lately mining has lagged far behind. But of recent years the situation has taken on a different aspect, and the mineral industry is claiming its legitimate place. To all appearances, the extraction and utilization of the mineral wealth of Ontario will prove one of the most powerful factors in the future development of the Province.

Ontario is lacking in coal, and in this respect differs from her sister Provinces both on the Atlantic and Pacific, but in almost every other mineral of importance, her resources are large. In certain substances, both metallic and non-metallic, her deposits are unique in quantity as well as in quality. For instance, in nickel, in arsenic, in corundum, she stands practically alone, not only among the confederated Provinces, but among the communities of North America. Petroleum and salt are produced in Canada only in Ontario, and the same may be said of feldspar and iron pyrites. She shares with Quebec the possession of the best mica mines on the continent, perhaps in the world. In fact, the list of Ontario's economic minerals is a long and varied one. It may yet be found to include even diamonds.

The Nickel Industry.

The branches of mining which have made the greatest progress in Ontario are those which are concerned with the production of nickel and silver. The Sudbury nickel mines now supply the greater part of the world's requirements of this metal, and are year by year increasing their output. In 1904 the production was 4,743 tons, in 1908, 9,563 tons and in 1909, about 12,000 tons. The yield of copper from the Sudbury ores for the same period has been about 70,000 tons, worth in the refined state certainly not less than 17 or 18 millions of dollars.

The Canadian Copper Company remains the principal producer, and its possession of immense and proven deposits gives this company a very strong position in the nickel mining business. For some time most of the ore passed through the company's furnaces has come from the Creighton and Crean Hill mines. Both mines yield nickel and copper, but while Creighton is rich in nickel and comparatively poor in copper, the case is reversed with Crean Hill, whose ore is rich in copper and low in nickel.

The other producing concern is the Mond Nickel Company whose works are at Victoria Mines. Both plants turn out now Bessemer matte only which carries about 80 per cent. of the two metals combined, and which is exported for treatment and final separation of the nickel and copper by the Canadian Copper Company to New Jersey, and by the Mond Company to Wales.

The Dominion Nickel Copper Company, which entered the field some time ago with the view of opening up some of the large deposits on the northern nickel range, has not as yet done much actual mining. At present the company is building a spur line of railway from the Canadian Northern to the Whistle mine.

The nickeliferous pyrrhotite found in Dundonald

Township, near the Temiskaming and Northern Ontario railway line, was under bond during the year to the Canadian Copper Company, but after exploring the property by a diamond drill, the company allowed the option to drop. Other shows of nickel have been found in the same locality, and there is a possibility that the Sudbury district may not contain the only deposits of this ore.

The nickel contents of the silver-bearing arsenides of the Cobalt camp are not important, and yield no return to the owners of the mines. The total production of nickel from the mines of the Sudbury district from first to last has been about 96,000 tons. At an average price of 40 cents per pound for the refined metal, this quantity of nickel represents a money value of about $77,000,000.

Electric power has replaced steam to a very considerable extent in the operation of the mines and works of the nickel district. The Canadian Copper Company has for some time been generating current at High Falls on the Spanish River and transmitting it to Copper Cliff and Creighton. More recently, the Mond Nickel Company has developed a power for similar purposes at Wabageshik Falls, on the Vermilion.

Silver Mining.

The silver mining industry has been developing in Ontario even more rapidly than that of nickel. Six years ago, practically no silver was produced in the Province, the old activities at Silver Islet, and later at the mines of the mainland west of Port Arthur, having entirely spent themselves. In 1903 came the discovery of the wonderful riches at Cobalt. Slowly at first, and with some misgivings, the mining community were led to take an interest in the Cobalt field. But as the phenomenal nature of the deposits became apparent, hesitation vanished, to be followed by the fierce boom which culminated in 1906, and which has had intermittent periods of recrudescence since that time. But the real Cobalt camp recked little of the vagaries and extravagances of the stock market. It went right ahead producing silver. How rapid was the increase in production may be seen by the following figures:—

	Production.
1904.....	206,875 ounces
1905.....	2,451,356 "
1906.....	5,401,766 "
1907.....	10,023,311 "
1908.....	19,437,875 "
1909 (estimated) .	25,000,000 "

a total output of 62,560,000 ounces. It is doubtful if this record has ever been equalled by a silver camp anywhere.

The Cobalt mines have placed Ontario in the third place among the silver-producing countries of the world. Mexico comes first with about 56 million ounces annually, then the United States with 52 or 53 millions. The production of Ontario in 1909 was considerably more than the production of the two best silver States in the Union, say Colorado and Montana, and little short of the combined output of these two States and Nevada.

The camp has had many abvantages; among them, rich ore, a railway running through the field from the outset, a plentiful supply of labour and supplies at reasonable cost. The narrow veins, however, have necessitated a great deal of dead work and the costs per ton have been anything but low.

Last year the shipments of ore and concentrates amounted to 27,721 tons, as compared with 25,624 tons in 1908. The increase in gross tonnage shipped, therefore, has not been large, but fuller details will no doubt show that the proportion of concentrates was much increased.

The concentration of the "low-grade" ores has become a prominent feature in Cobalt practice. Several of the mines have installed plants for the treatment of their own ores, and there are also two custom concentrators, in addition to the smelting and refining works at Copper Cliff, Deloro and Thorold, all of which have been operated steadily throughout the year.

The newer camps of South Lorrain, Elk Lake, Maple Mountain and Gowganda have not developed with Cobalt speed. Several of the South Lorrain mines have made shipments, and so also have some of the properties in Gowganda. The great expanse of territory over which silver has been found in the valley of the Montreal River is remarkable, and it may reasonably be expected that at least some of the deposits will develop into valuable mines.

Gold.

The gold-mining industry in Ontario has had a disappointing history, but in 1909 finds of gold in large quartz veins were reported from Porcupine Lake, in the Townships of Whitney and Tisdale, north of the height of land, and west of the T. & N. O. railway. Some of the veins are of large size, up to 25 feet in width, and contain visible gold in considerable quantity on the surface.

Options have been taken on several of the most promising claims by some Cobalters and also by New York and Scotch capitalists. The diamond drilling and test-fitting now going on will reveal something of the underground quality of the deposits.

Meantime, unaffected by the presence of a foot or two of snow on the ground, the staking of claims is going merrily on, and "discoveries" are being sworn to by the guileless prospector in muskeg and sand plain, quite as readily as on rock exposures. The latter, indeed, form a comparatively small proportion of the surface.

Porcupine holds the centre of the stage at the close of the year, and the indications are that another mining "boom" with its attendant swarm of fake companies will shortly afflict the public and damage legitimate mining.

Iron.

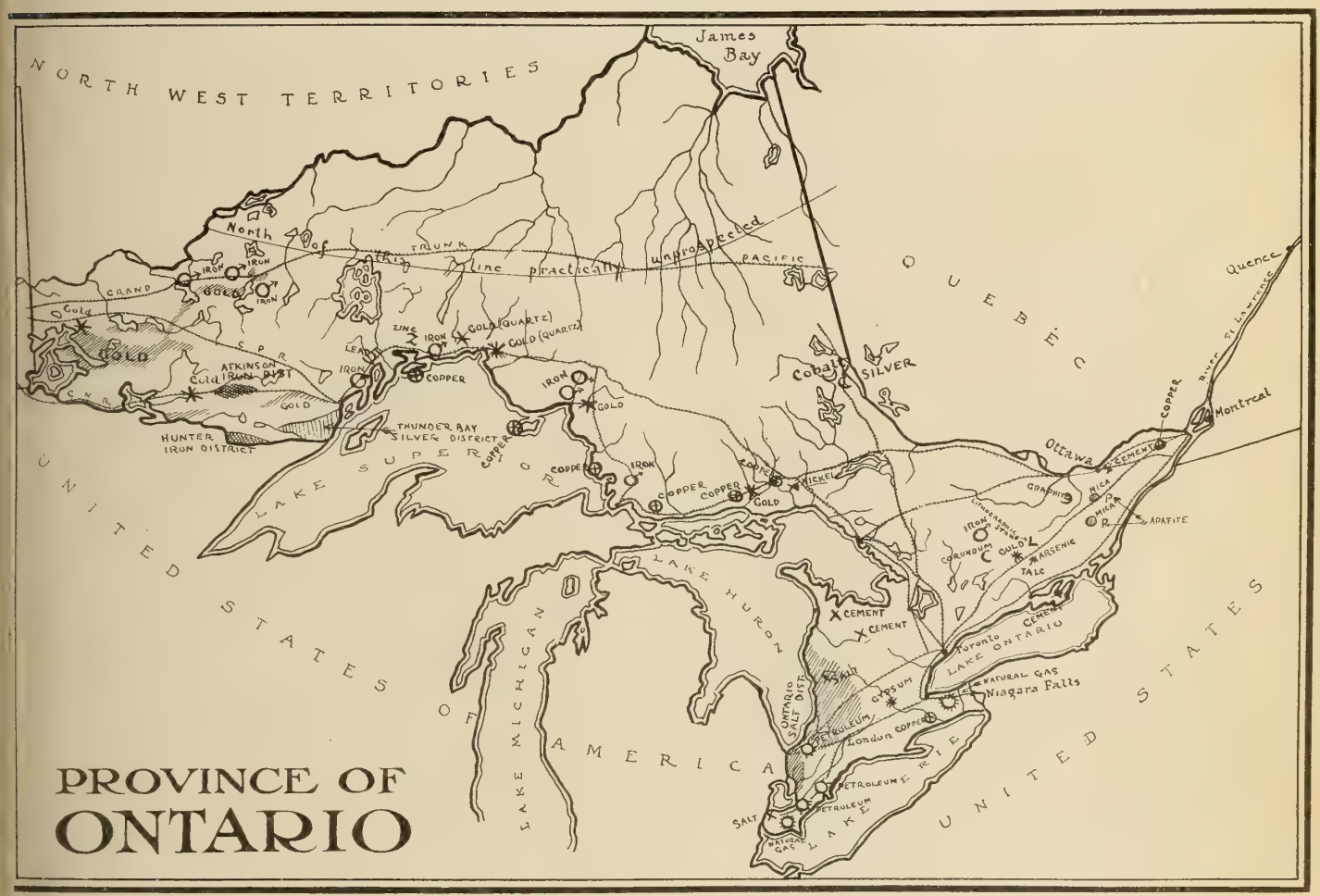
The year just closed was not productive of anything new in the way of iron mining, but previously known mines have been active. The most noteworthy feature was the shipment of a couple of cargoes of hematite from a deposit near Loon Lake, east of Port Arthur. The ore occurs there in horizontal beds near the surface, and is of good quality, so far as regards the absence of impurities, but the metallic contents are not specially high. Drilling has been done on some deposits of magnetite near Moose Mountain, and the reported results are encouraging. Most of the ore actually mined has come, as usual, from the Helen mine, Michipicoten, but Moose Mountain and Bessemer have also contributed to the total.

The pig iron product of the past year will exceed that of 1908, when it was 271,656 tons. The blast furnaces at Sault Ste Marie, Port Arthur, Midland and Hamilton, were operated during the year.

A little zinc ore, amounting to about 785 tons, was raised at the Olden mine, in the county of Frontenac.

Natural Gas.

Of the non-metallic products of Ontario, probably natural gas now holds first place as regards value of output. In 1908 the valuation placed on the yield, at a low price, was about a million dollars, and in 1909, the yield was certainly not less. The greater part is now furnished by the gas field in Haldimand and Norfolk counties, whose production now surpasses that of the Essex and Welland fields combined. During the year several wells were drilled on lands of the Crown underlying the waters of Lake Erie, and good flows obtained.



A satisfactory result of the operation of the tax on natural gas has been the almost entire stoppage of the waste of this ideal fuel, which formerly characterized the operations in parts of the gas territory. The tax is a merely nominal one on gas used in the Province —two-tenths of one cent per thousand cubic feet—but where the gas is exported or allowed to escape into the air, the tax is two cents per thousand feet, which forms a substantial impost. The effect has been twofold—the stoppage of exportation of gas and the cessation of waste. Legislation at Ottawa has also been passed regulating the export of gas and electric power.

Petroleum.

The petroleum fields of the Province of Lambton and Kent counties are falling off in production. For forty years the wells of Petrolea and Oil Springs have been yielding oil, but the average output per well is now not much more than 7 or 8 gallons per day. Even at this rate, 7,000 or 8,000 wells yield a large quantity of oil annually, and fortunately for the permanency of the field, the shallow wells of Lambton county can be operated very cheaply.

In East Tilbury and Romney, where two years ago the output was greater than that of Lambton county, the decline has been at a more rapid rate than in the older fields. The number of wells is much smaller, but the average yield is greater. The production in 1909 was probably less than that of 1908, say a little over 17 million gallons. Notwithstanding the bounty of 1½ cents per gallon paid by the Dominion Government on domestic crude, about one-half the quantity of petroleum required for refining purposes is imported from the United States.

Salt.

The salt wells of south-western Ontario produce from year to year the quantity required to satisfy the home market. The output is restricted only by the demand, for the salt beds along the east shores of Lake Huron, Lake St. Clair, River St. Clair and Detroit River are capable of supplying not only all the common salt needed in Ontario and other parts of Canada for generations to come, but also to furnish the raw material for the production of bleaching powder, soda and other chemicals largely used in manufactures.

Minor Minerals.

In the production of mica, graphite, feldspar and

corundum, smaller but still important industries are enjoyed.

The mining and grinding of talc are being carried on at Madoc, where Mr. George Gillespie is turning out a considerable quantity of the finished article in several grades and qualities.

Building Materials.

Ontario is fortunate in possessing ample supplies of raw material for construction purposes. Clay suitable for making bricks, limestone for burning into lime and for use in building, as well as sandstone of good quality are abundant, especially where there is at present the greatest demand, namely, in the older and more settled portions of the Province. The abundance and general distribution of brick-making clays, for instance, is an important matter in relation to the comfortable housing of the people, for in this climate bricks are preferable to timber for building purposes. The increasing practice of under-drainage, too, is leading to an enlarged production of drain tiles.

The Portland cement manufacture continues to expand with the steady growth of this material in public favour. For many uses, it has displaced wood and stone, and for some it is being substituted for iron or steel. At the inception of the industry in this Province, shell marl was principally used to provide the calcareous elements for cement, but solid limestone, where it can be obtained of suitable quality, is now preferred, as tending to lower cost of production. A number of the cement companies of the Province during the year formed a merger with several companies in the neighbouring Province of Quebec. The manufacture of "natural rock" cement has ceased altogether.

Prospects for the Future.

The outlook for the mining industry in Ontario was never better than at the present time. It would appear that the pre-Cambrian formations, which have proven to be specially prolific in valuable minerals, and which cover the greater part of northern Ontario, are likely to be the scene of great activity for generations to come. As population increases, and especially as transportation facilities are improved, new fields for the prospector and the miner will be opened up, and regions now unknown to fame will take their place among busy communities which, like Cobalt and Sudbury, are bringing to light the stores of mineral wealth now lying dormant in the earth's crust and making them subservient to the uses of man.

THE ASBESTOS INDUSTRY.

Written for Canadian Mining Journal by J. J. Harpell.

In my article on the "Amalgamated Asbestos Corporation, Limited," which appeared in the June 1st issue of the Canadian Mining Journal, I predicted a very rapid increase in the production of South African asbestos. At that time I was speaking from impressions formed by the quantities that were coming into the market and from the information I had regarding its quality and the increasing activity in the mining districts from which it was coming. I am now able to submit figures taken from the Government returns of the exports from British South Africa. These show an increase in production much greater than I had expected. The figures are as follows:—

Year.	Quantity.	Value.	Average price per ton.
1902	45 tons	$3,151	$70.00
1903	305 "	21,218	69.50
1904	411 "	29,186	71.00
1905	672 "	47,696	70.90
1906	680 "	47,901	70.40
1907	580 "	38,517	66.50
1908	1,605 "	108,250	67.40

During the first six months of this year the exports were 1,056 tons as compared with 718 tons during the same period last year. From this it looks as if the production for the whole of 1909 is likely to exceed 2,000 tons. A significant fact shown by these returns is that the Transvaal, South Rhodesia, and Natal contributed to this production for the first time in 1908. I have seen the material from these last three colonies, and it is of a fine white quality, quite similar to our own Canadian article.

From the above figures it will be seen that the average price per ton would indicate that these exports include only the superior grade. This is to be expected since the industry is not sufficiently established to be provided with mills and machinery necessary to produce the lower grades such as paper stock.

There is also fine grade of material coming from Portuguese East Africa. I have not yet been able to ascertain the entire output, but according to the imports into the United Kingdom from this district the increase in production would seem to be equal to that of British South Africa. In fact, the imports in 1908 lacked only 69 cwt. of being equal to those from the latter country, although they began only in 1906. According to the British Government returns, the average price per ton of the Portuguese East Africa material was $173.20 in 1908.

In my previous article I pointed out that the annual production of Russian asbestos had gone up from less than 1,000 tons previous to 1900 to 10,331 tons in 1907. Those interested in the Russian mines claim that the production was much greater in 1907 than they have been credited with. But the figures I quoted were the most reliable that I was able to obtain. I have not yet succeeded in ascertaining the average price per ton for the whole of the Russian output. But the British returns show that the average price of the quantity that came into Great Britain in 1908 was $118.20 per ton.

According to the returns of the Quebec Government the Canadian production of asbestos during the last nine years was as follows:—

Year.	Total production of superior grades.	Total production of paper stock.
1900	21,613 tons	.....
1901	19,382 "	14,054 tons
1902	19,952 "	10,682 "
1903	12,434 "	16,327 "
1904	12,143 "	23,336 "
1905	14,600 "	34,655 "
1906	22,469 "	39,306 "
1907	24,330 "	37,655 "
1908	17,582 "	47,574 "

According to the same returns, the average price of the superior grades in 1908 was $80.55 per ton, and the average price of the paper stock only $23.86.

The heavy cost of transportation has made it impossible for the lower grades of the Russian asbestos to be brought into the market, but this will not be the case with the lower grades of the South African material when mills are erected for its production. Besides, the lower cost of labour in South Africa will mean cheaper production than the Canadian mines can hope to attain under the present high cost of living in Canada. Moreover, it is hard to say what will be the outcome of the present demoralization of the European market for Canadian asbestos.

Furthermore, the report that an export duty is likely to be imposed upon the Canadian material has further aggravated the situation. If this report is not true, it should be denied at once by the proper authorities. On the other hand, if there is any disposition to impose such a duty, a very careful investigation of the whole situation should be made before any such step is taken.

As regards consumption, distribution and manufacture asbestos is quite a different commodity from pulpwood and sawlogs, which commodities, according to rumor, are also likely to be subjected to some special tax. The world's consumption of asbestos at present does not exceed 100,000 tons of all grades.

Undoubtedly the widest application of asbestos is as an ingredient of covering for steam-boilers and pipes. For this purpose it requires no further treatment than it now receives at the Canadian mills. As it comes from the mills it is simply mixed with other materials, which either serve to increase its non-conducting qualities, or to make the composition adhere better to the surface of the boiler or pipe. The percentage of asbestos fibre in such mixture is very much less than is generally supposed. According to Merrill, it is as follows for the respective compositions:—

Asbestos sponge mould.....	4.20%	of asbestos
Fire felt section al covering.....	.8.00%	
Magnesia plastic	7.80%	"
Magnesia sectional covering.....	7.80%	"
Asbestos felting	32.00%	"

To attempt to increase the manufacturing industry of Canada by imposing an export duty on asbestos used for this purpose, would be like endeavouring to compel masons and builders to transfer their business to Canada by imposing an export duty on the Canadian cow-hair they use in their mortar.

The number of merchants who sell asbestos for boiler-covering, and who are in a position to buy directly from the producers and sell directly to the consumers, is legion. They are to be found in every city of any size throughout the world. But their trade in asbestos, as a general thing, forms but a very small part of their business. In many cases it is so small that if it disappeared altogether it would be hardly missed; yet in the aggregate this class forms a considerable factor in the market for asbestos.

The remainder of the market is made up of those who make a business of manufacturing one or more of the thousand and one different articles into which asbestos enters. But here again very few of such firms devote themselves exclusively to the manufacture of asbestos articles. Textile establishments, in addition to carding, spinning and weaving asbestos, manufacture cotton, woollen and metallic fabrics. As a matter of fact both cotton and metallic thread enter largely into the manufacture of asbestos cloth. Manufacturers of asbestos mill-board, paper, or felts also make similar articles from other materials, or use other materials extensively in the manufacture of these asbestos articles. Firms making packing and steam joints also manufacture similar articles from rubber and other commodities. The same is also true of firms that produce asbestos fire-proof paints and flooring, etc. As a matter of fact the manufacturing firms of the world, in whose supplies of raw material asbestos forms the largest item, can be numbered on the fingers of one hand.

This being so, can it be expected that an export duty on raw asbestos is likely to bring many manufacturing establishments to Canada? As a general thing these manufacturing establishments are situated where the advantages of either proximity to the market or of cheap living and cheap labour are of much more economic importance to their promotion than the disadvantages of any export duty that might be imposed on raw asbestos, which, at most, can only be a temporary disadvantage. These manufacturers will soon arrange to get their supplies elsewhere.

The cost of living in Canada has reached a point where almost every article, in the production of which labour enters to any extent, and which has to be sold in the markets of the world and hence compete with similar articles manufactured elsewhere, cannot be produced and sold at a profit. The success, therefore, of manufacturing in Canada depends upon the extent of the market that can be found in Canada itself, where the tariff prevents outside competition and compels the people within the country to pay the higher price for the products of the local manufacturer. But since it will be some time before the Canadian market will be large enough to support an asbestos manufacturing industry, the Canadian producers of asbestos must depend upon their export trade for their market.

But, it will be asked, how are the Canadian producers to retain this market under existing conditions? This is the question that is being asked everywhere regarding the production and marketing of almost every commodity. As yet the problem is far from being satisfactorily solved. But, if we have regard to the attention that is being attracted and the jealousies that are being aroused by German methods, we are safe in surmising that these are meeting with greater success than any others. Certainly the manner in which the Germans meet the exigencies of trade is thoroughly practical and generally successful.

According to the recent and most valuable report on the trade in Germany by Sir F. Oppenheimer, the British consul at Frankfurt, we learn that "Owing to the intensified protective spirit of the last German tariff, German export has been rendered more difficult. In spite of the elaborate protection and preparation of statistics upon which to base a scientific tariff, a number of Chambers of Commerce openly complained that the treaties concluded on the basis of this tariff had dealt German exports a serious blow. The course of the exports of the chemical industry is instructive as illustrating the difficulty of sending goods abroad. Even German commercial enterprise, which is notoriously active and which is certainly the keenest in Europe, has not been able to maintain its grasp of foreign trade. It is to-day freely admitted that the difficulties of German export trade are due to the higher protective barriers which Germany was the first to set up."

"The figures for foreign trade in 1908 are considerably below those of 1907 and on analysis disclose some

peculiar characteristics. There is an extraordinary drop in the export of textiles, and this extends to all the more important items of export. A noteworthy falling off is shown further in the export of dyes and chemical products, amounting to over 35,000,000 marks."

This was the situation that confronted the German exporters at the end of last year and it is interesting to note how they met it. After a very careful review of the whole situation, during which much technical and expert advice was sought, an association was formed in March last, known as "The German Export Union for the Extension of German Export Interests and the Protection of its Members before the Law Courts in Foreign Countries." For the purposes of this organization, it has sent its own technical experts and representatives abroad, and on them will devolve the duties "not only of actually getting business but also of constantly watching over customs formalities and duties and any changes therein; over the conditions of transport and the costs thereof; over local laws in the region of patent protection, as well as the protection of trade mark, etc." For the protection of the legal rights of the members of this Association, its representatives will get into direct communication with local lawyers, and will conclude agreements with them on special terms for the furtherance, or protection of, as the case may be, the member's interests in foreign Courts of Law. Already these representatives are hard at work in all parts of North and South America. The efforts they are making in Canada will give the Canadian people some idea of what the representatives of this Association are expected to do.

This latest move, however, only accentuates the principle that has long been the mainspring of German industrial enterprise and commercial economics, viz., organization. Not organization as we have it in Canada by the formation and over-capitalization of combines and monopolies brought about by brokers, bankers, and company promoters; but organization of associations of producers, for the purpose of determining the best and cheapest means of production and of marketing the products of the different members of the Association. It is to this system more than to any other institution that Germany owes the wide application of science to industry for which that country is so noted. The requirements of these associations for information and for the best trained skill have turned the universities into laboratories of original research, have established the best system of technical education, and have put a premium on the services of the trained student.

What this system of organization has done for the German iron and steel industry will indicate its operation and efficiency. "German progress," says a recent writer, "in steel exportation—progress under natural geographical and economic difficulties quite unknown in England—is a monument to the virtue of organization. The production, price and sale of practically every important material of steel manufacture, from iron ore to machinery, are controlled by syndicates or manufacturers' unions. These syndicates do not, as a rule, control any works as do the American "trusts," but merely the products of the works. The usual German syndicate method is for a number of experts to visit each of the associated works and ascertain its capacity of production and aptitude for any special class of work. Then orders which are usually received by the central offices are allotted to the various establishments, regard being had to the geographical situation and mechanical circumstances of the several firms in order to avoid unnecessary cost of delay in execution. Careful watch is kept by the experts of these associations over new methods and conditions of production, as well as over the requirements and peculiarities of the markets. In fact these syndicates watch over the general interests of their constituents and are in fact manufacturers' trade unions and co-operative societies combined." The efficiency of such a policy can best be judged by results. In 1897 the iron and steel exports of Germany amounted to 1,069,000 tons, and of Great Britain to 3,318,000 tons. By 1908 Germany's export of these commodities had increased to 3,732,000 tons, while England had increased only to 4,233,000. In chemicals German exports have increased by $55,000,000 during the last twelve years, while those of Great Britain have increased by $27,000,000; and those of the United States by about $11,000,000.

Such a policy, whether adapted individually or collectively to the producers of Canadian asbestos, would have been highly beneficial to the industry. In this way they would have been able to keep closely in touch with their market instead of allowing it to drift into the hands of outsiders, who are now in a position to divert this market to other parts of the world for its supplies. With a thorough knowledge of the uses to which their material is put and of the requirements of the market as regards grading, packing, and labelling, etc., they would have been able to sell their material to much greater advantage than has been the case. Such an organization in addition to looking after sales, studying the requirements of the market, and collecting information as regards other sources of supplies, would also have been able to do something towards improving the facilities for shipping and transportation. It seems a piece of gross indifference on the part of someone that there should be no facilities for storing and shipping asbestos at Levis, the nearest and most natural seaport of the Canadian asbestos industry.

Furthermore such a policy of commercial and industrial economy would not be long in discovering that one of the most essential requirements for satisfactory and steady production is faithful and efficient labour, and that such exists in proportion to the labourers' physical welfare and educational opportunities. In Germany, as soon as a new district shows signs of giving birth to an industry, whether mining, manufacturing, or anything else, both the State and those interested in the industry give special attention and encouragement to the development of intensive agriculture. They recognize that this is the first essential of cheap and wholesome living, which, of course, is the basis of cheap and efficient labour. How different are the conditions that still exist in the asbestos districts of Canada, where an important industry has been established for over twenty years. Much of the best agricultural land about the mines is owned by two or three individuals who are holding it for fancy prices. Much of it still remains covered with timber and brushwood. The food stuffs for the miner have to be brought in from a distance and are hence expensive and often of a poor quality. The present Quebec Government cannot be held responsible for the condition of land holdings that exists around Thetford Mines and Black Lake, but they will be responsible for these conditions in new districts such as Chibogamou where they are creating a state of affairs no better than that created by their predecessors in the asbestos districts of the Eastern Townships.

THE NEW PORCUPINE GOLD FIELDS.

Written by Request of the Canadian Mining Journal

By A. M. Hay, Toronto.

The rush into the Porcupine District of Northern Ontario which began a few months ago on the report of valuable discoveries of gold quartz in that section still continues, and the rim of the circle of excitement has already been extended far into the adjoining townships to the north and west, and into the Temagami Forest Reserve to th south.

Th writer accompanied a party of mining men into the section for the purpose of making a cursory examination of the properties upon which work has recently been started under working options obtained from the owners.

Leaving Cobalt on the afternoon of the 4th, of January by Temiskaming and Northern Ontario Railway, the party arrived at Mileage 222 about three o'clock on the morning of the 5th, the train having been delayed through various causes. The camping outfit and supplies taken in by the party were dumped in the snow at this point, no facilities having yet been provided by the Railway Company for the handling either of passengers or freight.

Arrangements had been made for teams to meet the party, and after partaking of a frugal breakfast and sorting out the party's belongings from the chaos of impedimenta belonging to about a hundred passengers heading Porcupinewards, a start was made before daylight, and the party reached the Camp of Father Paradis on the East shore of Frederickhouse River in time for the mid-day meal.

The accommodation at this camp was limited to about thirty or forty, but the meals supplied were excellent. A force of between twenty and thirty men were engaged in putting up new buildings to accommodate about 150 guests.

It being impossible to reach Porcupine until late on the night of the 5th, it was decided to sleep at this camp and leave early the following morning, so as to reach Porcupine early in the day and enable the party to erect camp before nightfall of the following day. Accordingly a start was made on the morning of the 6th at five o'clock, and Porcupine Lake was reached before noon of that day.

While construction of the camp was proceeding a number of the party drove through a distance of about five miles—over a fairly good now winter road—to the properties which are now being tested under option by Messrs. Timmins, of the La Rose Mine, and by Mr. M. J. O'Brien, of the O'Brien Mine, Cobalt.

On the Timmins properties, which are known as the MacMahon and Hollinger claims, camps have been erected and a force of about thirty men is at work opening up the test-pitting veins, which appear to occur in the form of large dykes or intrusions of quartz in a country of diorite and dioritic schist.



Davidson Ledge, Tisdale.

Owing to the snow, it was impossible to determine the extent or continuity of the quartz dykes. They appear however, from examination at different points where they are exposed, to be wide, and of considerable extent. The country rock has apparently been scored off by glacial action leaving the quartz dykes standing up in places in the forms of "hogs backs." At one point where the schist was exposed, it was found to be heavily mineralised with iron pyrites standing vertically at right angles to the quartz, which leads to the supposition that the dyke is striking diagonally across the formation. Except at this point, there were no walls in evidence. Well trodden trails led to various points on the dyke where visible gold had been discovered and exposed, so that there was no difficulty in making an examination of the surface showings of gold, which appear to occur for the most part at points where the quartz has been slightly fissured and considerable ox-

idation has taken place, forming what appear to be pay-streaks, extending in some instances over a surface of several feet in area. No working having been done at these points it was of course impossible to determine whether the visible gold is merely the result of surface enrichment or whether it goes to depth. Numerous samples of rock which had been taken into the camp from points where work had been done gave evidence that the yellow metal had been found at other points



Mileage 222 on T. & N. O. Ry.

on the vein, and the management was enthusiastic and optimistic about the ultimate result of the testing operations which were then being conducted.

On the O'Brien properties known as the Gillies and Miller claims a test pit was being sunk at a point where the dyke appeared to pinch into the country both at depth and in length, and at a depth of about six feet the quartz contained a considerable amount of base mineral. Whether this may be taken as an indication of a change in the character of the quartz which may be met with at depth, or whether it is merely a pinch at



Mileage 222, T. & N. O. Ry.

the end of a large lenticular body of ore can only be determined by further work.

A diamond drill had been set up on this property and drilling operations commenced on the day of our visit, the drill being then about three feet in the rock. The hole has been laid out to test the large dyke on which test-pitting was being done, at a depth of over 100 feet, and the management expected that the test would be made in time to satisfy them whether the free milling character and values of the quartz continued to that depth, before the 15th inst., the date on which a payment has to be made under the terms of the option granted to the purchasers. The result of this operation will be looked forward to with great interest by the whole camp.

Returning to camp at the south end of Porcupine Lake, the night was spent in comparative comfort owing to the strenuous efforts of the party which had been entrusted with the task of clearing the ground, erecting the tent and preparing cooking and sleeping quarters.

On the following morning the bulk of the party



Father Paradis'—19 miles on Trail.

started out on foot to visit the claims known as the "Wilson" claims, which lie about two and a half miles south-west from Porcupine Lake. Under the guidance of Mr. Preston one of the owners of these claims, every facility was granted to the party to make an examination of the properties which, in respect of the formation and the occurrence of visible gold in the quartz dykes, were found to be similar to the claims above described. The showings of visible gold were, however,more frequent and spectacular.



Davidson Shanty.

The claim on which the best showings occur was originally staked on what appeared to be a small auriferous vein, and the huge dyke of quartz was subsequently discovered in getting out timber while camped on their original discovery.

It was the intention of some of the party to visit the Bannerman claims lying near the north end of Porcupine Lake, but it was learned that no work was going on, and with snow on the ground the trip would probably have been fruitless, so this plan was abandoned.

After another night in camp, some of the party drove through to Mileage 222, arriving there on the

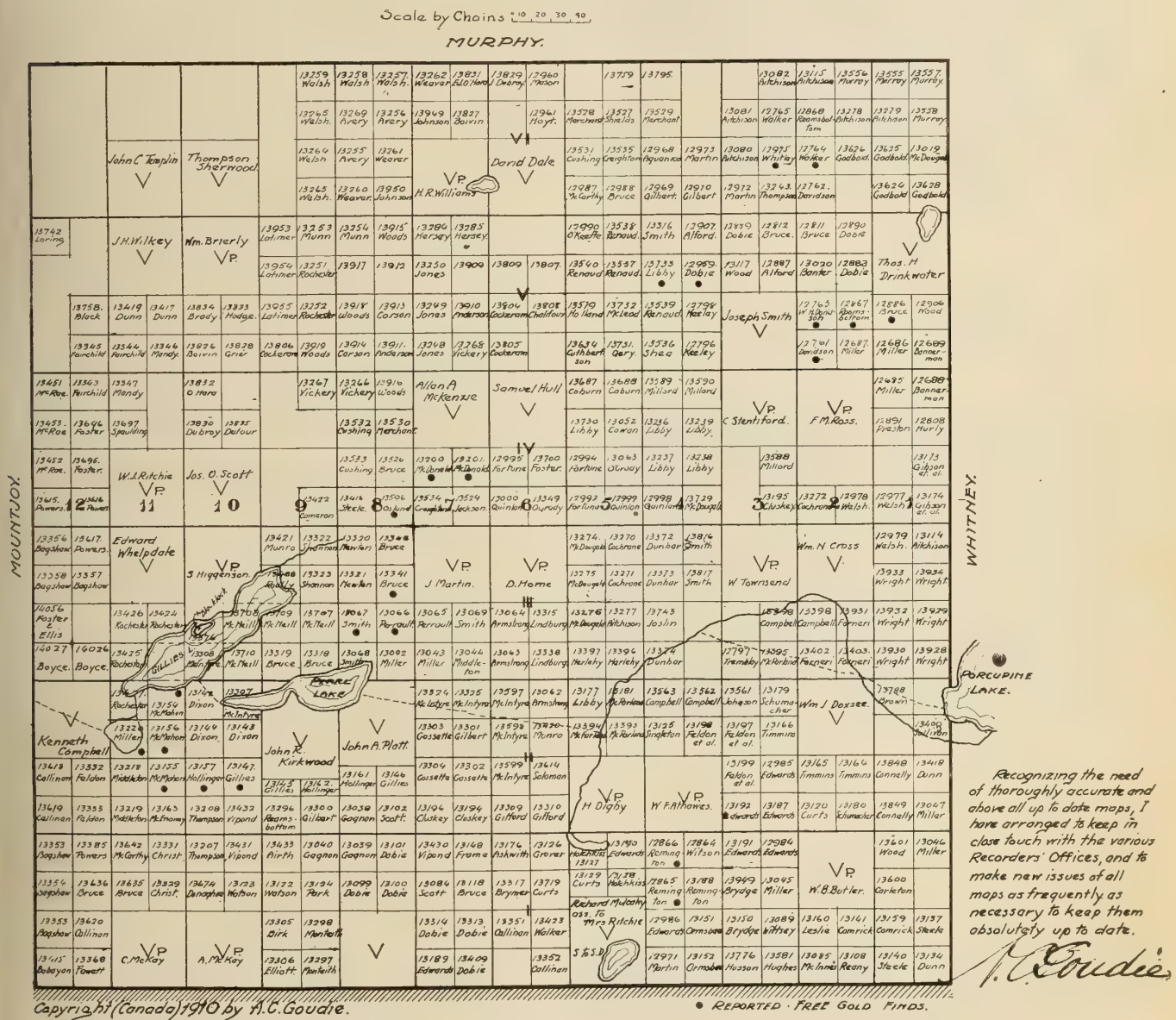
night of the 8th, and left that point for the south by train on the morning of the 9th.

It is not to be wondered a t,that the occurrence of these rich surface showings of gold quartz dykes of such magnitude should create a considerable amount of excitement in the communities which take an interest in mining affairs. It must not be forgotten, however, that prospectors have been in the Porcupine District for several years, and many large dykes of quartz have been known to exist in the section but were disregarded on account of the low values which they were found to contain. Mining liscenses on some claims were granted four or five years ago, and the location on which Father Paradis camp is placed was staked by him over three years ago and a mining compny incorported to acquire and develop same.

The history of the Porcupine District cannot be written in advance, but it is safe to prognosticate that the bulk of the claims which have been staked over the swamp and muskeg country surrounding the Porcupine Lake will not show enough rock to admit of being tapped by hammer and steel.

The mining men above mentioned who have acquired options on the claims above referred to, are well able to take care of themselves, and it may be that the high prices asked by the owners of these properties may ultimately be justified.

The danger ahead however, is that many of the Snowshoe claims recently staked, will change hands



and be used as a medium for interesting the public in companies promoted, not for the purpose of developing mines, but for the purpose of reaching money out of the public purse.

That the Government is alive to this danger, and to the injury which will inevitably follow any ill considered boom, is evidenced by the words of warning which have been given out by the Hon Mr. Cochrane, Minister of Mines, through the press.

All roads lead to Rome, and the signboards point to the fact that the mining laws of the country must ul-

timately be laid on lines that will prevent the acquisition of mineral lands from the Crown for anything but legitimate mining purposes. There are many ways in



On the Trail.

which this might be accomplished without hardship to those engaged in the mining industry, but spasmodic legislation enacted during periods of excitement to meet special conditions, is to be avoided. The future deve-



Night Hawk Lake.

lopment of the mineral resources of the Province of Ontario and of Canada as a whole, can only be satisfactorily accomplished under a mining law based on sound and equitable principles, which will not only protect the



Frederick House River.

man who engages in the business of prospectig and mining, but will prevent the legitimate mining business being travestied by speculators for sordid ends.

Such a law must also contain provisions not only to encourage capital to engage in the mining industry, but to protect such investments by enactments which will stand for stability of title and continuity of vested interests.

While the mining law exists in its present form and is subject to modification by Orders in Council, enactments may be made to meet special cases as they arise, but a final and satisfactory solution of the problem can only be reached by the method which has been recommended by unanimous vote of the members of the Canadian Mining Institute, to the Dominion and Provincial Governments, namely to create a Royal Commission made up of representative mining men and Members of the Provincial and Dominon Governments, to co-operate in formulating an Act that will be the standard of the world.

TONNAGES AT TRAIL.

Through the courtesy of Mr. W. H. Aldridge, managing director the Consolidated Mining & Smelting Company, we have been supplied with the following comparative statistics. The figures show the tonnage of ore smelted at Trail since 1899. They give a fair idea of the expansion of both the lead and silver business at that growing centre. It will be noted that in ten years the tonnage has been multiplied almost eight times. The following tabular statement is a synoptical history of one of Canada's greatest industries:—

1899		55,702 Tons
1900—Copper	91,194	
Lead	13,615	
		104,809 "
1901—Copper	122,035	
Lead	21,736	
		143,771 "
1902—Copper	56,793	
Lead	15,539	
		72,332 "
1903—Copper	152,914	
Lead	16,892	
		169,806 "
1904—Copper	139,760	
Lead	18,197	
		157,957 "
1905—Copper	214,969	
Lead	25,347	
		240,316 "
1906—Copper	238,983	
Lead	18,102	
		257,085 "
1907—Copper	263,910	
Lead	35,021	
		298,931 "
1908—Copper	266,579	
Lead	51,895	
		318,474 "
1909—Copper	374,069	
Lead	55,507	
		429,676 "

Note.—Tonnage for December, 1909, is estimated.

BRITISH MINERAL RIGHTS TAXATION—MINERAL RIGHTS DUTY—PROPERTY TO BE ASSESSED.

The rental value of all rights to work minerals and of all mineral wayleaves. But brickclay, sand, chalk, limestone and gravel are exempted.

By the rental value is meant the amount of rent paid by the working lessee under a mining lease, or where minerals are being worked by the proprietor the amount which he would have received as rent if he had let the right to work the minerals.

If the rent has been enlarged by reason of any capital expenditure on the part of the proprietor, the rental value to be assessed is to be reduced proportionately.

The duty is to be paid annually as a debt to the Crown by the proprietor if he is working the minerals, otherwise by the immediate lessor of the working lessee.

Where there are one or more successive sub-leases it is clear that the rental value is being enjoyed by each of the lessors in proportion to the rent which he receives, and that each ought, therefore, to contribute to the duty in proportion. To effect this it is provided that, the whole duty having been paid by the first lessor, each lessor may deduct from the rent paid by him a sum equal to the duty on a rental value of the same amount as the rent which he pays. Agreements affecting this incidence of the duty are to be void.

The duty is to be charged at the rate of five per cent., or 1s for every £1 of rental value.

The value of the right to work minerals is part of the site of land; therefore were owners of minerals to be subjected to the general taxes on site values in respect of the value of their minerals as well as to the special mineral value duty, they would be paying twice over in respect of the same property. To remedy this the bill provides that no reversion duty or increment value duty is to be charged in respect of the determination or grant of a mining lease; and makes the following further provisions:—

No increment value duty is to be charged in respect of minerals which were the subject of a mining lease or were being worked on April 30th, 1909.

Where increment value duty does become chargeable in respect of minerals the increment value is not to be estimated as a capital sum, but is to be taken to be the excess of the rental over the annual equivalent (two twenty-fifths) of the original capital value of the minerals; and the duty is to be charged annually. A payment of increment value duty in this manner is to count as a payment on account of mineral rights duty.

The capital value of minerals referred to above is their total value, deducting capital expenditure necessary to bring them into working; and their total value is the value of the fee simple sold by a willing seller in the open market.

The original capital value is that determined by the general valuation as on April 30th, 1909, in which all minerals leased and being worked are to be separately valued.

The opening up of the Gillies Limit attracted considerable attention to the Keewatin. Up to date the development work on recent discoveries does not show that Keewatin will equal the Lower Huronian. Incidentally, the future of this section has been heavily discounted by several promoters.

PERSONAL AND GENERAL.

Mr. A. G. Kirby, who is superintending the erection of the new stamp-mill and cyanide plant at the Nova Scotia mine, Cobalt, will remain there during the coming winter.

Mr. F. J. Bourne, general manager of the Northern Customs Concentrator, Cobalt, will shortly visit the Portland Canal country, British Columbia. Meanwhile Mr. M. F. Fairlie has been given charge of the plant.

Mr. E. R. Reid, formerly manager of the Union Bank, Parrsboro, N.S., has been appointed sales manager of the Maritime Coal, Railway and Power Company, Limited, and will, in the future, have full charge of this department of the company's business.

Mr. Alexander H. Smith, late of Oaxaca, Mexico, has been engaged by A. E. Osler & Co., of Toronto, as consulting engineer in connection with the development of a large group of claims in the Porcupine district. Thirty men are now starting on assessment work. Mr. Smith will remain in the Porcupine district most of the winter.

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt.—At the annual meeting of Cobalt Central Mines Co. held a short time ago in Augusta, Me., it was found that the present control of Thos. Nevins & Sons was sustained. Mr. J. S. Bradley, who is the leading factor in the fight against the present management, cast votes for over 1,000,000 shares, but he was not strong enough to take over the control. Tests have lately been made at the concentrator at Cobalt to see if enlarging the mill would be productive of more economical results. So far the experiments carried out have been satisfactory and it is probable that the capacity of the mill will be increased to 120 tons a day.

The Crown Reserve mine has presented all its employees with a bonus of 15 per cent. of their wages for the year as a Christmas present. The unfavourable reports that were circulated regarding this property some time ago appear to have subsided and the recent finding of high-grade ore on the 200 foot level has helped to disprove many of these rumours.

The 200 foot level is in the Keewatin and although the values dropped off to some extent, the veins still continue richer than the average veins of the camp. A short time ago a station was cut on this level preparatory to sinking a winze an additional 100 feet, and the first cut toward widening the drift exposed a branch of the main vein about three inches in width carrying high values in native silver. A raise was also started from the 200-foot level, at a point in the vein where the values were small, but the second round showed about eight inches of high grade ore.

During the year 1909 Nipissing shipped about 6,000 tons of ore, which is almost 75 per cent. increase over any previous year's shipments. A large proportion of this has been of course low grade ore, as this company ships about in the proportion of one car of high grade to four cars of low grade ore. During the month of December the No. 64 vein, near the Hudson Bay Mine produced 100,000 ounces. On the lowest or 275 foot level, which

is in the Keewatin, a drift is being run on the vein toward the east to cut through the contact between the conglomerate and the Keewatin, where it is expected that the high values will come in again. The shaft on the Meyer vein has been sunk to a depth of 190 feet and at that point a station is being cut, from this level a cross-cut will be run to cut the veins that dipped from the shaft at a depth of 75 feet. The shaft that is being sunk on vein 122 discovered last summer, will be continued to a depth of 200 feet and will have three levels. Great hopes are entertained for the future production of this vein as it has been traced for over 800 feet on the surface.

It has always been known that the Cobalt mines suffered to a greater or less extent from high-grading, but the discovery of an organized gang and the extent of their depredations showed that Cobalt had lost more by this means than any other camp in Canada. Under the old law it was exceedingly difficult to obtain a conviction for high-grading as it was necessary for an owner or mine manager to positively identify the stolen ore. Last year the law, however, was changed and now it is necessary to have a written authority from a mine manager or owner in order to keep or dispose of silver ore. Several well-known men in Cobalt and Toronto were arrested, and are now in custody. The ore, when it was stolen from the mines, was turned over to regular fences who took it to Toronto and disposed of it to a small private smelter. The smelter's books show a purchase of four tons of ore for the month previous to the arrests. When it is considered that this ore is the very purest that can be taken and that its value would run about, $4.00 to $5.00 a pound, some idea of the extent of the operations may be gathered, One man admits of having made seventeen trips to Toronto in the past few months carrying each time about 100 pounds of ore.

The Townsite has been getting some good results lately from development, and the physical condition of the mine has much improved from what it was when operations were first resumed on the property. From the No. 1 shaft a cross-cut is being run parallel to the T. & N. O. tracks to pick up some of the Right-of-Way veins. This cross-cut will be continued to cut the McKinley-Darragh vein which was worked by the Right-of-Way. In the No. 7 shaft a good vein about one and a half inches in width of high-grade ore was found. There is also a good width of milling ore, in some places six feet that will carry about 30 ounces. In shafts Nos. 2 and 5 there are also narrow rich veins and large tonnages of milling ore. The company in considering the advisability of putting up a mill next spring.

It is interesting to note that for the year 1909 the Crown Reserve will have distributed $1,238,168 in dividends as against $353,762 for 1908. It is stated that the surplus remaining in the treasury at the end of the year amounted to about half a million dollars.

A new road is being built into the South Lorrain district that will have a beneficial effect in cutting down the cost of transportation of supplies. Formerly the old road went round by way of Lake Temiskaming and was only available during the winter months. The new road will be about ten miles shorter and can be used the year round. It is probable that a telephone line will also be installed between Cobalt, Haileybury and South Lorrain.

During the present year the following companies have paid dividends on their issued capital as follows: Cobalt Central 4 per cent.; Buffalo, 32 per cent.; City of Cobalt, 13 per cent.; Coniagas, 9 per cent.; Crown Reserve, 71 per cent.; Kerr Lake, 13 per cent.; McKinley Darragh, 10 per cent.; Nipissing, 22½ per cent.; Right-of-Way, 37 per cent.; Temiskaming, 12 per cent.; Trethewey 25 per cent.; Temiscaming & Hudson Bay 2400 per cent.; La Rose, 16 per cent.

It is reported that the Big Six property at Miller Lake has encountered high grade ore at a depth of 90 feet. The first property to send out ore from this district for this season is the Blackburn which recently made a shipment of about 36 tons of very rich ore. The Reeves-Dobie has also considerable ore ready to send out, that for richness will compare favourably with the best that has been produced in Cobalt. In the Elk Lake district the Lucky Godfrey has sacked about forty bags of rich ore from the vein found a short time ago.

The Dr. Reddick Co., of Larder Lake, has issued a statement to the shareholders, explaining that the reason for asking for the issue of 118,600 shares was on account of there not being sufficient money in the treasury to carry on their operations. This company is spending a considerable sum of money in systematically developing its property, to find out the extent and values of its ore bodies, and see if they will justify the erection of a plant.

In a drift from No. 1 shaft down by the Drummond, the Hargraves has run into about six inches of high grade ore, in the conglomerate.. The vein in which the silver was found was first discovered last summer on the surface, where the showing was very fine. A shaft was sunk in the diabase and a few feet below the surface the values in the vein practically disappeared. The shaft was continued to a depth of 75 feet and a drift was started toward the east. When in a few feet it passed through the contact between the diabase and conglomerate, and the high grade ore was found in the latter formation. At the 380-foot level of the main shaft the drift on the vein carrying high grade ore has been run to the boundary of the Kerr Lake.

The Buffalo has recently cut two small, but rich veins on the 85-foot level, with about four feet of milling rock. Since the mill has been running with electric power its capacity has been much increased.

The road into the Maple Mountain district has now been cut through from Mountain Chutes to Mackenzie and Stull Lakes and machinery is already being taken in.

Two suits have been brought against G. H. Brown and the Equitable Trust Co. to recover some $21,000, being money invested in the stock of the United Cobalt Exploration Company. The plaintiffs allege that the company was to sell $500,000 of stock to develop properties in this district but that when only $373,000 had been sold the promoters gave up. They claim that they returned $50,000 to persons who bought stock, and squandered the rest of it in payments to persons who were not entitled to it.

Although the shipments for the year 1909 only exceed the shipments for the previous year by about 4,500 tons it is expected that this year's silver production will exceed last year's by at least 4,000,000 ounces. Up-to-date the shipments are as follows:

Prior to 1908	23,182.49 tons
Year 1908	25,362.10 "
Year 1909	29,865.66 "

This large increase in the number of ounces produced is attributable to a great extent to the concentrators that are treating the rock, a large part of which was formerly going on the dumps. Almost $1,250,000 has been invested in concentrators in this section and it is probable that during the coming year this sum will be considerably augmented. It is exceedingly interesting to note that during the past year the amounts paid out in dividends represent about 50 per cent. of the value of the production of the camp, and when it is considered that the City of Cobalt , Right-of-Way, and O'Brien pay 25 per cent. the Hudson Bay 15 per cent and the Crown Reserve 10 per cent. of the gross value of their ore to the Ontario Government in royalties, these figures are even greater than they appear.

BRITISH COLUMBIA.

Rossland.—During the past ten days or two weeks the Consolidated M. & S. Co. of Canada has given ample proof of its expansive policy in the acquiring of several very valuable mines. These are the Ikeda copper group on Moresby Island, the No. 7 in Central Camp, Boundary, and the Sullivan group in East Kootenay. With the advances made by the Consolidated in the

acquirement of new mines the closing down of one of the older properties would not affect the status of the concern in the least, whereas, if operations were confined to the properties being worked at present, news of the closing down for an indefinite period of one of those mines would be received with dismay by the stockholders. It is all a matter of being progressive.

The Ikeda group of about 26 claims, is probably the most valuable copper-gold property in the New Queen Charlotte fields. The mine has been worked for several years by its Japanese owners and is well equipped to handle a tonnage of about 1,000 tons per month. Average "first-class" ore as shipped averages approximately 14% copper, $6 gold and $2.50 silver; "second-class" ore, as shipped to smelter, which is about two-thirds of the total output, 6% copper, $4 gold and $2 silver. The Consolidated Co. will very likely improve the mining plant and if future development warrants, will erect a smelter near the property. This smelter, if built, would no doubt be a paying proposition from the point of view of customs ores and would be of great benefit to the surrounding mines of the Queen Charlotte Islands, and the nearby mainland mines. A sufficiency of coal for such a plant is to be found on the same island, and the ore is practically self-fluxing.

The No. 7 group consists of eight claims and fractions, situated in Central Camp. In the past the cost of hauling this ore to the railway has been about $3.50 per ton, but the Consolidated Co. is going to build a concentrator at Boundary Falls and send the ore from mine to concentrator by a tramway a couple of miles long. The concentrator site has already been secured. The ore is a quartz, carrying gold, silver and lead and is quite amenable to concentration. By means of the tramway the cost of conveying the ore from mine to mill will be reduced to about 15c. per ton. It is reported that there is an ore body "in sight" in the No. 7 of about 200,000 tons.

The Sullivan group has been acquired by lease and bond and initial work begun by a force sent over from the "hill workings" of the St. Eugene which have been closed down. It is understood that there are 150,000 tons of ore in this mine that will average 15% lead and 6½ oz. silver. The Sullivan Co. just before closing down in 1908 had some trouble at the smelter with the zinc content of this ore.

The Rossland mines of the Consolidated Co. are looking very well and steady tonnage is being shipped to Trail smelter, averaging about 400 tons per week. The Le Roi, Le Roi No. 2, Ltd., and Velvet are also shipping steadily each week.

It is seen as the year draws to a close that the Centre Star and Le Roi 2, Ltd., will show a slight increase in ore shipments, but the drop in Le Roi shipments of about 66,000 tons, is going to cause a decrease in district shipments, compared with last year of about 60,000 tons.

Phoenix.—This district has been favoured with the payment of dividends by two important companies during the past ten days, both the Granby Company and the Hedley Gold Mining Co. (Nickle Plate mine) making a division of profits with the shareholders. The Granby dividend was 2%, which on the 135,000 shares, of $100, each, outstanding amount to $270,000. This dividend, which was fully anticipated by those who knew the good financial condition of the company, makes a total of $3,778,630 paid by this company in dividends since December, 1903. The dividends in 1907 were a total of 9%; 1908 total 4%; 1909 altogether 2%. The decrease has been caused by the big improvements, which this year alone, to smelter and converter, will cost over $250,000. Good dividends will no doubt be paid in 1910. Granby mines are shipping nearly 30,000 tons per week to the Grand Forks smelter, where the eight augmented furnaces are working. Total Granby shipments for the year are now over the million-ton mark and for the year will show an increase of about 29,000 tons, over 1908.

The Hedley Gold Mining Co., which acquired the Nickle plate mine at Hedley from the Daly estate last August, at a figure of about $715,000, has declared a dividend of 30c. per share, amounting in all to about $36,000. The air compressor, mill, tramway, etc. are being enlarged and operations will be doubled during 1910. It is thought a saving of about $1 can also be made in the treatment of tailings.

After rumour upon rumour during the last few months, work has now been started on the Rawhide group of the New Dominion Copper Co., diamond drilling being the order of the day, although it is expected shipments will be started at no late date. A crew of 15 to 20 men is employed; power is being derived from the company's Brooklyn air compressor plant.

Between the Mother Lode and Oro Denoro mines the B. C. Copper Co. is shipping over 12,000 tons of ore per week to its Greenwood smelter. Despite the several months shut-down the increase in Mother Lode shipments over 1908 will be over 38,000 tons; Oro Denoro shipments however, will drop about 49,000 tons. It is stated the profits of this company for November amounted to $54,000 and that the cost of copper production for that month was cut to .0735c. per lb., naturally, it is to be expected that the yearly average will run much higher.

The Snowshoe, being operated under superintendent Chas. Biesel, is sending about 4,000 tons per week steadily to Trail smelter. The output of this mine for 1909 will exceed that of 1908 by about 114,000 tons, which will be just about the amount of increase for the year in the Boundary district. While the Granby and Mother Lode show a big increase, the drop in Oro Denoro and the mines of the Dominion Copper Co. hold the district increase to the amount of increase shown by the Snowshoe, which is under lease to the Consolidated.

Nelson.—The convention held in this city on December 15th, to discuss the zinc problem, was a most enthusiastic one, and it is hoped that the influence of this movement will culminate in the establishment of a commercial zinc smelter in this district. It does not seem probable that the Dominion Government can fail to be impressed with the importance of this question to this district, to the Province and to the Dominion generally. An invocation has been addressed to the government asking for aid in experimental work. A protective tariff on manufactured zinc products entering Canada might also help and tend to greater consumption of the product of this district in Canada. At the present time about 1000 tons of zinc ore is being sent per month from this district to United States zinc smelters, and being about 50 per cent. zinc is paying nearly $10. duty and approximately $10. freight—quite a burden. It is to be trusted that this question will be satisfactorily and economically solved before another season has gone past.

Ore shipments for Nelson-Slocan section will show an increase of about 46,000 tons this year over 1908. The net increase for the whole of Southeastern British Columbia will be about 100,000 tons more than for the year 1908.

A new plan of development is to be worked presently in the Payne mine. A rich ore shoot has been located on the eighth level that is thought to be a continuation of the old, rich ore deposit.

Vancouver.—It is stated by E. C. Wallander, manager, that the Kamloops Mines,, Ltd. will open up its property on a large scale in six weeks or two months and that the company has in view the establishment of a smelter at Kamloops, if developments warrant it, of course.

A wagon road is being built into the property of the Red Cliff Mining Co., over which to take the boiler, air compressor and general mining plant recently bought from the Canadian Rand Co. All of the Portland Canal mines look promising and it is expected there will be considerable activity in the district next spring, in the way of plants going in, etc. Active work is being done on the Portland Wonder and Tyee.

Torontonians have bonded three copper-gold claims on Banks Island at a figure of $25,000. There is a ten-foot vein on the property carrying an average of $43. in gold, silver and copper.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—A decrease of nearly 1,000,000 tons in the production of coal and a loss to the Province in revenue of over $100,000 since the inauguration of the strike in the Nova Scotia collieries was the statement by Hiram Donkin, Deputy Commissioner of Works and Mines, on the witness stand in the alleged coal conspiracy case.

Since the strike there has been a falling off in the production of 910,000 tons up to December 1st.

The Dominion Coal Company's production was 700,000 tons less, and the Cumberland Collieries 210,000 less.

Last year more American coal was sold in Canada than ever before. This was on account of the surplus stock on hand.

The sales of American coal are increasing rapidly in Canada. 130,177 tons were sold in November, 1909.

From 1886 to 1906, he estimated that the aggregate advance received by the men was about thirty per cent.

The production of gold in Nova Scotia for the year just ended was in round figures 12,500 ounces, which shows a slight increase over the production of the year 1908.

The principal producers were the New England Mining Company (formerly the Boston Richardson Mining Co.) at Goldboro, The Oldham Sterling Gold Company at Oldham, The Great Bras D'Or Gold Mining Company at Middle River, Cape Breton, The Ponhook Mining Company at Malaga, and the Sydney Gold Mining Company at Country Harbor, altogether about twenty-five mines were in operation employing a total of 550 men.

During the year the Dominion Mining Company at Tangier has changed its plant from steam to hydro-electric, generating power at the Tangier River, about one mile from the mine. This new plant was completed in October and has since been in operation, giving satisfaction.

At Middle River, Cape Breton, the Great Bras D'Or Gold Mining Company has commenced sinking a shaft on the Lizard lead and in the spring purpose to greatly increase their equipment.

At Caribou a disastrous fire destroyed the mill power buildings and shaft house at the Hake property, greatly handicapping the operators. New buildings, however, have been completed, and work underground is to be pushed during the coming year.

At Malaga Barrens the Ponhook Mining Company has reopened the old workings on the Main Rabbit lead, and has installed new and up-to-date equipment.

Although the production shows no great increase there has been much greater activity throughout the province during the past year in connection with the gold mining industry, and indications point to still greater activity during the coming year.

ONTARIO.

Toronto.—Ten of the accused in the Cobalt ore stealing cases were, on January 6th, committed for trial before a jury. They are Alex. Littlejohn, Geo. Barber, J. H. McGale, H. A. Van Winkle, Wm. Lander, Wm. Johnson, Nicholas Zorfaty, Jacob Cohen and Morris Rowchinsky.

Zorfaty was in addition fined $25 for carrying a revolver. Dimitras Andras was discharged and Jaako Hukkala was remanded to obtain an interpreter.

The charge of receiving stolen property laid against Dr. Wilkinson, head of the smelter company, will not be taken up until the theft charges are disposed of.

Ottawa.—A nice little New Year's greeting in the form of $33,000 reached the holders of Right of Way Mines, Limited, Cobalt stock on Jan. 1st. Though the dividend is 2 per cent., it is equivalent to 6 per cent. on the old basis (that of the Right of Way Mining Company).

Cobalt.—Edward Burley, an Englishman, employed at the Rochester, died on December 29th from injuries received at the mine. Burley and his brother were working at the 75-foot level. Preparation had been made for blasting. Burley had lighted the fuse and was walking away to a place of safety when an explosion, possibly caused by a defective fuse, took place. Burley's body was badly broken up by the flying rock. He was thrown on his face and his left shouder was badly crushed. Dr. Melbourne, who was at Kerr Lake, was called in, and removed the victim to the Red Cross Hospital, where he succumbed to his injuries just after noon.

BRITISH COLUMBIA.

Fernie.—General Manager Ashworth of the Crow's Nest Pass Coal Company, reports that over 2,000 tons of coal are being turned out daily at the Coal Creek mines, and as much at Michel, thus making an average of over 4,000 tons a day from all the mines. About 800 tons of this coal is being turned into coke at the Fernie ovens and nearly as much at Michel. The Morrissey mines are not being worked now and it will be some time before they will again be operated, as new development work, both at Coal Creek and Michel, is occupying the attention of the management at present.

Cranbrook.—The Fort Steele Mining & Smelting Company, who recently secured the property of the Sullivan Group Mining Company, which is located at Kimberley and Marysville, has leased the property to the Consolidated Mining and Smelting Company.

The property is leased to the Consolidated Company for a period of two years, with an option to purchase.

The lessees are to begin work immediately. Thirty per cent. of the net proceeds of the ore taken from the mine is to be spent in development work. The lessees are bound by their agreement to mine and take out 30,000 tons of ore during the life of their lease, and to pay to the Fort Steele Mining and Smelting Co. 20 per cent of the net profits derived from the sale of said ore.

If the Consolidated Company succeeds in taking out 30,000 tons of ore inside of six months, they, under their agreement, are compelled to purchase the property.

The property consists of three mining claims, the Hamlet, Shylock and Hope, and is located about two miles north of Kimberley. At Marysville, the property leased consists of an up-to-date smelter, having a capacity of about 200 tons, which can be increased to 500.

The mine is equipped with a first-class compressor, hoisting and pumping plant.

The showing of ore in the mine is enormous. According to examinations made, there is over 200,000 tons of ore in sight ready for stoping. With this large amount of ore in sight, the lessees will have no trouble in mining 30,000 tons of ore inside of the stipulated six months.

The trouble with the Sullivan ore has been the difficulty and expense of getting the proper flux to mix with the ore from the mine, but with ore from the North Star, or the St. Eugene, it is said that the combination will make a self-fluxing proposition.

The resumption of work on the Sullivan will bring renewed prosperity to Kimberley, and with the starting up the smelter at Marysville the residents of these two mining camps will receive a New Year's gift that will bring prosperity to all.

MINING NEWS OF THE WORLD.

EUROPE.

Roumania.—During October the Roumanian oil production amounted to 108,000 tons. For September the output was 111,500 tons.

INDIA.

Calcutta.—During 1908 the tin mines of South Burma yielded an output of 1,887 cwt., valued at £11,015. This production is above the average of that of the past five years.

An important survey is contemplated by the Geological Survey of India Department in the coalfields and oil-bearing areas of north-east Assam.

AUSTRALIA.

Sydney.—The railway and tramway services have been restored. North Sydney was in darkness on the night of Dec. 20th. A supply of coal from the Western district is expected soon. The Western miners resumed work on December 21st.

Of the fifteen lodge officials and delegates prosecuted for offences against the Industrial Disputes Act, in connection with the coal strike, thirteen have been fined £100 each, with two months' hard labour in default.

SOUTH AFRICA.

Johannesburg.—From present indications, and judging by the most recent data, there is reason to believe that in the coming year the mines of the Rand will be operating profitably on 2½ dwt. rock and further reducing expenses by half-a-crown per ton.

As conflicting reports are reaching the Rand as to the results being obtained on the Abercorn Banket Company's property, it has been decided to have an independent examination.

The dividend-aggregate for 1909 from Rand mines promises to equal, and will, in the final results, probably surpass that of 1908, notwithstanding total profits are below last year's level.

Reports are to hand of diamond discoveries in the Carnarvon district of Cape Colony.

Rhodesia.—In view of the great development of Rhodesia's mining industry and the multifarious duties now devolving upon Mr. Ackermann, the Chartered Company's engineer, who has hitherto been at liberty to engage in private work and to report for outside parties, it is now considered in Rand-Rhodesian circles that, in the interests of all concerned, the time is arrived when Mr. Ackermann's services should be solely at the command of the company.

Latest private telegrams from Rhodesia state that the Giant mine values in the seventh level are proving as good as in the upper levels. It is added that Rhodesian mines generally are opening up well and that a big move is inevitable at no distant date.

TRINIDAD.

The annual report on the trade of Trinidad states that a considerable amount of development work was done during the year 1908 in boring for oil at La Brea and Guano, and at both places gushes of oil to a height exceeding 60 feet occurred as the result of the operations. A total of 3,758 feet of borings was made during the year with satisfactory results.

UNITED STATES.

The world's production of gold and silver for the calendar year 1908 is estimated by the Bureau of the Mint to have been: Gold, 21,378,480 fine ounces, of the value of $441,932,200, and silver, 203,186,370 fine ounces, of the commercial value of $108,684,000.

Compared with 1907, there was an increase in the gold product of $31,376,900, and in silver an increase of 18,992,300 fine ounces. The greatest increase in the product of gold in any country of the world was in Africa, which increased from $151,899,600 in 1907 to $166,520,500 in 1908.

Butte.—President J. D. Ryan has ordered the closing of Amalgamated Copper Mines. He has issued a statement in which he states that this is due to action of the miners' union refusing to take any stand or action to aid in the resumption of switching and handling of ore at Great Falls. It has been decided that Anaconda, Butte and Boston, Boston and Montana, Washoe Copper, Parrot, Trenton Co., Red Metal Co., and North Butte could not continue operations under present conditions and must be closed pending such action as would relieve the situation.

The Buell property, near Central City, Colo., which is said to have produced about $2,000,000, principally in gold, has been absorbed and will be operated soon by the U.P.R. Milling and Mines Company, arrangements for financing the property being well under way. The mill of the company is to be electrified and labour-saving devices installed for closer amalgamation and concentration of ore from the property as well as for custom ore.

New York City.—The deadlock at the annual meeting of the Cobalt Mines Company held in Augusta, Me., has been broken, and the old directors are in control, all being re-elected. President Nevins represented 2,250,000 shares, while James P. Bradley, the leader of the opposition, had 1,075,000 shares. The result is regarded here as a vindication of Mr. Nevins, on account of the failure of Mr. Bradley's vigorous campaign to rally greater strength. The directors' meeting will be held in New York soon, when it is expected that all the old officers will be re-elected.

With the payment of the dividend of $8 a share, Calumet & Hecla will have returned to its shareholders for the calendar year 1909 the sum of $27 a share, against earnings estimated at $35 a share. The company's mineral output for the year will be equal to 80,000,000 pounds of refined copper, but as the company is curtailing its ingot output by 14 per cent. only 86 per cent. of this mineral is being smelted. The refined copper output therefore, should be about 69,000,000 pounds.

Globe, Ariz.—The foundation work for the concentrating plant at the Miami property is going rapidly forward, with the exception of a part of that for the power house site where the bedrock upon which the concrete work is to rest is at a greater distance from the surface of the ground than it is at other parts of the site. When the third churn drill has arrived, it may be put to work on this site to ascertain the depth and character of the bedrock at this point.

The two Star churn drills which have already arrived at the property are in position for drilling the first holes, and the management is anxiously awaiting the arrival of some of the tools which were delayed in shipping, so that the prospecting work can be begun. The first two drill holes will be put down in a north and south line and only a few hundred feet from the line of drill holes which the Inspiration Company's drills put down on its property, which adjoins that of the Miami Copper Company on the northern end.

The new office building of the Miami Copper Company is rapidly nearing completion. All the framework is about finished. A new warehouse near the concentrator site is being built.

Company Notes

The International Nickel Co., has declared 1 per cent. and an extra dividend of ½ per cent. on its common stock.

AN ASBESTOS BUREAU.

The operating asbestos mining companies in the Black Lake and Thetford districts and the various manufacturers of the finished products of asbestos, have decided to establish an Asbestos Bureau. A meeting of the representatives of all the companies interested was recently held in New York, when the preliminary arrangements were made and special committees appointed to look after all the details. One of the main objects of the Bureau will be to keep the public advised as to the new uses to which asbestos may be put and of the development of the various properties situated the world over.

Mr. E. B. Greenshields, the President of the Amalgamated Asbestos Corporation, attended the meeting on behalf of the company.

At the annual meeting of the Nova Scotia Silver Cobalt Mining Company the financial statement was approved. It showed $121,000 as having been expended on underground development and over $50,000 on surface work.

The engineer's report showed that the company had over 1,600,000 ozs. of silver blocked out, which would give a net return the first year of some $60,000, and after the completion of their cyanide and amalgamating mill now under construction, and which will be ready early in the spring, the company will be in better condition than at present.

A by-law authorizing application for supplementary letters patent, increasing the capital stock of the company by $500,000, was ratified by the shareholders.

This stock is to be offered to the shareholders at 50c per share, pro rata to their holdings, being at the rate of one to four held, and arrangements have been made with a syndicate to underwrite any of the new issue at this price, which may not be taken up by the shareholders.

The old directors were re-elected with the exception of Mr. A. M. Reaper, who resigned in favour of Mr. A. L. Bayley, of Sherbrooke.

The Buffalo Mines have declared a 5 per cent. quarterly dividend, with 3 per cent. extra bonus, which is equivalent to 32 per cent. for the year.

The Nipissing dividend of 7½ per cent, and the La Rose of 2 per cent, will be payable on the 20th. The transfer books of the respective companies will re-open on January 17th.

The Temiskaming & Hudson's Bay Co. has paid dividends of no less than 15,100 per cent. on its issued capital of $7,761 of $1 shares.

The Granby management has decided to issue 13,500 shares of its 15,000 shares of treasury stock. This will be issued to stockholders of record on the basis of one share of new stock for every 10 shares now held at $85 a share. Granby's authorized capital is $15,000,000. The stockholders several years ago voted to issue stock to pay for the company's investment in the shares of the Crow's Nest Pass Coal Company, and it is presumed that the proceeds from the stocks now to issue will be used in paying the indebtedness incurred in the acquisition of these shares. It is understood that the Granby Co. entered the year 1910 with several hundred thousands of cash in its treasury. At the present time the company is operating at the rate of about 30,000,000 pounds per annum. The maximum capacity is 35,000,000 pounds, and the management has no plans for the enlargement of smelting capacity beyond this figure.

The Crow's Nest Pass Co. has recently increased its dividend to 6 per cent.

A review of the operations of the Nova Scotia Steel and Coal Company, Limited, during 1909 shows large increases in practically all branches as compared with the previous year:—

	Tons.
Coal mined and shipped	830,000
Iron ore mined and shipped	460,000
Coke made	85,000
Limetone and dolomite mined	70,000
Pig iron made	62,000
Steel ingots made	63,000
Billoms and billets cogged	54,000
Finished materials, bars, plates and forgings shipped from New Glasgow	53,000
Amount of freight paid to the Intercolonial Railway	255,000
Freight carried by Sydney Mines Rail way of the company exceeded	1,400,000
Coal and ore freighted by boats owned or time chartered by the company	925,000

The total wages paid by the company during the year was nearly $2,500,000:—

Wages paid at Sydney Mines	$1,698,000
Wages paid at New Glasgow	425,000
Wages paid at Wabana	350,000

With the exception of coke made, the figures named above all show increases over the past year.

The improvements in plant and equipment made in the closing months of 1908 resulted in savings in the cost of manufacture, so that the cost of converting iron ore into the 50,000 odd tons of finished material shipped from the New Glasgow works was less than ever before in the history of the company. Practically all of these savings should be credited to improved physical condition of the plant, as no reduction in wages was made during the period under review.

At Wabana, the slopes, which in the latter part of 1908, after passing through the boundary of intervening ground between the land areas and the submarine areas of the company, had reached the submarine territory of the Scotia Company, have been extended during the past year more than a quarter of a mile. Bore holes put down in the submarine territory of the company have proven the quantity of underlying ore to be greater in thickness than shown on the land or in the inner portions of the submarine extensions of the seams, while the quality has been fully maintained. All the work done during the past year has served to confirm and increase the evidence of the extent and value of these submarine deposits.

At the New Glasgow mills, enlargements and extensions of the furnace heating plant, accessories, and all other devices required for handling the increased output are now being installed. These mills are expected to be in operation during the coming summer. The additional rolling mill capacity now being provided should increase the output of the finished material from the New Glasgow mills by about 20,000 tons per annum.

For 1910, the coal output of the company from its "Old Sydney" mines, will, it is expected, show considerable increases, and will total 900,000 tons.

The unfilled orders for steel products on the books of the company at the beginning of 1910 will aggregate a larger tonnage than at any period during the past two years. Indications point to an increased demand for all classes of the finished iron and steel products of the company.

PORTLAND CANAL ANNUAL MEETING.

At the annual meeting of the shareholders of the Portland Canal Mining Company, Limited, held at Duncans, B.C., on the 11th December, the following reports were presented by Mr. C. H. Dickie, President and Managing Director:—

"Your directors report that during the current year they entered into negotiations with a firm of underwriters, and the

sum of $100,000 was secured to the company in return for a block of the company's shares.

The above capital was required for, and is being used in the installation of a concentrator, aerial tramway, water power plant and for general purposes of the company.

The concentrator and power plant are well under way and will be completed at an early date if the snowfall is not excessive. Had normal conditions prevailed during the past season, the plant would probably now have been complete, with the exception of a part of the concentrating machinery, which has not yet arrived from the manufacturers.

The concentrator has been termed a 50 ton unit, but as our ore will only require coarse concentration, we expect to be able to mill about 100 tons every 24 hours. The tramway, which is of the Bleichert type, is now about completed, and will be 8,000 feet in length and bring ore from the mine at an altitude of 2,100 feet to the concentrator in Bear River Valley. It can be equipped to transport 200 tons every 24 hours and will be utilized for conveying all supplies from the mill to the mine.

Our water power is a splendid asset, and will be ample for all requirements when we multiply the capacity of our concentrator, and this we expect to do at no distant date. The water is brought from the head of a waterfall in a 2 feet by 4 feet flume along the side of a canyon, over a trestle 70 feet high, across Glacier Creek and along the mountain side to the mill, a total distance of 1,400 feet, the effective head being 100 feet. Owing to the fact that there was a large tonnage of ore in the mine available for stoping, and our camp facilities were being taxed to their utmost capacity to provide accommodation for tramway employees and others, it was considered inadvisable to carry on an energetic campaign in the mine during the summer.

No. 1 Tunnel was advanced 110 feet to a total length of 180 feet, 35 feet of cross-cutting was also done in this tunnel, which, with the exception of a few feet, where purely local distorted conditions prevailed, may be said to be all in good ore. No. 2 tunnel is 124 feet in length, and, with the exception of a few feet of what might be termed low grade concentrating ore, is also all in good ore. No. 3 tunnel was advanced 65 feet to a total distance of 300 feet, and a raise and crosscut connecting Nos. 3 and 2 tunnels were completed. At 280 feet from the portal of No. 3 tunnel a splendid body of ore was encountered, the development of which will be vigorously prosecuted this winter. This ore body is the downward continuation of that disclosed in Nos. 1 and 2 tunnels and carries the same or better values, native silver and argentine being fully as conspicuous as in Nos. 1 and 2 tunnels.

Your directors have no hesitation in assuring the shareholders that they consider the property one of the most promising in British Columbia, and there is absolutely no doubt but that substantial dividends should be paid when the complete plant has been in operation for a reasonable period."

NORTH STAR CO. INTERIM REPORT.

The following interim report has been mailed to the stockholders of the North Star Mining Co., Ltd.:—

The directors are able to announce that the long-continued exploration work now shows a measure of success.

Under date of the 20th December, 1909, Mr. Curran, the manager at the mine, reports as follows:—

"The ground adjoining the north incline is being opened out in three different places, 100 feet apart. Total length of ground now being explored, 300 feet. At each place we have found good shipping ore, principally carbonates, but underlying the carbonates is a body of sulphate ore. This body of sulphate ore has not yet been explored."

Later, the manager reports that "work done at these points has materially improved the extent of the carbonate ore. This ore is all the way from three feet thick, and the value of the metal contents is improving as the work advances."

It is not possible so far to make any estimate of the extent or value of this newly found ore.

STATISTICS AND RETURNS

MINERAL OUTPUT OF NOVA SCOTIA FOR 1909.

Preliminary estimates of the mineral outputs and metallurgical products of Nova Scotia for the year 1909 are as follows:—

Coal	$14,200,000
Coke	2,000,000
Gold	250,000
Gypsum, limestone and other materials	750,000
Stone and building materials	1,100,000
Pig iron	1,100,000
Steel	4,250,000
Steel rails, rods, etc.	9,500,000
	$33,150,000

DOMINION COAL COMPANY, LIMITED.

Comparative Statement of Outputs by Collieries, 1908, 1909.

	1908	1909
No. 1	532,248	576,072
" 2	704,139	552,868
" 3	340,654	227,689
" 4	418,247	319,987
" 5	479,420	357,894
" 6	218,194	59,405
" 7	125,326	88,993
" 8	194,454	155,864
" 9	344,657	204,557
" 10	162,983	143,580
" 12	32,393	38,603
" 14	3,594	13,495
Total	3,556,309 tons	2,739,007 tons

Output by Months, 1908, 1909.

	1908	1909
January	314,108	200,176
February	285,649	209,656
March	346,529	253,622
April	303,249	294,017
May	335,829	316,205
June	346,036	354,485
July	368,508	136,736
August	310,295	154,475
September	257,160	178,241
October	266,048	206,030
November	246,252	220,871
December	175,405	214,493
	3,556,309	2,739,007

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending December 31st, and those from January 1st, 1909, to date:—

	Dec. 31. Ore in lbs.	Since Jan. 1. Ore in lbs.
Argentine	.....	40,000
Buffalo	54,400	1,148,417
Beaver	.....	101,470
Carnegie	.....	63,410
Chambers-Ferland	.....	961,010
City of Cobalt	.....	1,204,927
Cobalt Central	.....	815,267
Cobalt Lake	.....	141,340
Cobalt Townsite	.....	54,369
Coniagas	.....	1,504,378
Crown Reserve	222,480	6,285,247
Drummond	100,000	2,282,100
Foster	.....	187,800
Hudson Bay	.....	1,350,120
Keeley	.....	96,000
Kerr Lake	.....	2,555,641
King Edward	.....	275,522
La Rose	215,376	13,768,234
McKinley-Darragh	166,504	2,147,039
Nancy Helen	.....	167,834
Nipissing	631,892	13,138,343
North Cobalt	.....	40,000
Nova Scotia	.....	480,810
Peterson Lake	.....	324,040
O'Brien	64,010	2,855,763
Right-of-Way	63,302	2,981,148
Silver Queen	54,000	738,844
Silver Cliff	.....	241,820
Stewart H. J.	.....	62,392
Timiskaming	.....	1,806,060
Trethewey	142,055	2,152,878
Wettlaufer	.....	224,700

Ore shipments to December 31st from January 1st are 60,196,932 pounds, or 30,098 tons.

Total shipments for week ending December 31st are 1,714,019 pounds, or 857 tons.

The total shipments for 1908 were 25,463 tons, valued at $10,000,000.

MARKET REPORTS.

Metals.

Jan. 10th (Quotations from Canada Metal Co., Toronto):—
Spelter, 6½ cents per lb.
Lead, 3.75 cents per lb.
Antimony, 8½ to 9¼ cents per lb.
Tin, 35¾ cents per lb.
Copper, casting, 14¼ cents per lb. (market active and strong).
Electrolytic, 14¼ cents per lb.
Ingot brass, 9 to 12 cents per lb.

Jan. 10.—Pig Iron (Quotations from Drummond McCall Co.):
Summerlee, No. 1, $23.00 (f.o.b. furnace).
Summerlee, No. 2, $22.50 (f.o.b. furnace).
Midland, No. 1, $22.00 (f.o.b. furnace).
Coal—Anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

Jan. 5th.—Connellsville Coke (f.o.b. ovens):—
Furnace coke, prompt, $2.65 to $2.75 per ton.
Foundry coke, prompt, $3.10 to $3.25 per ton.

Jan. 5th.—Tin (Straits), 33.40 cents.
Copper, prime Lake, 14.00 cents.
Electrolytic copper, 13,80 cents.
Copper wire, 15.25 cents.
Lead, 4.70 to 4.75 cents.
Spelter, 6.25 cents.
Sheet zinc, 8.50 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 21.75 to 23.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, $29.50 to $33.25 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $52.50 per 75-lb flask.

SILVER PRICES.

	New York. cents	London. pence.
December 18	52¾	24¼
" 20	52¾	24¼
" 21	52⅝	24 1-16
" 22	52⅝	24 3-16
" 23	52¾	24¼
" 24	52⅝	24¼
" 27	52½	24¼
" 28	52⅝	24¼
" 29	52⅝	24½
" 30	52⅝	24¼
" 31	52⅝	24¼
January 3	52½	24 3-16
" 4	52⅝	24¼
" 5	52⅝	24¼

Metal Movements During 1909.

The following table shows the highest, lowest, and average prices of metals for the year 1909:

	Highest.	Lowest.	Average.
Straits Tin, New York	34.12½	27.30	29.76
Lake Copper, New York	14.62½	12.75	13.39
Electrolytic Copper, New York	14.37½	12.25	13.11
Casting Copper, New York	14.25	12.10	13.02
Cooksons Antimony, New York	8.62½	7.87½	8.27
Pig Lead, New York	4.75	3.95	4.30
Spelter, New York	6.50	4.75	5.52

Boston, January 6.—There were sales of Lake Copper made yesterday at 14⅛c, and Boston copper interests refused to sell at that price. Electrolytic is quoted about 13⅞ to 14c.

Messrs. Samuel Montagu & Co. report, December 24th, 1909, as follows regarding silver:—The market has been rather more animated, with a good tendency. The support has been chiefly from the Continent, with very little competition. Consequently, the price has been largely dependent on the amounts offering, especially as the quotation has been maintained over Eastern parities. The fluctuations have also been assisted by speculative operations, for which wide movements are a tempting bait. The stock in Shanghai stood, on 13th inst., at 164 lacs of sycee and 1,875 bars. There was a falling off in 1908 of £21,000,000 in the total foreign trade of China, and as the total imports fell off £15,000,000, against £6,000,000 reduction in exports, the net difference of £9,000,000 readily accounts for the huge stock of sycee in Shanghai and the bars held for China account in London. A shipment of £30,000 has been made from San Francisco to the Far East. The quotations yesterday were 1-16 above those quoted a week ago.

SAFETY = SPEED = SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" OF THE ATLANTIC

FASTEST and FINEST
in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records
between Liverpool and Canadian Ports

---

900 Miles on Enclosed and Sheltered Waters

LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent,
Board of Trade, - MONTREAL.

5 Important New Books

Cost of Mining

BY JAMES RALPH FINLAY. 415 *pages,* 6x9, *illustrated,* $5.00 (21s.) *net, postpaid.*

An economic investigation of those principles upon which scientific, profitable mining is based. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metals discussed. Detailed analyses cover costs of mining *coal, iron, lead, zinc, copper, gold and silver.*

CONTENTS: Value of Mining Property. Factors Governing Variations. Partial and Complete Costs. Statistics of Coal Production. Cost of Mining Coal. Cost of Mining Lake Superior Iron. Occurrence and Production of Copper. Lake Superior Amygdaloid Copper Mines. Conglomerate Copper Mines of Lake Superior. Copper Mines on Fissure Veins in Montana, Australia and Arizona. Various Copper Mines of Arizona and Mexico. Copper Mines in various other Districts. The Copper Mining Business in general. Lead. Silver-Lead Mining. The Cost of Silver-Lead Smelting. Zinc Mining. Occurrence and Production of Gold. Quartz-Pyrite Gold Mines. Cripple Creek, Kalgoorlie and Goldfield. Silver Mining at Cobalt and Guanajuato.

Principles of Mining

BY H. C. HOOVER. 200 *pages,* 6x9, *illustrated,* $2.50 (10/6) *net, postpaid.*

Part I deals fully with the determination of value, prospective and in sight—the sizing up of the mine and in this Mr. Hoover's work has been extensive and highly successful.

Part II discusses the development of tunnels, shafts, crosscuts, etc., with chapters on mechanical equipment and efficiency.

Part III. Administration of Mines with all the problems of labor efficiency, labor unions, wages, working costs, accounts, division of expenditure, etc.

These are all specialties of Mr. Hoover.

Timbering and Mining

BY W. H. STORMS. 300 *pages,* 6x9, *fully illustrated,* $2.00 (8/6) *net, postpaid.*

A simple practical book on timbering and mining. It gives an account of the best American practice, compiled from data collected by the author at the mining centres of the country. It covers all phases of timbering, timber preservation, drift sets, structural steel, shaft sinking, drainage, bucket dumping, head frames and a hundred other important points.

Electro-Magnetic Ore Separation

BY C. GODFREY GUNTHER. 193 *pages,* 6x9, *fully illustrated,* $3.00 (12/6) *net, postpaid.*

The great variety in method and practice makes this book, with its full treatment, especially valuable. The underlying principles, their application and the machinery and plant are fully covered. Both strongly and feebly magnetic minerals are treated.

CONTENTS.—Introduction. Magnetism Applied to Ore Dressing. Principles of Magnetic Separation and Preparation of the Ore for Treatment. Separators for Strongly Magnetic Minerals. Separators for Feebly Magnetic Minerals. The Concentration of Magnetic Ores. The Separation of Pyrite and Blende. The Separation of Siderite from Blende. Separation of Miscellaneous Ores and Minerals.

Ore Dressing

BY ROBERT H. RICHARDS. Professor of Mining, Massachusetts Institute of Technology.

Volumes III and IV, per volume $5.00 [21s.] net postpaid. The set, 4 volumes, $20.00 [£4 4s.] net, postpaid.

Volumes III and IV supplement but do *not supplant* Volumes I and II. The Chapters supplement without repetition the corresponding chapters in the earlier volumes, describing new machines, new processes and giving new data.

Volume III discusses fully fine grinders, particularly tube mill and grinding pans, rectilinear tables of the Wilfley type, the questions of magnetic and electrostatic separation and flotation processes, while Volume IV describes in detail many up-to-date mills, their methods, cost of operation, machines, power and water plants, etc.

The index to all four volumes now ready. It will be supplied free to purchasers of the entire set or volumes III and IV.

We Can Supply Any Engineering Book In Print.

BOOK DEPARTMENT **Canadian Mining Journal**

Confederation Life Building, Toronto

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Campbell & Deyell
DeMorest, Stull & Low
Evans, J. W.
Gwillim, J. C.
Gillespie, G. H.
Hassan, A. A.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Ramsay, J. D.
Roland, W.
Scott, O. N.
Tyrrell, J. B.
Willmott, A. B.
McGee, Boyd
Astley, J. W.

Quebec

Hardman, J. E.
Hersey, Milton L.

Nova Scotia

Brown E. Percy

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

Nova Scotia

McCallum, A. L.

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

BARRISTERS, SOLICITORS, ETC.

Ontario

Bartram, Wadsworth & Sherry

Ontario

Ryckman, Kerr, MacInnes & Mahon

British Columbia

Hallett, I. H.

Ontario

McPherson, Laug & Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N.Y.

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

WILLMOTT, A. B.
M.A., B.Sc.
Consulting Mining Geologist
Sault Ste. Marie, Canada
Consulting Geologist
Lake Superior Corporation

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

CARTER, W E. H., B.A., Sc.
Consulting Mining Engineer
85 Front St. East, - Toronto, Ont.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 James St. Montreal

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
BOX 519, - COBALT, ONT.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA, ELK LAKE, TORONTO
Bartram, Wadsworth & Sherry
J. B. Bartram, W. R. Wadsworth, C. J. Sherry.
Continental Life Building, Toronto, Ontario
Solicitors for { Imperial Bank of Canada, Elk Lake / Royal Bank of Canada, Gow Ganda
Cable Address, "Barwad." Western Union Code

W. D. MCPHERSON, K.C. J. M. LAING
MCPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: MCPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

GOWGANDA PORCUPINE LAKE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98
Porcupine Claims—Write Matheson Post Office

A CROWN MINERAL PROPERTY

Suppose the Government should say to you there is a property worth $10,000. We will sell it to you for $10,000, payable in 20 annual instalments and won't charge interest on deferred payments. In event of your death at any time during the 20 years, we guarantee to cancel the balance due and execute a warranty deed to your wife, or if she prefers, we will pay her $10,000 in cash. If you live to complete all payments, we will pay you $10,000 cash, plus interest earned on your annual deposits. Chances are you would jump at it. We are making just such an offer backed by assets of over $45,000,000. Better investigate it.

ROYAL INSURANCE COMPANY Limited OF LIVERPOOL, ENGLAND Founded 1845

Full particulars on application to

A. R. HOWELL, Superintendent
Royal Insurance Building, Montreal, Que.

OR

W. H. LEACOCK, Inspector
Royal Insurance Building, Toronto, Ont.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

FOR SALE—Three 125-ton Copper Smelting Furnaces. Four Connersville Blowers; capacity 72 cu. ft. per revolution; direct connected to Erie Engines. Three Converter Stands and fourteen Shells, 84 x 126, for electric drive.

Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONTARIO.

FOR SALE—One Double-Drum Hoist; drums 8 ft. diameter, 6 ft. 3 in. wide; frame 24 ft. x 11 ft. 6 in.; cylinders 14 x 18; capacity 2½ tons at 700 ft. per minute. One 100 H. P. and one 75 H. P. Boiler, both tested to 100 lbs. pressure. One Northey Sinking Pump, 8 in. x 4 in. x 12 in. One Worthington Duplex Pump, 20 x 10¼ x 10. One 40 H. P. Jenckes Machine Company Engine, 10 x 14. Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONTARIO.

Second Edition With New Material

Simple Mine Accounting

By David Wallace

78 pages, 6x9, with forms. $1.00 (4/6) net postpaid.

Some very good material has been added to this excellent little book. It has some new sections on card systems for warehouses, shipping documents, sheets of costs and profits, etc , etc.

From the first publication the book has proved most useful to every Superintendent or Mine Manager who wasn't an expert accountant and whose business wouldn't warrant employing one.

It is essentially *simple*. It shows how to develop the ordinary books and systems of a small mine (or a large one) so as to preclude the slipshod, inaccurate methods which are so expensive to every business. It isn't an expert accountant's book, but it shows how to keep records that are accurate and tell the real facts.

BOOK DEPARTMENT
Canadian Mining Journal
Confederation Life Bldg. - TORONTO

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite, etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

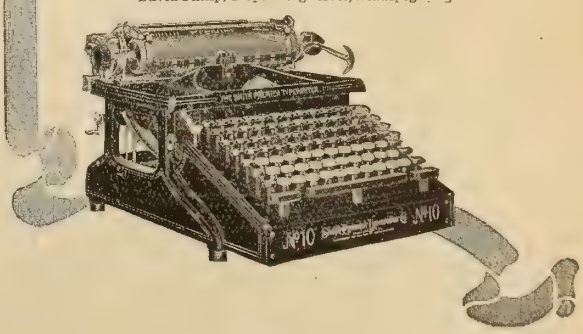
Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.
SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. **Cable Address, BATHOTA, London**

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

SOLIGNUM

Preserves wood under any conditions. For MINING TIMBERS it is invaluable. **Solignum** goes right into the wood. **Solignum** treatment works out ⅓ price of paint.

Write for Booklet with Particulars to

F. STURGEON ***34 Yonge St., Toronto***

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.



An Accurate Ore Test on any metal in 10 minutes For Five Cents.

Thats what the Mining Man or Prospector can have, provided he has a Way's Pocket Smelter Outfit. Anybody can make his own tests right in his office or in the field on **any ore.** Think of what this means to a prospector "miles away from nowhere" or to the mining man who must make dozens of tests a day.

Write for folder giving full information about **Way's Process** and describing both field and laboratory outfits.

WAY'S POCKET SMELTER CO.
Box 954, South Pasadena, Cal.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. New Brunswick : W. H. Thorne & Co., Limited.
Montreal and Toronto : Drummond, McCall & Co. Vancouver, B.C. : John Burns. Winnipeg : David Philip, Portage Ave.

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.

Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ainsworth, Wm., & Sons xiv
Ackroyd & Best, Ltd xiii
Allan, Whyte & Co. xxvii
Astley, J. W. xx

B

Beatty, M., & Sons, Ltd. ix
Baszanger, Jacques & Co.....xi
Belliss & Morcom, Ltd viii
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of..xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply xxvii
Bartram, Wadsworth & Sherry xx
Behrend Concentrators Ltd..... xi
Brown A. H..... xx

C

Canada Metal Co..... xv
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute xiv
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Canadian Northern Ontario Ry..xxi
Curtis & Harvey, Ltd.....xxvii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xiii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks.... viii
C. L. Constant Co., outside back cover

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus xii
Drummond, McCall & Co.....xii
Dominion Coal Co., Ltd. xiv
Dietzgen, Eugene, Co., Ltd.... xvi
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables.....iv
Davis, John & Son..... xvi
Dessau's, S. Sons.....vii

E

Evans, J. W xix

F

Fleck, Alex., Ltd. viii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gillespie, Geo. H. xix
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v
Grand Trunk Ry xxix

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iii
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C xx
Laurie & Lamb viii
Lymans Ltd.....xiii
Link Belt Co. xii
Leckie, J. Edwards xx
Ledoux & Co xx
The Lancashire Dynamo and Motor Co., Ltd..... x

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Metal Shingle & Siding Co.... xiii
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxi
Nova Scotia, Province of.....xxvi

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros. .....vi & vii
Patterson Mfg. Co. xii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx
Royal Insurance Co. xxi

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co.....viii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Sydney Cement Co., Ltd..... xiv
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,, Ltd xi

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Seperating Co. x

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905. Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

WHY IS IT

THAT SALES OF

MORTON'S

"BC"

Drill Steel

ARE INCREASING EVERY DAY?
MUST BE IT IS BETTER MATERIAL,

Gives Best Satisfaction

AND THE DRILL

Lasts Longer.

COULD ANYONE EXPECT MORE?

IN STOCK WITH

E. G. PRIOR, Victoria, B.C.
CANADIAN RAND CO., Cobalt.
BAINES & PECKOVER, Toronto.
ANGEL ENGINEERING & SUPPLY Co. St. John, Nfd.

Canadian Representative

D. W. CLARK, P.O., Box 521, **Toronto.**

GRAND TRUNK RAILWAY SYSTEM

The Longest Continuous Double Track Railway in the World Under One Management.

The Great Double Track Route Through Canada.

Fast passenger service from the Atlantic Ocean to the head of the Great Lakes. The line taps all the principal commercial centres in Canada and reaches the important points in the States of Maine, New Hampshire and Vermont, the principal towns and cities in the Provinces of Quebec and Ontario, and many important places in the States of Michigan, Indiana and Illinois.

The "International Limited" (Canada's Railway Greyhound)

The Finest and Fastest Train in the Dominion

Runs every day in the year leaving Montreal at 9.00 o'clock in the morning for Toronto, Hamilton, Niagara Falls, Buffalo, Detroit, Chicago and intermediate points.

Write for copy of "Trains 3 and 4" descriptive of the route from Chicago to the sea, to J. Quinlan, Bonaventure Station, Montreal, or to J. D. McDonald, Union Station, Toronto.

W. E. DAVIS,
Passenger Traffic Manager,
MONTREAL.

G. T. BELL,
Assistant Passenger Traffic Manager,
MONTREAL.

GEO. W. VAUX,
General Passenger Agent,
MONTREAL.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
N. J. Holden Co.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
A. M. Ellicott Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
A. M. Ellicott Co,
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.
Drummond, McCall & Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.

Crossings (Diamond —
Montreal Steel Works, Limited

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cement—
Sydney Cement Co., Ltd.
Link Belt Co.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
The Hardy Patent Pick Co.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.
Peacock Bros.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Drummond, McCall & Co.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Peacock Bros.
A. M. Ellicott Co.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Eugene Dietzen Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Drummond, McCall & Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.

Girders, Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
A. M. Ellicott Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Peacock Bros.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
The Hardy Patent Pick Co.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Metal Shingles—
Metal Shingle and Siding Co.
Pedlar People.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
The Hardy Patent Pick Co.
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.

Pipe (Cast, Wrought, Spiral, Riveted)—
Drummond, McCall & Co.

Roofing, Steel—
Metal Shingle & Siding Co.
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Peacock Bros.
Canadian Cleveland Drill Co.
N. J. Holden Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.

Rails (steel)—
Montreal Steel Works, Ltd.
Durmmond, McCall & Co.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
The Hardy Patent Pick Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
The Hardy Patent Pick Co.

Structural Metal Work—
Dominion Bridge Co.
Drummond, McCall & Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Eugene Dietzgen Co.
Keuffel & Esser Co.

Steel (Tool)—
Montreal Steel Works, Ltd.
Drummond, McCall & Co.
Morton & Co.
Thos. & Wm. Smith
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Smith, Thos. & Wm., Ltd.
Drummond, McCall & Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

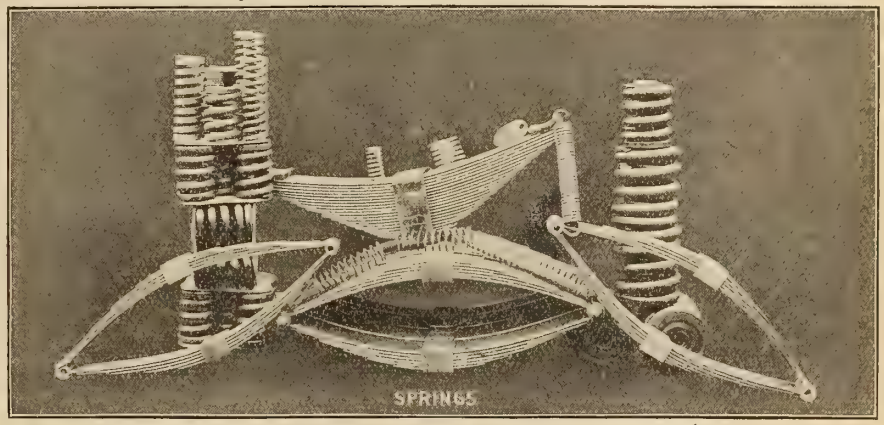
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel; Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse Motors for Mines

Westinghouse Mine Motors are noted for great strength of parts, large self-oiling bearings that seldom need attention, large overload capacity, low operating temperature and high efficiency.

We illustrate a Westinghouse Induction Motor driving a Deep Mine Sinking Pump. Westinghouse Alternating and Direct Current Motors are fully described in Circulars 1068 and 1118; ask for copies.



Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.

Address nearest office: HAMILTON.
922-923 Union Bank Bldg., WINNIPEG.

252 St. James Street, MONTREAL.
158 Granville Street, HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines

Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

BUY YOUR OUTFIT AT SIMPSON'S

We'll supply you with an outfit complete from tent to pick-hammer.

We'll pick out a prospector's outfit for *travelling light* or an outfit for *developement work* at a stationary camp. Don't overload yourself. We can help you choose what you really need and we can do it at a minimum expense.

THE SIMPSON MINER'S KHAKI DUCK SHIRTS.

A Shirt with "no end of wear." A Shirt made of the strongest khaki duck—in the strongest kind of way—by men who are highly experienced in miners', surveyors' and prospectors' outfits. Buying these shirts in very large quantities, we are able to offer you a shirt worth in every way a $1.50 for - **One Dollar per Shirt.**

Miners', Surveyors' and prospectors' shirts, heavy khaki duck collar, two pockets with buttoned flaps, dome fasteners, sizes 14 to 18. Our special value at **$1.00.**

OUR SPECIAL UNDERWEAR FOR MINERS.

We recommend heavy pure wool, the kind that feels warm and is warm, all the time, whether wet with perspiration or not. Try our heavy all wool with just a little camel's hair mixed with it—making a very soft garment next the skin, and giving "the highest degree imaginable," of cold weather protection and comfort. This underwear we specialize at - - - - **One Dollar per Garment.**

SIZES 34 to 48.

OUR SPECIAL TARTAN FLANNEL SHIRTS.

The cashmere flannel in these garments can only be made in Glasgow, Scotland. We import it in large quantities and have it made by skilled workmen into shirts to our own specifications, making the price of the very best quality only **$3.00 per shirt.**

Men's, all wool, cashmere, flannel, tartan, shirts, made with reversible collars, and pockets, genuine fabric, best tailoring, they fit perfectly in every way. Our Special Price is - - - - - - - - **$3.00.**

THE ROBERT **SIMPSON** COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

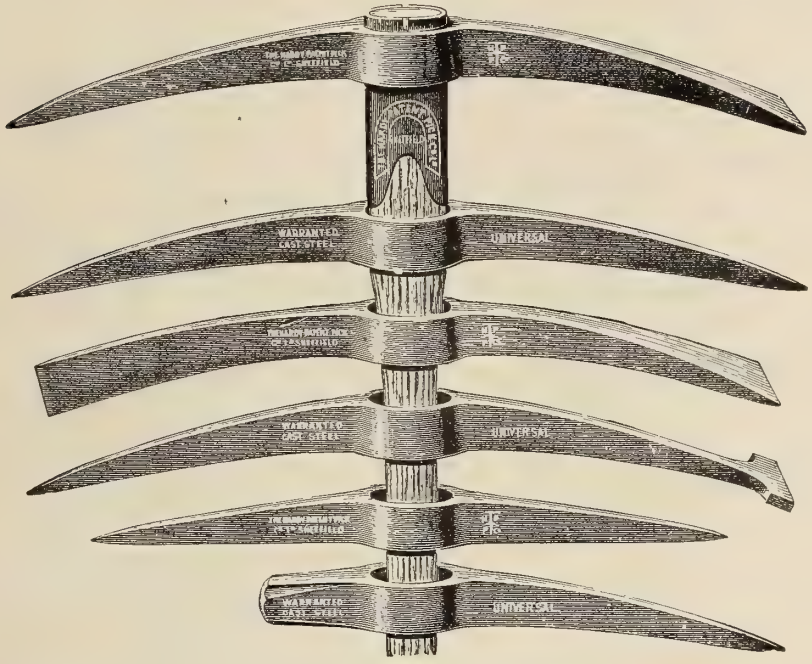
Mining and Metalurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

THE CANADIAN MINING JOURNAL

VOL. 31 TORONTO No. 3

HARDY PATENT UNIVERSAL PICKS



This illustration shows the Hardy Patent Universal Picks which are made entirely of steel.

Everyone interested in the use of picks for any purpose, who has tried the Hardy Patent Universal, readily admits that it is the best—the Collier, the Metal Miner, the Prospector, the Road Mender, the Sectionman, the Manager, the Engineer, the Blacksmith and the Purchasing Agent, each in his sphere of work admits without qualification that the Hardy Patent Universal Pick is the best Pick that can be obtained, and that it saves work for the user and money for the owner.

If you have not tried the Hardy Universal, you should get a sample without delay.

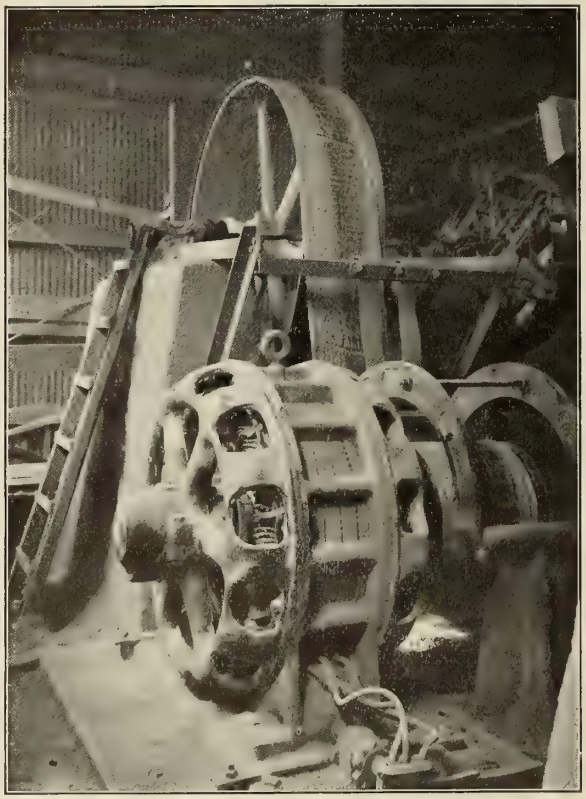
MUSSENS LIMITED

Head Office: MONTREAL

Branches { TORONTO, 73 Victoria Street
COBALT, opposite Right of Way Mine
WINNIPEG, 259-261 Stanley Street
VANCOUVER, Metropolitan Bldg.

INDUCTION MOTORS
IN
CRUSHING & CEMENT PLANTS

Polyphase Induction Motors have many advantages in the operation of rock crushers, ball mills, tube mills, rotary kilns, hoists, conveyors, pumps and other machinery. In addition to flexibility and economy, demonstrated in many other lines of service, electric drive eliminates long lines of counter-shafting, a specially desirable feature where gritty dust makes the maintenance of both belts and bearings very expensive.



In the dusty atmosphere of a cement mill the simple squirrel cage rotor of an induction motor is much less liable to give trouble than the wound armature of a direct current machine. The illustration shows one of our 100 H.P. type "AN" induction motors belted to a tube mill at the Belleville Plant of the Canada Cement Company Limited. The equipment of that plant includes over 1,000 H.P. of our motors.

See Bulletin 301 (revised)

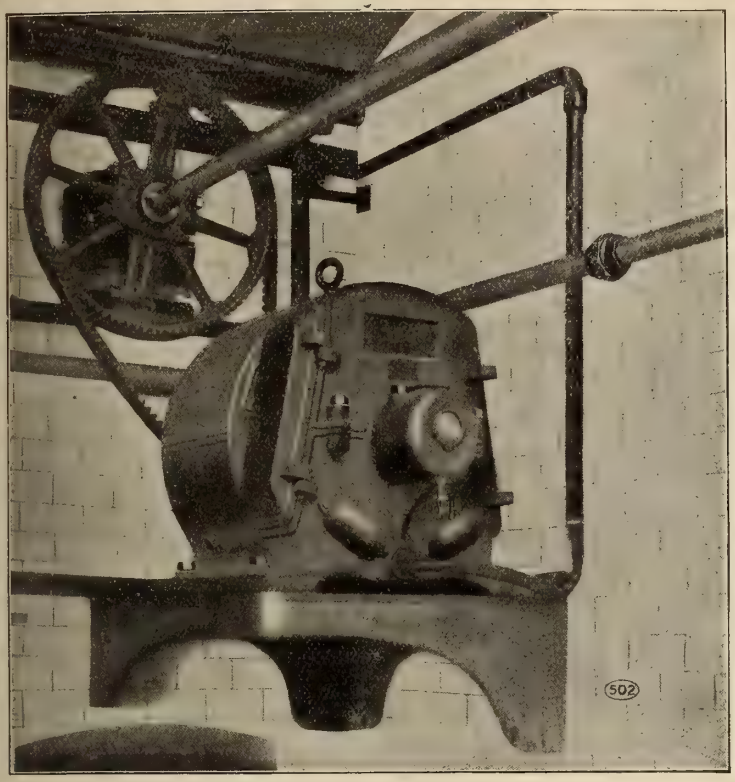
ALLIS-CHALMERS-BULLOCK
LIMITED

WORKS - - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY



QUIET, FRICTIONLESS, AND COMPACT.

RENOLD PATENT SILENT CHAIN

MANCHESTER, Eng.

overcomes

TRANSMISSION TROUBLES

The only Drive suitable to Short Centres.

All the advantages of direct connection at half the cost.

WRITE FOR ILLUSTRATED CATALOGUE

JONES & GLASSCO., Canadian Agents MONTREAL, Que.

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.

Write us for Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 522, Cobalt, Ontario



JEFFREY

A 5 Electric Rotary Drill

for

Coal, Slate, Shale, Clay, Gypsum, Rock Salt, etc.

This machine
can be absolutely depended upon to drill any material which can be penetrated by an auger bit.

Send for descriptive Bulletin No. 16

JEFFREY ELECTRIC LOCOMOTIVES

THE COST OF MAINTENANCE
of Jeffrey Locomotives has been shown by actual records to be less per ton mile than any other make of Electric Locomotive. Bulletin No. 17

We build Complete Coal Mine Equipments

THE JEFFREY MFG. CO., Columbus, O., U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance Street.

SULLIVAN DIAMOND CORE DRILLS



Sullivan Class "R" 300-foot Electric Diamond Drill in operation underground in West Australia.

IT IS EASIER to string wires than to lay pipes or haul boilers. So there are many cases in which electricity is more convenient than steam or air for operating Diamond Drills.

Sullivan Electric Diamond Drills are made in any capacities, for either direct or alternating current. Their compactness and adaptability permit operation either underground or from the surface. Holes bored at any angle.

Catalogue 655.

Air Compressors
Rock Drills
Coal Cutters

SULLIVAN MACHINERY CO.

Railway Exchange, CHICAGO, U. S. A., CLAREMONT, N. H.

Birmingham, Butte, Salt Lake, Cobalt, Ont., St. Louis, Denver, San Francisco, El Paso, Joplin, Seattle, New York, Spokane, Pittsburgh, Sydney, N.S.W., Rossland

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
10 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE

We carry in stock a complete line of Mining Machinery and supplies in our

Cobalt Warehouse

Our representatives cover the whole Northern mining district and are in a position to quote good delivery on our mining equipment.

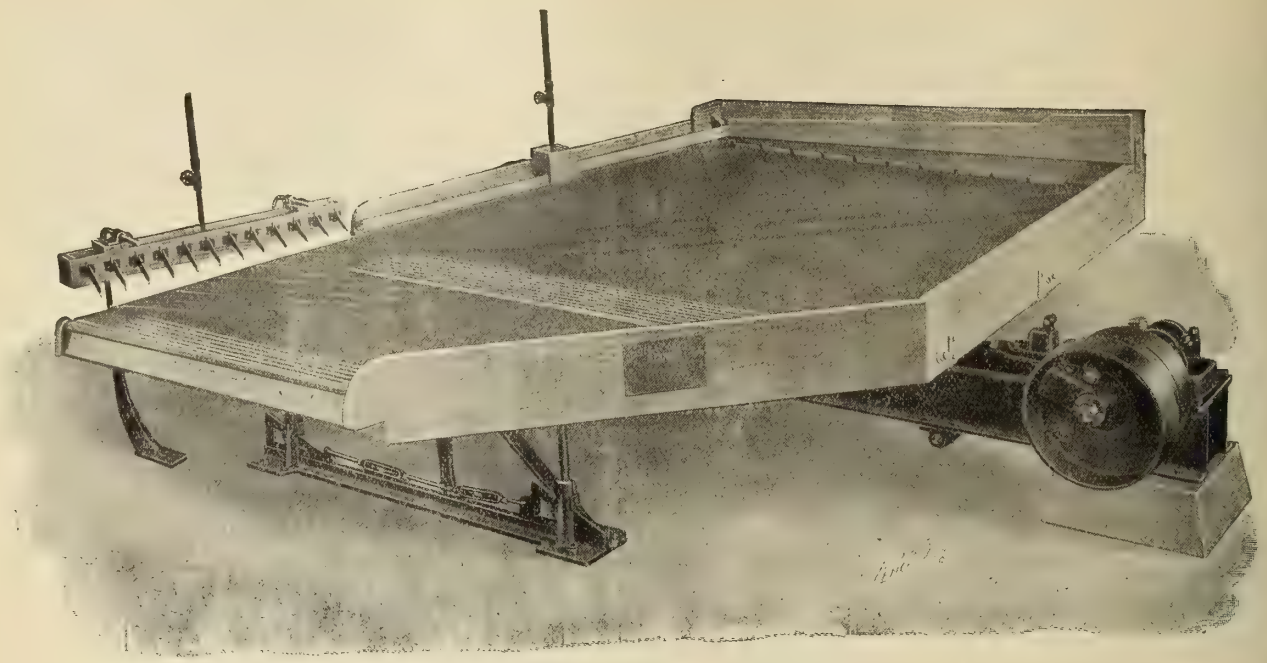
AIR COMPRESSORS ROCK DRILLS BOILERS
HOISTS ORE CARS ORE BUCKETS
WIRE ROPE STEAM AND AIR HOSE
OCTAGON AND CRUCIFORM DRILL STEEL

ALL SMALL SUPPLIES

CANADIAN RAND CO., LIMITED

Montreal, Canada

ELK LAKE COBALT ROSSLAND VANCOUVER WINNIPEG TORONTO HALIFAX



24 Additional Improved No. 3 Deister tables are being installed in the new addition to the Goldfield Consolidated Mines Company's mill as the result of efficiency in operation and small cost of maintenance of a previous installation of 70 tables.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

THE CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Philippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faros Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

The Canadian Laboratories

Chemical and Physical tests of all Materials.

Mining properties examined and reported upon.

Write for prices for Ore analysis.

37 Melinda St. Toronto

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

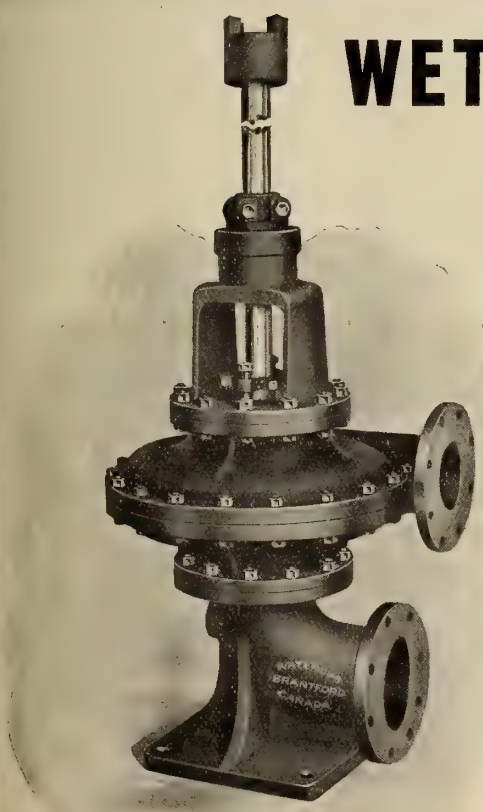
WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.



WET AND DRY PIT PUMPS

For Mine Drainage

Direct Connected to Engine or Motor

OUR VERTICAL SHAFT

CENTRIFUGAL PUMPS

are particularly adapted for Mine Work. Built with all the special features of our Horizontal Pumps, their

LIGHT COMPACT DESIGN
AND
SIMPLE CONSTRUCTION

Permit easy handling, require little space and make skilled attention unnecessary.

Write for special Bulletin No. 200.

The Waterous Engine Works Co. Ltd.

BRANTFORD, - CANADA

Walker Brothers (Wigan) Limited

Wigan, England



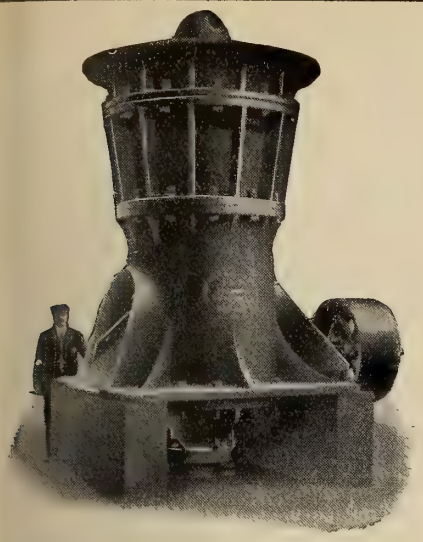
Largest Air Compressors in Canada

are of WALKER BROTHERS (Wigan) LIMITED manufacture.

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

lucluding
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

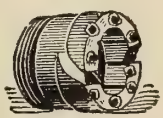
THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

We personally break all our carbons

Goods sent on approval for selection

CARBONS
Black Diamonds)
and BORTZ for
DIAMOND DRILLS



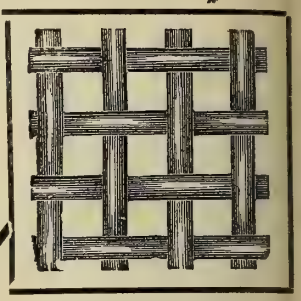
S. DESSAU'S SONS
Importers
180 B. Broadway,
N. Y.

Carbon for all mechanical purposes

Bortz for all mechanical purposes

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalog 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

BELLISS

Engines, Air Compressors

Ask for Catalogue.

CANADIAN AGENTS

LAURIE & LAMB

Consulting and Contracting Engineers

211-212 Board of Trade Building, MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

Aluminum Powder

Manufactured By

THE

CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

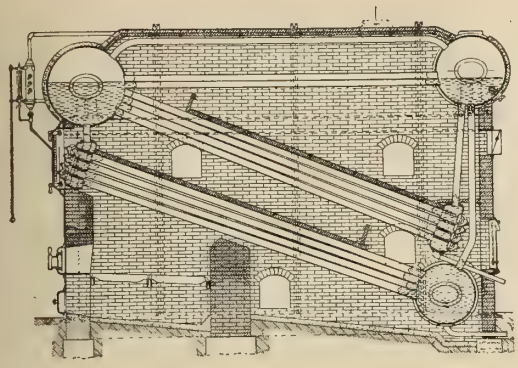
Works, Valleyfield, Quebec

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Robb Water Tube Boiler



Straight tubes. Perfect water circulation.
Dry or superheated steam.
Half the usual number of handholes.

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
Calgary Block, Calgary, - -	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,

Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,

Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors' Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

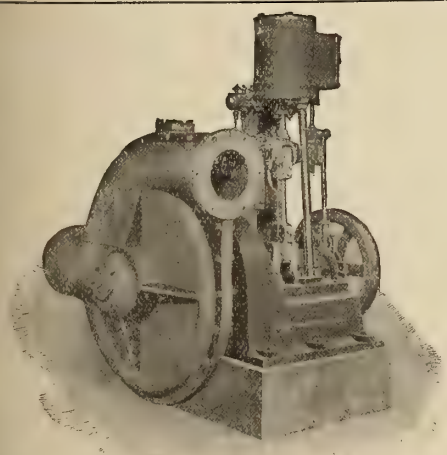
Agents: E. LEONARD & SONS, Montreal, Que., and St. John, N.B.,
R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



Morris Machine Works
BALDWINSVILLE, N.Y.

Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

New York Office—39-41 Cortland Street

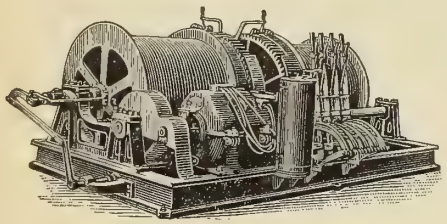
AGENCIES
Henion & Hubbell, 223-231 North Jefferson St., Chicago, Ill.
Harron, Rickard & McCone, San Francisco, Cal.
Zimmerman-Wells-Brown Co., Portland, Ore.
H. W. Petrie, Toronto, Ont.

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

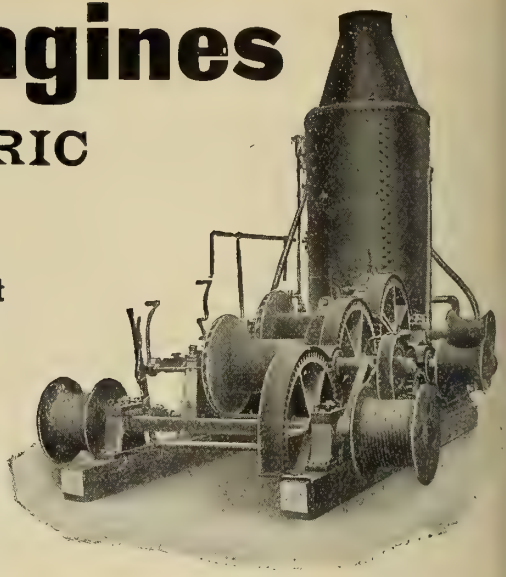
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines

CANADIAN PACIFIC RAILWAY

THE SHORTEST, CHEAPEST AND BEST ROUTE
TO

GOWGANDA

IS

Leave Toronto 10.10 p.m. daily, Ar. Gowganda 9.00 p.m. next day.

THROUGH FARE $15.80

Through sleeper to Sudbury; dining car on C. N. O. train to Gogwanda Junction. Stops made at Phoenix for lunch and Elkhorn for dinner by stage line.

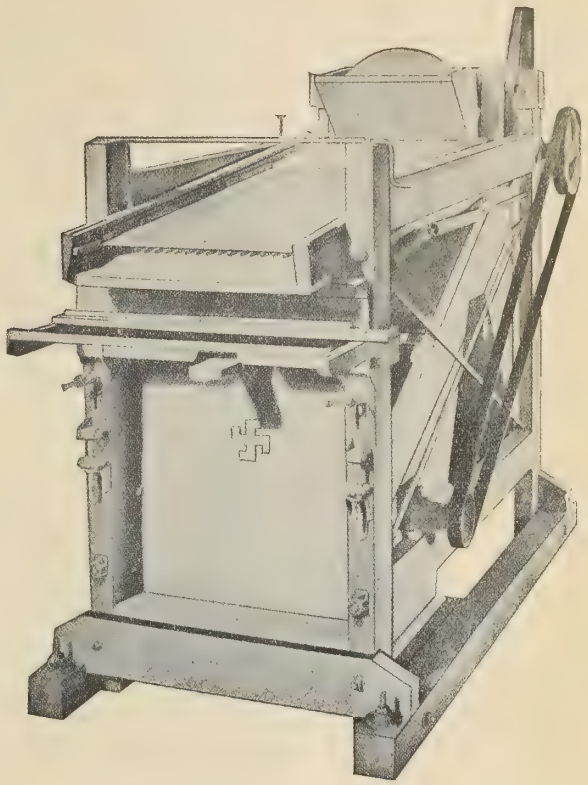
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

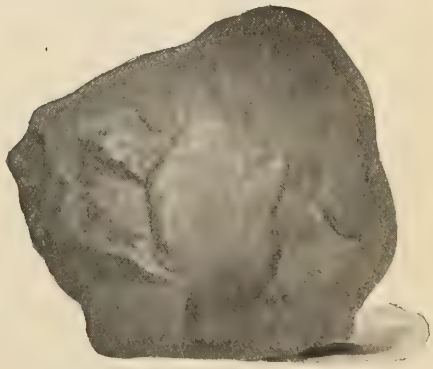
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

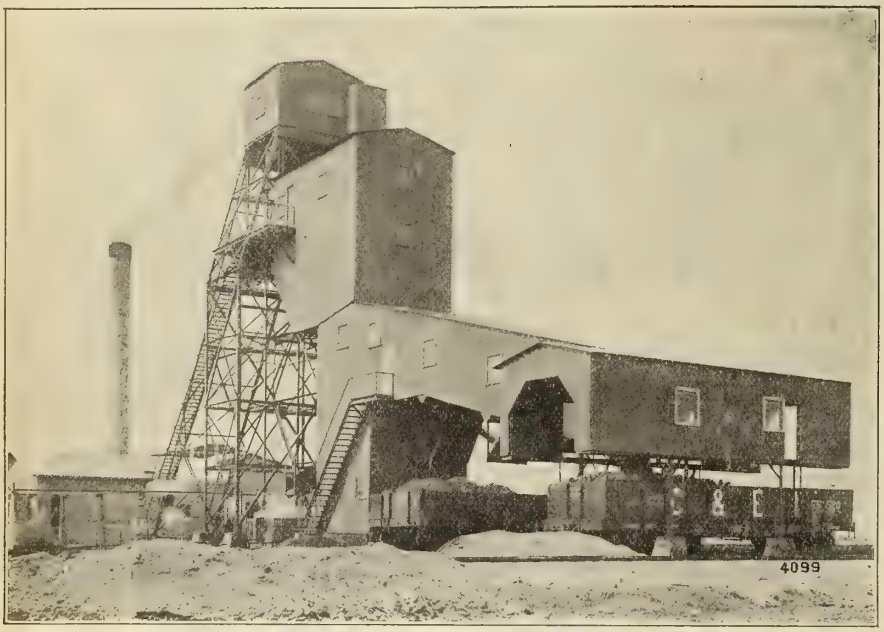
Scrantan, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 110 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

"LINK-BELT"

COAL TIPPLES

CONSTRUCTED OF WOOD OR STEEL



Steel Coal Tipple built for the Burnwell Coal Co., Witt, Ill.
Equipped with "Link-Belt" Bar Screen, Shaking Screens, Weigh Hopper, etc.

Our manufactures include

Conveyors, Car-Hauls, Screening Plants, Complete Washery Equipments, Box-Car Loaders, Weigh-Boxes, Etc.; Original "Ewart" Link-Belt, "Dodge," "Monobar," "Ley," and other Chains; **>FLINT-RIM<** Sprocket Wheels, Small Rollers and Truck Wheels for Conveyors, Carriers and Cars.

Link-Belt Company

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK, 299 Broadway
ST. LOUIS, Missouri Trust Building
NEW ORLEANS, Wilmot Machinery Co.
PITTSBURGH, 1501-2 Park Building
SEATTLE, 439-440 New York Block
DENVER, Lindrooth, Shubart & Co.

DRUMMOND, McCALL & CO.

MONTREAL TORONTO LONDONDERRY, N.S.

Wrought Iron and Steel Pipes

All Sizes and to any Pressure

Iron and Steel Boiler Tubes
Red, White and Blue Brand Mining Steel
Full stock always on hand.

Cold Drawn Seamless Steel Boiler Tubing

"KERVA" BRAND
For Stationary, Marine and Locomotive Boilers

Pressed Steel Floor Plates
Raised Diamond and Ribbed Pattern

BRATTICE CLOTH

Tarred, Airproof, also Fireproof. Quality Guaranteed. All Sizes for Direct Import.
Sample Books on Request.

LARGE STOCKS CARRIED IN MONTREAL FOR IMMEDIATE SHIPMENT

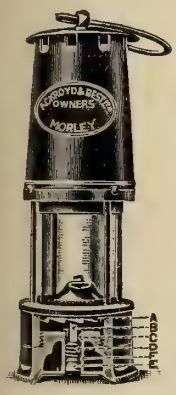
ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F) Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

1910

We shall appreciate your enquiries and orders for Assay Apparatus and Chemicals during the year 1910.

LYMANS, Limited

(ESTABLISHED 1800)

MANUFACTURING CHEMISTS

Importers and Dealers in Chemical and Assay Apparatus

MONTREAL



RIGHT OF WAY MINE, COBALT, SHOWING BUILDINGS ROOFED AND SIDED WITH OUR ACORN QUALITY CORRUGATED GALVANIZED SHEETS.

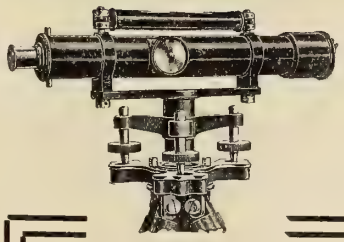
Acorn Quality Corrugated Galvanized Sheets

Satisfy every requirement for mining construction work. They are fireproof, durable and economical. Buildings may be erected more quickly by using our Corrugated Sheets than by any other style of construction.

Our ACORN QUALITY Corrugated Galvanized Sheets will stand the **British Government Acid Test** for Admiralty and other public service. This guarantees lasting service in the most trying conditions, and that is what mining men want.

We can furnish **Corrugated Leaded Sheets** and Painted Sheets for special purposes. We give prompt attention to enquiries. Write us at once for prices and information.

METAL SHINGLE & SIDING Co LTD.
PRESTON & MONTREAL



DUMPY (SURVEYING) LEVELS

BEST DUMPY LEVELS, with powerful telescope, having large object glass, three levelling screws, and improved locking plate. In mahogany case, and with round Tripod Stand.

The first level to be made with stage and parallel plates in one piece. Extra large centres carefully ground ensure accuracy and resist wear. This is "The Level that will last the longest."

Catalogue F. on request.

Joseph Casartelli & Son,

Scientific Instrument Makers,
43 Market Street,
Manchester, Eng.



OUR TYPE B.F.

Mountain and Mining Transit

With Interchangeable Auxiliary Telescope has 5 inch limb with veriners at 30° with telescope, reading to 1 minute magnetic variation plate, 1 minute plate levels, 30 seconds telescope level, 10-inch 25 power main and 8-inch 20 power auxiliary telescopes, 5 inch vertical circle with guard and veriner reading to 1 minute, stadia, gradienter and extension tripod.

Its Equal Can Only Be Produced In

THE PRECISION FACTORY

Nearly 4,000
BRUNTON PATENT POCKET TRANSITS
are in use by Civil and Mining Engineers, Mine Managers and Geologists
EVERYWHERE

Closed for the pocket it measures 3½ x 3½ x 1½ ins. Case of Aluminum, weight 8 ounces.

Send for Bulletin B & B x 16
to
WM. AINSWORTH & SONS
Denver, Colo., U.S.A.

CANADIAN AGENTS
Lyman Sons & Company,
380 St. Paul St., Montreal.
B. C. Assay & Chemical Supply Company,
Vancouver, B. C.



Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

CANADIAN MINING INSTITUTE

NOTICE OF CHANGE OF ADDRESS.

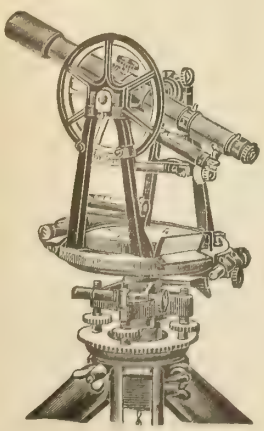
The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.
Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.
The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196



C. L. Berger & Sons

37 WILLIAMS STREET
BOSTON, - MASS.

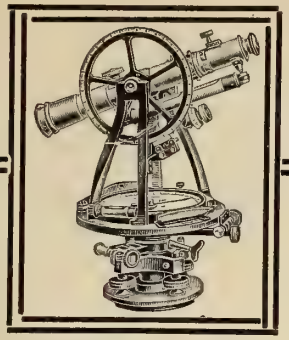
SPECIALTIES:
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

RAMPART CEMENT

Perfectly Sound. Never swells or bursts.
Reliable for all purposes for which hydraulic cement is used.
Fineness 92 per cent. through a 200 mesh sieve.
Strength up to standard specification and permanent.
Used by the leading Mining Companies of the Maritime Provinces.

Sydney Cement Co., Ltd.
Rampart Brand
SYDNEY, NOVA SCOTIA, CANADA



K & E

Engineering Instruments

The superior design, high quality of material, workmanship and finish which characterize our Surveying Instruments, account for their use on nearly every important engineering enterprise.

When in the market for a new surveying outfit, we will be pleased to quote on your requirements, as we can furnish every requisite of the engineer for field or office.

Send for our Solar Ephemeris for 1910.
Our complete Catalogue sent free on request.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

THE

Bennett Fuse

Crown  Brand

MANUFACTURED BY

William Bennett, Sons & Co. Limited
CAMBORNE, CORNWALL,
ENGLAND

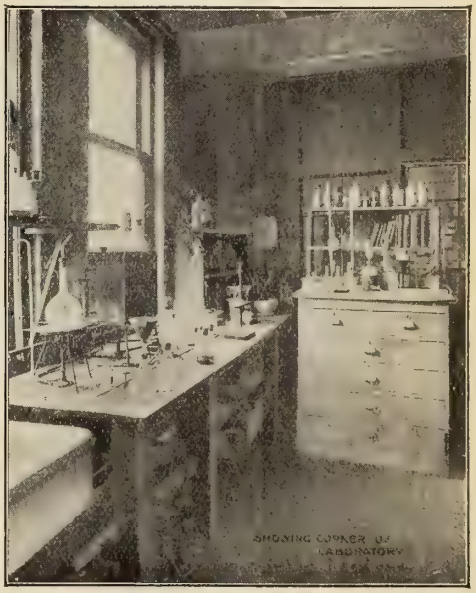
CANADIAN OFFICE:

The Giant Powder Company, Con.
VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION

WE DON'T GUESS

This is our Chemical Laboratory. We know our Metal from the raw material to the cases it is packed in.



Chemical Room.

Harris Heavy Pressure Bearing Metal

Will keep your Bearings Cool, save you money in Oil and Fuel.

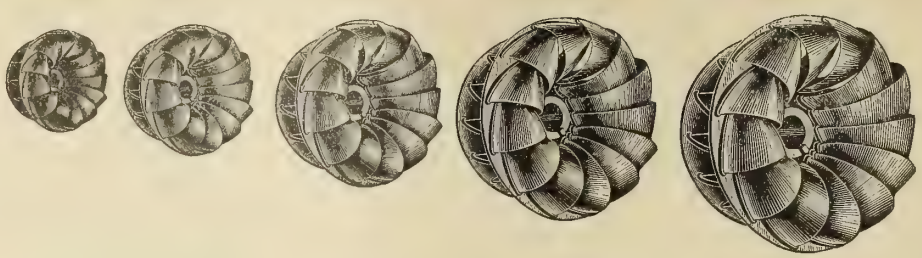


This Factory behind the Metal.

These are Facts

Would you like a sample shipment

THE CANADA METAL CO., LTD.
TORONTO



The Improved Turbine

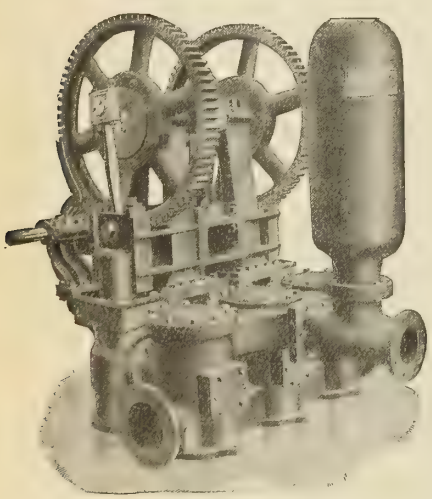
Parties having Water Powers they are desirous of utilizing will be furnished with reliable information as to the best means of making them available for the purpose intended.

A Competent Engineer will be sent to any point for consultation and the Survey of any Water Power proposition with report thereon.

CATALOG ON REQUEST

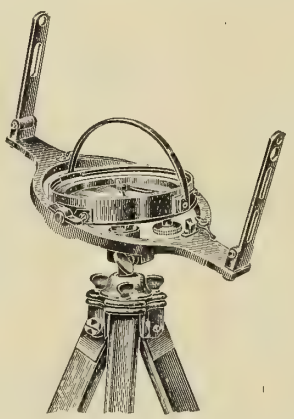
The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.



POWER AND STEAM PUMPS, CENTRIFUGAL PUMPS, ROTARY AND VACUUM PUMPS.

The SMART-TURNER Machine Co. Limited, Hamilton, Ont.



DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.
68 BEAVER HALL HILL MONTREAL

Eugene Dietzgen Co.

Limited

10 SHUTER STREET, -:- TORONTO



Instruments of Precision, Mining, Surveying, Mathematical. Drawing Materials.

CATALOG ON REQUEST

LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, February 1, 1910 No. 3

The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

	Page.
Editorials	65
(1) The Oleaginous Mr. Henshaw Maddock	65
(2) The Quarterly Bulletin of the Canadian Mining Institute	66
(3) An Indiscreet Official	66
(4) Railway Statistics	66
(5) A Comparison	67
(6) The Bartlett Fiasco	67
(7) Editorials Notes	67
House Cleaning Applied to Mineral Lands in Ontario. By G R. Mickle	67
Mischievous Political Interference With Industry. By J. J. Harpell	68
Conditions and Needs of Mining in the Yukon. By F. T. Congdon, M.P.	71
Nova Scotia's Mineral Output in 1908	74
Report of the Council of the Canadian Mining Institute for the Year 1909	76
Accident at Goodwin Lake Mine, Township of Lorrain, Jan. 15, 1910, Whereby Frank Shepherd Was Killed	78
The Electrically Driven Pumps of Lockport, N.Y.	79
Silver in 1909	80
The Nickel Industry	81
A New Electric Process for Producing and Refining Steel With Composite Arc Electrodes. By F. C. Perkins	82
The Relation of Mining to Forestry. By B. E. Fernow	85
The Nissen Stamp in Cobalt	87
Legal Column	88
Obituary	89
Personal	89
Exchanges	89
Special Correspondence	89
General Mining News	93
Company Notes	94
Statistics and Returns	94

THE OLEAGINOUS MR. HENSHAW MADDOCK.

Mr. Henshaw Maddock occupies Suite 9, 10, 11, No. 205 Yonge Street, Toronto. Also he occupies a great deal of advertising space in our dailies. From his portrait, of which he is justly proud, we judge that Mr. Maddock is a person of engaging manners, and of convincing speech.

Mr. Maddock is promoting the sale of shares in the California-Alberta Oil Company. Some time ago we filed away for future reference, a copy of his prospectus. It is quite possible that this prospectus would have remained innocently in the file, had not our correspondent drawn our attention to one or two inaccuracies contained therein.

After pursuing the California-Alberta Oil Company prospectus, and comparing it with our correspondent's letter we are led to believe that Mr. Maddock does not know what he is talking about—or does not care to know.

For instance, on page 7 of the prospectus, a quotation from a report, dated 1898, is credited to Dr. G. M. Dawson, The report was written by Mr. J. B. Tyrrell.

Another quotation, page 8 of the prospectus, is attributed to the Summary Report of the Geological Survey of Canada, 1905, page 7. No such statement is made in the Summary Report. Indeed, any official of the Survey making such a statement would lose his usefullness at once. The quotation reads thus: "The same oil belt was traced into the Athabasca regions, 250 miles north of Egg Lake, showing vast deposits of asphaltum, or tar sands in the Athabasca region." If Mr. Maddock does not realize that he is talking nonsense, we must seize this opportunity of informing him that such is the case.

On page 8, moreover, the reader is told that the Canadian Government pays a bounty on crude oil. This is perfectly true. Unfortunately the Canadian Government, in its blindness, insists that you must first get your oil.

In many other respects the prospectus before us is a network of silly exaggeration. We may be pardoned if, since Mr. Maddock has seen fit to misquote Dr. Dawson, we reproduce here exactly what Dr. Dawson did write of the Egg Lake district. Here it is:—

"It does not follow however, that this would be a specially favourable locality in which to test the beds of the lower Cretaceous by boring, for on the contrary our knowledge of the geological structure of this part of the country indicates that the depth at which these beds lie, is here very great, probably, at least 2,500 feet, and possibly much more" Our correspondent continues thus: "After this was written the well at Victoria had

to be abandoned at 1840 feet, without reaching the lower Cretaceous (supposed oil bearing rock). A private well near Morinville is now down, somewhere near 1900 feet, without reaching it, and two wells near Calgary are down 3,400 feet, without reaching it. It is only fair to state, however, that at Calgary there is a greater thickness of overlying formation than is to be expected near Edmonton. At Pelican, 150 miles north, there is only about 800 feet of overlying formations to penetrate, and going eastward the overburden also rapidly thins down."

In short, we may safely conclude that Mr. Maddock and his associates are trading upon the exploration work, actually being done in Alberta by competent men. A conclusion even more safe for Mr. Maddock is that it is time for him to shut up shop.

THE QUARTERLY BULLETIN OF THE CANADIAN MINING INSTITUTE.

Two years have passed since the Council of the Institute decided to publish the technical papers contributed by its members in the form of a regular quarterly bulletin. The experiment was eyed with disfavour by not a few. It was considered that the annual volume satisfied all needs, and the added expense was unnecessary.

However, the judgment of the Council has been vindicated. The Quarterly Bulletin, has not only been well received, but it has kept interest continuously alive. It has bridged the twelvemonth gap between meetings.

We have before us Bulletin No. 8, for December, 1909. Its contents warrant more than casual commendation. Within its covers are no less than fifteen papers. Papers that in all essentials conform to the highest standards.

Particularly impressive is the variety of topics presented. Shaft sinking, ore sampling, coal, copper, iron, chrome, dynamite, are among the subjects indicated by the titles. Several essays on general questions are to be found. In fact this diversity is a most marked and creditable feature of this particular bulletin, also it is exceedingly difficult to attain. Only suffering editors know the depths to which the average mining man will descend rather than write an article. He promises with fervour. He postpones with equal fervour. But perform he will not except as a dernier ressort. Yellow bate allures him not. Therefore, when Mr. Secretary Lamb lands a basketful of fine fish on bare hooks we take off our hat.

Eight of the fifteen papers are contributed by students. We have compared these with the student papers of former years, and we have no hesitation in declaring in favour of this year's crop.

The gold medal, awarded annually to the student whose paper is considered worthiest, was this year awarded to Mr. N. L. Bowen, of the Kingston School of Mining. The second and third prizes went to McGill students. The task of judging the essays must have been peculiarly trying.

The policy of inciting students to honourable competition is wise. The Institute can hardly overdo this.

As for the other papers, it suffices to say that they are uniformly good. Noticeably timely is Dr. Fernow's "The Relation of Mining to Forestry." This and other papers we shall discuss more fully at another time.

It is only necessary to add that praise is due Mr. Lamb for the care and discrimination with which he has edited the Bulletin. The Canadian Mining Institute has every reason to be proud of its publications.

AN INDISCREET OFFICIAL.

Discretion is a virtue without which a Government official cannot thrive. Dominion officials are paid servants of the nation. Dr. Eugene Haanel occupies a very responsible and important position. He is Director of the Mines Branch of the Department of Mines. In this capacity his duty is to aid the mining industry to the best of his ability.

A few days ago, at Ottawa, Dr. Haanel publicly criticized the metallurgical methods of the Canadian Copper Company. His criticisms were strong and, we believe, unjust. But, in any case, Dr. Haanel has neither the right nor the technical knowledge to offer criticisms on one of the most modern and most effective metallurgical plants.

Before going further, we may state that we hold no brief for the Canadian Copper Company. Our columns are open to any fair comments on that company. Our position, however, is this: Dr. Haanel, as a public servant, has openly attacked a large industry. Dr. Haanel has therefore laid himself and his Branch of the Department of Mines open to criticism. And incidentally, there is evidence of growing dissatisfaction with the work of the Mines Branch. It now devolves upon Dr. Haanel to substantiate in detail his strictures upon the methods of the Canadian Copper Company. He must show cause, or make instant retraction. We need hardly point out that the Hon. Mr. Templeman, as Dr. Haanel's immediate superior, is strictly accountable for the vagaries of his subordinate.

We shall look forward to Dr. Haanel's explanation with much interest.

RAILWAY STATISTICS.

Government returns concerning the freight traffic on Canadian railways throw light upon the part that mining plays in the industrial life of the Dominion.

During the year ended June 30, 1909, the total freight carried on the 24,104 miles of Canadian railways amounted to 66,842,258 tons—formidable figures indeed. We find under the heading "Products of Mines" 35.81

per cent. of this total, or 23,931,061 tons. In other words, the mining industry provides more than one-third of all the freight moved by our railways.

Comparing mining with agriculture, the returns shew that to the latter industry can be attributed hardly 50 per cent. of the tonnage credited to the former. Products of forests almost equal those of agriculture, both standing at less than 18 per cent. of the total freight moved. Manufactures account for 11.82 per cent.; products of animals, merchandise, and miscellaneous materials making up the balance.

The items classified as products of mines are anthracite coal, bituminous coal, coke, ores, stone, sand, and "other products." The last vague item forms an inconsiderable part of the whole. It is to be noted that cement, bricks, lime, and all metallurgical products are excluded. Nor is petroleum, which is essentially a mineral, included.

We often wonder if our railway corporations really know how dependent their enterprizes are upon the mining industry. The figures above quoted are certainly well within the truth. Probably any different classification would place mining in an even higher position. But as they stand they are eloquent enough.

A COMPARISON.

One of the most irritating fictions, and one that is constantly reiterated, refers to mining. It is popularly believed that mining is essentially a dangerous calling. No amount of reasoning convinces the lay mind that this is not the case.

A comparison of statistics may convince where reasoning fails.

More than eighteen thousand men are employed in the collieries of Nova Scotia. During 1908 there were 41 fatal accidents at these collieries. To be exact, there were 2.2 men killed for each 1,000 employed.

Last year the railways of Canada employed 19,443 trainmen. Of these 113 were killed. That is, the fatality rate was 5.8 per 1,000 men employed. As this is considerably more than twice the rate obtaining in Nova Scotian collieries, the moral is obvious.

THE BARTLETT FIASCO.

To no Gowganda prospect was so much newspaper puffing given last winter, as to the Bartlett. The mine has now been closed; the promoter has been exposed; and the shareholders are wondering where they come in.

Comment is superfluous. Incompetent technical management, and prodigal waste at headquarters always bring the one result. But, there yet remains the consideration that the men who permitted their names to decorate the prospectus, are morally and legally liable. The Hon. Mr. Harcourt and his fellow-directors, if they wish to retain the respect of honest men, will assuredly come to the rescue.

EDITORIAL NOTES.

The annual meeting of the Canadian Mining Institute will be held at the King Edward Hotel, Toronto, on March 2, 3 and 4. A fine list of papers has been promised. All arrangements have been completed as to special railway rates, accommodation, etc.

In a review of last year's silver market, reprinted on another page, Messrs. Samuel Montagu & Co., point out that even if a gold standard were to be adopted by China, the demand for silver would not be seriously affected. The development of the Empire's internal wealth will provide a growing market for years to come.

HOUSE CLEANING APPLIED TO MINERAL LANDS IN ONTARIO,

By G. R. Mickle.

In the Ontario Gazette of December 18th ult., and in the three successive issues appears a long list of lands in default of taxes and therefore subject to forfeiture on the 30th of June 1910, if the taxes are not paid before that date. This is the first systematic clean-up since the province made its first grant of land as mining land in 1852 about two generations ago. It is true there have been tax sales under the Algoma Land Tax from time to time, but this act did not apply to the whole province.

It will be noticed that the parcels of land advertised are of all sizes from the 10 sq. mile or 6,400 acre location of the early days down to fractions of 10 acres. Fancy granting an area equal to 160 claims of 40 acres in one block! These lands, which the present owners take no interest in, no doubt once represented great hopes. The fact that they now revert to the Crown is a striking illustration of the gulf often fixed between Expectation and Fulfilment.

Taking the list as a whole it will be seen that 247,037 acres are in arrears for taxes or about 29 per cent. of the total area subject to the Supplementary Revenue Act under which the tax is levied and the lands become subject to forfeiture. In a paper read by me before the Canadian Mining Institute last annual meeting, the working of this Act was fully explained. It applies only to mining lands in territory with no municipal organization. The policy long since abandoned, of selling outright large areas has evidently only resulted in tying-up a large amount of land for a long time to the benefit of no one.

By districts the areas advertised as subject to forfeiture are as follows:—

Kenora and Rainy River Districts	4,072	"	"	29%	"
Thunder Bay District	96,371	"	"	23%	"
Algoma District	36,336	"	"	30%	"
Sudbury District	18,230	"	"	22%	"
Nipissing District	5,249	"	"	37%	"
Parry Sound and Muskoka Districts	4,072	"	"	29%	"

Since the list was first published the area in Kenora and Rainy River has been somewhat reduced by the payment of amounts due.

It may be anticipated that before the 30th of June the number of acres will be further diminished, and that finally something like 200,000 acres will probably revert to the Crown. This should stimulate prospecting in the Western part of the Province where most of the land that will be revested in the Crown lies. It is to be hoped that some valuable discoveries will be made as a result.

POLITICAL AND MISCHIEVOUS INTERFERENCE WITH INDUSTRY.

Written for the Canadian Mining Journal, by J. J. Harpell.

One of the most disastrous conditions into which a country and its government can drift is that which forces companies and other corporations to keep representatives in the government lobbies and to retain the services of legal lights in order to protect their interests from the interference of men who are actuated by the hope that these companies and corporations may find it to their advantage to quiet them by purchasing something that they have to sell or in some other way remunerate them for their silence. Legislation and investigation, and the rumours of both, that proceed from the work and talk of the mysterious men who are advertised as representing foreign governments or as speaking for large amounts of capital that are ready to be invested in Canada if such and such legislation is passed, result in more harm than good.

A short time ago considerable publicity was given to the rumour that an export duty would shortly be put on Canadian asbestos in order to compel its further manufacture within the country. The effect of this rumour has been to increase the efforts of the foreign manufacturers to look for their supplies elsewhere in order to be independent of the Canadian material.

The rumour that is now being featured on the front pages of our dailies and receiving considerable attention in their editorial columns, is that something is to be done to prevent the large and increasing exports of nickel. This rumour seems to have emanated from a man, of whom little is known, who claims that the present producers of nickel, by keeping up the price of the metal, make it difficult for other capital to be invested in the industry. One would think that this fact would encourage the investment of more capital rather than deter it. He claims that nickel can be manufactured for much less than is admitted by the present producers, yet he advocates that the Government should subsidize the industry by means of bounties. According to the Globe of Jan. 20th, he advises, "that in the interests of the Dominion and the Empire as a whole, the Canadian Government should step in and take over the ownership, or otherwise provide for Government control of these nickel deposits [the Sudbury nickel deposits] . . . as a matter of imperial urgency it was important that Great Britain should be placed in a position of advantage over all other countries by securing control of the world's nickel resources, both from the standpoint of naval supremacy and from the standpoint of industrial development. At present the trust, by keeping down production, kept the price of nickel so high that practically only governments were able to purchase it in anything like large quantities." How ridiculous and imaginary do these statements appear in the light of the following facts:

1st. At present Canada produces only about sixty per cent. of the world's consumption of nickel.

2nd. The present holdings of the so-called nickel trust in Canada comprise but a small part of the known nickel deposits of the Dominion. Thus there is ample opportunity for this expert and his cheaper process to produce nickel independent of the present producers. If the buyers of nickel are being held up, as he claims, they will be very glad to buy what he has to offer at a lower price.

3rd. British interests at present have a large share in this so-called nickel trust. In some quarters it is believed they control it. The remainder is owned by citizens of Great Britain's most trusted ally.

4th. Apart from the nickel required for coinage, governments do not purchase nickel.

5th. The British Navy Yards build war vessels for any country from which they can get a contract.

Unfortunately, the agitation which this nickel expert is creating is apt to impress the man in the street, because the manner in which the Dominion Government treats the Canadian nickel production has left him with very false notions of the profits which the producers of nickel are making. According to the report of the Bureau of Mines of Ontario, in which province all the Canadian nickel is produced, the value of the nickel production for 1908 was $1,866,059. But according to the Dominion Government reports it was $8,224,180. The difference between these two amounts is due to the fact that the Ontario valuation represents the value of the nickel as it is exported from Canada, while the Dominion valuation is arrived at by multiplying the number of pounds exported by the quoted price of refined nickel in the markets of the world. It is assumed that this price in 1908 was 43 cents. This figure is so far from being the actual price received by the producers that it would be nearer the truth if it were cut in two. Why the Dominion Government should place the nickel producers in such a false light it is difficult to understand, unless the very serious falling off in Canadian exports and production of almost all commodities has forced it to take advantage of every opportunity to inflate.

Another feature of the agitation that is bound to impress the man who has no more information than what he gathers from the daily papers, is the attempt which a Government official, in a speech before the Conservation Commission, made to discredit the excellent work that is being done by the Canadian Copper Company, the largest producer of Canadian nickel. This company, without the slightest assistance from the Canadian people in the way of either bonuses or tariffs, has built up the finest and most up-to-date nickel mining and smelting plant in the world. It is to the efforts and energy of this company more than any other that Canada owes her proud position of being the largest nickel producer in the world. This company is now supplying regular employment to some 1,500 Canadian workmen. But, notwithstanding these facts, Dr. Eugene Haanel, Director of the Mines Branch of the Department of Mines, has seen fit to say that this company employs "an inconsiderable number of men," and uses a process that is "extremely wasteful."

For the last ten years the mining men of Canada have tolerated Dr. Haanel with an indulgence that is eloquent in its prayer for a strong reforming hand or the sickle of Father Time. During this time the mining industry has suffered much from the work of his department. One example will suffice. About the year 1900 Canada was producing over ninety per cent. of the world's consumption of the superior grades of

asbestos. At present she is producing not more than sixty per cent. of these grades. The period at which the change began to set in is coincident with the date at which Dr. Haanel's department began to be interested in the industry. From that time there has been company promotion and flotation at the expense of development and production, and a wide distribution of promoters' literature of a kind that has done much to hurt the market for the Canadian material. The manner in which a subordinate, working under Dr. Haanel, has lent himself and the prestige of his office to this company promotion, and personally profited by it, is a disgrace to the civil service of Canada. Under the guise of a Government official he entered upon and examined freehold properties, manipulated until he got advantageous options on them, and then sold them to company promoters.

Asbestos and nickel are two of the very few industries of Canada that have been built up to exceptional proportions entirely on their own merits. They have had none of those artificial assistances such as bounties or tariffs, which in other industries have meant such a tax and drain on the country. On the contrary, they have both been taxed by provincial and local authorities. The success which both have attained has done much to advertise the exceptional mineral wealth of the Dominion. In both cases the markets for the products have had to be found outside of Canada. In both cases the problems of mining, manufacturing and marketing had to be solved for the first time. There was little to be gained from the experience of the past in this or other countries, because they were new industries.

On the whole these are industries of which the people of Canada should be proud, and grateful to those who have made them. Instead of allowing them to be bled, or hampered by the proposals of dreamers and company promoters, they should be protected and encouraged, and everything done to permit them full and free development under the most natural and advantageous conditions. By this is meant that everything should be done which would improve the facilities and rates of transportation, banking and the costs and conditions of living.

What is the Dominion Government doing to assist the industries of our country in this respect?

Nickel ore can be profitably mined in New Caledonia, transported some 12,000 miles, and delivered in the ports of Great Britain and other European countries for about $8.50 a long ton, or about the cost of transportation alone of ore from Sudbury to the European markets, a distance of only 3,500 miles. Proportionate to the distance, the freight rates on Canadian asbestos are equally exorbitant. It costs more to ship a ton of mica from Ottawa to Montreal than it does to bring the same quantity from India to New York. India is Canada's greatest competitor in mica. China Clay enters into competition with Canadian talc in a number of important uses, yet China Clay from France or England is carried from either St. John, New Brunswick, or Montreal, to Windsor, Ontario, for much less than talc is carried from Madoc, Ontario, to either Windsor or St. John. All other Canadian ores are equally handicapped in the matter of freight rates, notwithstanding that Canadian railways and transatlantic steamship companies have been much more heavily subsidized than those of any other country.

In passing through the port of Montreal for export, a ton of feldspar worth about three dollars, pays the same port tariff as does a ton of tobacco leaf coming into the country. The tax on a ton of nickel ore or mica is considerably higher. The whole schedule of Montreal port charges seems to have been compiled with little idea of how it might interfere with the export of low-priced products, particularly ores. In view of the importance of encouraging the development of our natural resources there is little to support a policy which imposes any port charge on exports, and less to support a charge that amounts to over five per cent. of the value of the goods, particularly when there are no facilities for transhipping, and when the goods are transhipped over side of the vessel in the harbour without being landed on the wharf. Most other countries whose products enter into competition with those from Canada in the markets of the world have free ports.

But one of the greatest injustices to exporters of Canadian products lies in a system that is maintained by the transatlantic shipping combine, by which a special tax is imposed on the purchasers of Canadian goods entering the port of London. This tax is known as the "London Clauses" charge. The conditions of this charge and the rates of tax it imposes, are to be found on all Bills of Lading issued in Canada. This tax is levied only on goods coming from Canada and the United States. Although it is generally paid by the purchaser, yet it comes out of the exporter, because he is forced to accept prices for his goods lower by the amount of these "London Clauses" charges than those received for similar goods from any other part of the world. Feldspar from Sweden, mica from India, or talc from France and Italy, comes into the port of London free, but similar material from Canada is taxed 42 cents a ton. Cheese from New Zealand or Denmark or Holland comes into the port of London free, but cheese from Canada pays 79 cents a ton, etc. In the case of some low-priced commodities this tax is sufficient to shut out the Canadian article. The port of London authorities receive no part of this charge. It is all returned to the shipping companies that carried the goods from Canada.

In the matter of banking accommodation, the Canadian producer and exporter is also handicapped. On his discounts and accommodations he pays a higher rate of interest than his competitor in any other country. During the last few years Canadian exporters have been unable to get their drafts, drawn against Bills of Lading, discounted for less than six per cent., and in many cases they paid seven. In most other countries similar commercial paper is discounted at from 2½ to 3 per cent. Loans to the producer of either mineral, agricultural, or other commodities are made at rates between seven and nine per cent. In most other countries such loans seldom exceed five, and in most cases are made at rates not exceeding four.

It is, to say the least, an insult to the intelligence of the people of the Dominion for the Canadian banks to attempt to justify their excessive foreign call loans by claiming that they have more money than they know what to do with, and at the same time charging the industry of the country the excessive rates they do.

Money and credit is the life-blood of industry, and the banking systems the veins through which it flows. If the money is drawn off from any country or community the industries in that country or community become sluggish or dry up. The more successful and active industry becomes, the more does it require money. The agricultural communities of France are among the most successful and wealthiest of any in the world. Yet the laws of France are framed so that the French farmer can borrow money at low rates of interest. By its charter the Bank of France is required to lend

40,000,000 francs to the co-operative agricultural banks, free of interest. These in turn lend it to the farmers at rates not exceeding three per cent. The agricultural and other producers of Germany and Denmark get their loans at 3 and 3½ per cent. Those of New Zealand and Australia never pay more than 5, and the greater part is borrowed at 4¼ per cent. The Canadian banking system, on the contrary, is built, and proceeds upon the principle that the success of any community is measured by the amount of bank deposits which that community contributes to the money centres of the world. According to the May bank statement, the foreign call loans of the Bank of Montreal were $90,440,910, or $3,747,317 more than all the savings deposits which the Canadian people had in that bank at that time. Now there are communities which are entirely dependent upon this bank for their accommodation. How can any bank in such a condition be expected to give it?

Of course, they do not give it, and they avoid direct refusal by exacting an exorbitant rate of interest and by questioning the security offered. There are two reasons why the Canadian banks prefer to loan in the stock markets on call. 1st. In time of dear money they get a higher rate of interest, and, 2nd, in times of cheap money they profit by the increase in the value of stocks, in which the Canadian banks are always large speculators. The people of Canada and its Parliament will make a great mistake if they permit a revision of the Bank Act without first appointing a Royal Commission to thoroughly investigate the workings of the Canadian banks and to carefully study the banking systems of other countries. The present Canadian Bank Act and its administration are sapping the life of the industries of Canada, while of our bankers it is making multimillionaires and penitentiary convicts, according as they succeed or fail in their stock speculations with the people's savings.

Another condition that is attaining alarming proportions and making the position of the producer almost unbearable is the increased cost of living. Owing to this the employer is being pressed by his workmen for higher wages, which, if granted, will increase the cost of his production and make it more difficult for him to sell his products in the markets of the world in competition with those from other countries that have been produced under conditions of lower costs of living. On the other hand, the employer recognizes how difficult it is becoming for his workmen to live on their present rate of wages. Those who have given this question only a superficial consideration are apt to charge the increasing cost of living to the avariciousness of the Canadian farmer. But a careful study of the question reveals nothing to support this contention. On the contrary, the Canadian farmer is suffering from the increase in the cost of living as much, if not more, than any other class in the country. Salaried officials have had their salaries increased. Labourers have had their wages raised. But the farmer, whose profits, even under the most favourable conditions, were never large, is compelled to work along as best he can without any such assistance, while he sees the costs of his living and production increasing much more rapidly than the price of his products and thus wiping out what little profit he used to make. The first to feel the pinch of such a condition is the poor and unscientific farmer, who, in order to make ends meet, begins to grasp at every opportunity to earn an extra dollar, and a diffusion of effort sets in that further aggravates the situation, and brings about a decrease in production. That the present high cost of living is due to a rapid decrease in the production of agricultural commodities may be gathered from the pages of almost every agricultural report issued. The effect of the increased cost of production on the Canadian farmer is much more fully dealt with in an article entitled "Canada and Tariff Reform," which the writer has contributed to the January number of the Contemporary Review.

Thus, from almost every point of view, conditions in Canada are becoming more and more difficult for industry to thrive, the products of which have to find a market outside of this country. To permit such industries to be harassed by political interference or to hamper them by unreasonable restrictive legislation, is to drive them out of the country just as soon as they can get their supplies elsewhere.

Moreover, it incites these industries to make special efforts to exploit foreign fields and discourages the exploitation of our own unprospected and undeveloped areas.

SOUTH LORRAIN.

Notes by Frank C. Loring.

Two problems in South Lorrain are; proper roads and cheap power.

The power problem will be solved by the advent of the "Mines Power, Limited," bringing electrical energy from Matibitchouan Falls. No expense has been spared in this enterprise. At present the sparse growth of wood, or coal brought from Haileybury at great expense, is utilized.

There is no summer road from South Lorrain to Cobalt, Haileybury, or elsewhere. Steamers supply transportation from Haileybury to Silver Centre, and from there to the mines, there is no means of transportation excepting roads which are a disgrace.

The Government has overlooked the enormous expenditures being made by various companies, and has not considered that district in its appropriation for road construction. It would seem that an enlightened policy would dictate the co-operation of the Government in solving the transportation problem.

The Keeley Mine, after having experienced considerable trouble because of insufficient gas producing facilities, has now overcome all difficulties and is operating with full force.

The Wettlaufer Mine, has completed constructions of station, at 140-foot level, and shaft has been sunk to 160 feet and is being timbered. Upon completion of the timbering, sinking will be continued, electrical power plant is to be installed.

On the Newman Mine a shaft is being sunk. Present depth is 45 feet. This is upon the vein, upon which the rich surface showings occur.

The Maiden Mining Co. is sinking a shaft on a large fissure in Keewatin and some very rich ore is being uncovered.

The South Lorrain Development Co., is about to start to tunnel some fourteen veins, which have been uncovered. These veins will be cut at between 200 and 300 feet, in depth.

On the Adair Mine a shaft is being sunk and from the hundred foot level a cross-cut will be made to intercept several veins known to exist on the surface.

On the Williams a boarding-an-bunk-house has been erected and a shaft is being sunk, present depth 30 feet.

On a number of other claims development work is being done, there is greater activity and far more genuine development work, than at any time in the previous history of the camp.

CONDITION AND NEEDS OF MINING IN THE YUKON.

Extracts from Speech of F. T. Congdon, M.P.

The resident of eastern Canada, and also of western Canada, for that matter, is so deeply engaged in the development of his own section of the country that he takes very little interest in anything beyond it. The common notion with regard to the Yukon territory, or of any other part of our northern territory, is that it is a great barren wilderness filled with icebergs, behind which the inhabitants are dodging and trying to keep themselves from freezing to death. A greater misconception never existed. The hon. member for North Toronto has never been able, in any speech made in this House, to mention the Yukon territory, or the officials of the Yukon, without saying something derogatory of them. He knows no more about the Yukon territory, about the conditions there, than Balaam's ass knows about the Hebrew grammar. Now, the hon. gentleman tries to belittle the Yukon territory by saying that it has a population of less than 8,000, probably 5,000. If it has only 5,000, I say they are one of the most remarkable 5,000 that has ever been collected together in any part of this mundane sphere. Imagine what would happen in the rest of Canada if every unit of 5,000 people added so greatly to the wealth of the country as the 5,000 people in the Yukon territory. Last year, and for several years before that, the gold production of the Yukon territory fell off. It was absolutely inevitable that it should fall off. In the earlier days there happened in the Yukon territory what happened in every other mining camp. Men flocked into the richest spots and these were capable of being worked. Men who knew nothing of mining, only enough to dig a hole in the ground, found a gold yield sufficient to make their fortune. But that ground naturally gets worked out in time, and if you could live in the Yukon territory and visit that ground which yielded these immense fortunes, you would see a gold-bearing ground which I believe is richer than in any other part of the civilized world. The area which can be worked to-day is ten times as large as the area which could be worked nine or ten years ago. The area is increasing in extent and, is so enormous that its output only depends upon the cheapness with which it can be worked. Now the hon. gentleman should remember this fact. He blames this government for the falling off of the gold yield in the Yukon. I do not think the hon. gentleman seriously meant to say that, but perhaps he did. But I say that the falling off of the gold production was exactly what has happened in every other country between the first wild rush when riches are dug out easily, and the second stage when scientific methods are necessary to get the gold out of the ground. Last year our production in the Yukon was a little over two millions, this year it has jumped up to $3,662,000. I venture to say that for the next ten years you will see an annual increase in the production of gold from placer ground alone with a continued improvement in the scientific mode of mining.

Now with regard to the government of the Yukon, and the reflections made by the hon. member on the government of that territory:—It must be remembered that in the beginning of the Yukon territory there occurred one of the most remarkable movements of men that has occurred since the Children of Israel started out from Egypt on their famous wanderings in search of easier work and better pay. That movement differed from all other movements that I know of. We had a large body of men moving together. Other movements of men were homogeneous; they were composed of men of the same language and the same ideas, and because of that fact it was easier to control and manage them than a movement such as this in which were represented every nation in the world, every trade, every profession, every occupation and every degree of morality. We had the pious deacon and the pick-pocket, and we had the preacher deserting for a time his sacred calling in the hope of being able to add to his poor stipend by striking a good claim. The worst feature of this crowd, numbering about one hundred thousand, was that while there were splendid men amongst it—no better could be found in the world—and while the large majority was eminently fit, capable, respectable and good, there was a lack of confidence in one section of the crowd with respect to the others. It might be that a man in a little group knew nothing whatever about other groups, and the consequence was that the crowd that rushed in there was filled with distrust of itself and of its different constituents. This naturally created in the government of this country, being guided, I suppose, by the reports of the authorities who had the management of this country, a distrust which was likely to grow. I do not think that any government will be greatly blamed if it takes pains to maintain the integrity of its territory. That is one thing that every government, whether British or Canadian, will protect. No government will take any chance in regard to the integrity of its territory. This government took no chance with regard to maintaining the Yukon territory as a territory of the Dominion of Canada. It sent into that country a force which I think was needless. But, it is easy to be wise after the event. Those 155 battleships that the British government "scrapped" a few years ago were unnecessary, but at the time they were constructed they were not unnecessary. They served a purpose and the fact that they were ultimately "scrapped" is no condemnation of the action of the government in constructing them at a time when they were believed to be necessary. This government sent into the territory a large force of the Northwest Mounted Police. No better force could have been sent, although I am not given to overpraise of the Royal Northwest Mounted Police or any other body of men. I realize that they have their faults and failings. In addition they sent in a large field force. That field force cost Canada $721,737. That was merely the result of the foresight of the Dominion government in taking such measures as would ensure the retention of the Yukon territory to the Dominion of Canada. In the public accounts the cost is included as a charge against the Yukon territory.

When one comes to ask for some vote for the Yukon, member after member will get up and say that the Yukon has been a loss to Canada instead of a profit, illustrating the unfairness of charging these extraordinary expenditures to that territory. In addition to that we are charged, not only with the original capital cost of the telegraph, but with the whole annual cost. I find that $600,000 of the cost was for the portion of the

line in the province of British Columbia. Last year the expenses of operating that line were, in the Yukon territory, $62,000, and the total cost of operating it in British Columbia was $158,000. Although our cost was only $62,000 we are charged with $227,000. The total cost of constructing the telegraph line was something over $700,000; the cost of the portion in British Columbia was $600,000. That should be deducted. The cost of operating that line since its initiation in 1901 up to the present time has been $1,070,000, of which $500,000 has been expended in the Yukon, and has been charged against the Yukon. The way this occurs in regard to the telegraph is that originally it was treated as the Yukon system, and ever since all the expense incurred in British Columbia or anywhere else in connection with the Yukon telegraph system has been charged to the Yukon territory. I think the account should undergo revision in order to bring into it only those items which are legitimately and properly chargeable against the Yukon. I find in addition that $283,000 of the amount paid as damages to Mackenzie and Mann is charged to the Yukon territory. I do not think it is fair to take that amount into consideration in estimating whether the Yukon has been a source of loss or profit to the Dominion of Canada. By including these various amounts the hon. member for North Toronto showed that the deficit of the Yukon amounted to $2,300,000. I think if that account were corrected in the way I have indicated and in the way that, I submit to the Finance Minister and this House, is the proper and legitimate way to correct it, it will be found that the Yukon has a surplus of over $3,500,000. In addition to that I wish to point out that it is utterly impossible to take the Yukon territory, or any other section of Canada, and make out from the public accounts the cost or benefit to the country of that particular section accurately and properly. The hon. member for North Toronto was surprised that while in 1900 and 1901 we had a surplus we had later used that up.

The government of this country adopted with the concurrence, with the express approval of the members of this House, a mistaken policy in the first place in respect to the Yukon territory which was only corrected about 1901. It is the same policy as is being adopted to-day in the province of Ontario and, without any reflection on the motives for the enforcement of that policy, I repeat that it is a mistaken one. It is based on the idea that the rest of the country can take a large mining district and make money out of it for the other public services of the country. That is not right, it is not the right policy with regard to any large mining territory to impose any taxes in addition to those which are imposed on the whole country and to expect that the rest of the country and not that particular territory will get the benefit of the special taxes so imposed. I think that a very few years will demonstrate the lack of wisdom, for instance, of the province of Ontario, in thinking they can take such a large royalty from the mining production of Cobalt and these other regions, and that the rest of Ontario outside those regions can derive any advantage from that royalty. *Ontario will find a little later, when she has had more experience, that while it may be wise and proper to impose some measure of royalty upon the minerals produced in that district, it is absolutely essential that the income thus derived should be expended exclusively for the benefit of the district from which it came.* Down to 1901, the idea of this Parliament and the idea generally prevailing was that these enormous sums of money that were coming out of the Yukon territory should, some of them, find their way into the exchequer of Canada for the benefit of the rest of Canada, and as I say it was not until 1901 that this government realized, and adopted a policy founded on that realization, that the only sane and proper use to make of the royalty got from the Yukon territory was to devote it to local uses in the Yukon. Previous to that time we had no public building, the telegraph line was not constructed, we had no roads which are the absolutely essential needs of that country, and whatever large expenditure there was after 1900 was due to the fact that the government, as I think, realized that the royalty which they had received from that territory ought to be devoted to the development of that country. They adopted that policy and expended for these objects the surpluses which they had previously piled up and the surplus of that year.

There are several causes which account for the reduction in the revenue from the Yukon since that time. In the first place, the royalty in the Yukon territory was ten per cent., which was subsequently reduced to five per cent. and later to two and a half. Necessarily the year in which the royalty was reduced from ten per cent. to five per cent. showed a decrease in the revenue, and this decrease was still greater when the royalty was reduced to two and a half per cent. Then, in the beginning of the Yukon, the people of Canada made a greater mistake than any mistake which the government made. They were not very familiar with mining localities and made the great mistake of imagining that anything was good enough for a mining camp, whereas any one who knows anything about mining camps knows that nothing is too good for them. The miners have the money and will pay for good articles, especially if they are far away from commercial centres, because the cost of transportation is so great that they have adopted the wise policy of buying the very best. For instance, some Canadian manufacturers or merchants sent into the Yukon butter not fit for axle grease, and it took four or five years to get over the bad impression created in the Yukon by that horrible butter; only in recent years would people in that country eat Canadian butter, which they now find as good as any produced in the world. That is one matter in which the farmers, or whoever were responsible for the export of butter, made a mistake. Another matter in which the Canadian manufacturers erred was in respect to boilers. I have seen the streets of Dawson for half a mile piled up with small boilers and hoisting machinery. I came to manufacturers in the east, and I know others who came, and asked them to meet that requirement of the Yukon and manufacture suitable boilers. Their answer was that their business was booming so rapidly that they could not undertake that business. One said that his business in the previous year had been so increased that he was obliged to double his capacity, and if he attempted to fill the demand of the Yukon he would be obliged to still further increase his power of production, and as a consequence he did not attempt to supply that market, and I venture to say that not one-half of one-quarter per cent. of the hoisting machinery that went into that country came from Canada; it all came from the United States. The people of the Yukon are quite willing to buy in this country and made endeavours to buy here, but when Canada would not furnish the articles demanded, they were obliged to turn elsewhere.

Another cause of reduction in the revenue from the Yukon is the change of the customs, and if I may express my opinion on the subject I hope that the Ministers of Finance and Customs will recommend a further change, because I think there is no policy which can be wiser for Canada to pursue than the policy of making absolutely free those articles of machinery, those articles of necessity which go into a new country and are absolutely essential to build up its industries. Take the conditions in the Yukon. A mining proposition is of necessity always hazardous, and I maintain that as little taxation as possible should be imposed until the venture has been absolutely set afoot and has been proved to be a profitable one. By imposing large taxation at the beginning, you are crippling and perhaps rendering impossible an industry. Take for instance an industry that proposes to install a large power plant to work mining machinery. It requires, in the first place, a large sum of money for installation. It is told that there is a heavy tariff on all machinery which it is required to import. That, of course, gives a little black eye to the scheme of promotion and then the promoters are obliged to pay a duty on that machinery at a time when their industry has not produced anything and is not in a position to produce anything, and when the promoters are not absolutely certain it will not be a failure. In one respect a royalty is the best of all taxes on a mining territory, because a man is only asked to pay when he has the money in his pocket to pay. *A tariff on mining machinery is the worst form of taxation, because it is a tax at the very initiation of an industry, which may and does stop thousands of developments that otherwise would take place.*

Another cause of reduction in revenue in the Yukon is due to the increased proportion of Canadian manufactured products used in that country. In the earlier days the major part of the importations into the Yukon was of American origin. I shall not weary the House with figures, but, for instance, in 1899 the domestic importations into the Yukon amounted to only 9,800 odd tons. By St. Michael's there were imported 3,334 tons and via Whitehorse, 6,510 tons—a total of 9,844. Of foreign importations via St. Michael's there were 12,000 tons, and via Whitehorse, 2,700 tons, making a total of foreign importations of 15,000 tons against 9,800 tons of domestic importations, the total importations at that time being 24,856. Every effort was made by the Department of Customs and by every one in that country who had any authority to direct the trade of the Yukon territory into Canadian channels, and this effort was successful to the extent that in 1906 the domestic importations into the Yukon were 14,309, and the foreign 10,698, so that you have about the same gross importations, but the proportions of Canadian and foreign goods are reversed between 1899 and 1906. The change in the source of the goods imported into the Yukon necessarily caused a falling off in the customs revenue from that territory, even although some of those goods that appear as domestic may be foreign. Of course that accounts for the falling off in the revenue of the Yukon territory even though some of those that appear as domestic may be foreign. But let me give one instance to show how difficult it is to get at the exact revenue which the national treasury receives from any particular portion of Canadian territory. There is being installed about 40 or 50 miles below Dawson a large power plant which will distribute that power to Dawson and its vicinity, which is absolutely essential for mining purposes. The company promoting that power plant was unable to make arrangements for the transportation of its machinery with the railway company that runs into the Yukon territory, and which I may say is the most horrible incubus that any country has ever laboured under. The power company was compelled to land its machinery at Vancouver, so that the province of British Columbia gets the credit for the revenue of $58,000 from the duty on that machinery, which will eventually go to the Yukon. Of course it makes no difference so far as the revenue of the country as a whole is concerned, but if the Minister of Customs can find any way to credit that amount to the Yukon territory rather than to the province of British Columbia, I suggest that he should adopt it. That, however, is only one instance, and there are very many others of a similar kind which go to prove the suggestion with which I began, that it is impossible to show the revenue derived from any one section of the Dominion. For example, I am informed that the customs revenue paid in the city of Montreal is one-third of the whole customs revenue of the Dominion of Canada, and while Montreal is a great city in a great province, yet there is no doubt that a very large part of the revenue paid there should be credited to other provinces in which the consumers who use the goods are located. In the same way, British Columbia gets credit for some of the revenue which should rightly be credited to the Yukon territory.

Now, there is one other thing which I wish to say with regard to the Yukon territory before concluding my remarks, and that is I think the government has adopted a correct policy in reducing to the very lowest possible amount the expenditure on the official administration of that territory. At one time undoubtedly the whole official staff employed in the Yukon was needed, and it is not an easy thing to determine the exact moment when a change in conditions renders it no longer necessary to retain the whole staff previously existing. However, I think that now the time has arrived when the official staff in the Yukon territory should be reduced, and I say that out of no spite or malice against any of the officials. I believe it has been intimated that I secured the dismissal of some of them for political reasons. Indeed, it has been stated in a despatch to the public press that they had incurred my displeasure because they refused to give $50 each as a contribution to a political campaign fund. Although some newspapers have published that despatch I notice that when these gentlemen were interviewed in Vancouver they made no such statement as that credited to them. At all events, I invite any hon. member of this House who wishes to investigate the charge, or, better still, he can go to any one of these officials and I think he will find they will deny that they ever made such a statement. I might add that I never made a request from them or from any man in my life for a contribution to my own or to any other campaign fund, and any one who knows me knows that I am one of the worst collectors that ever appeared in any country; I cannot collect even my own debts, not to speak of collecting campaign funds. I may point out also that not one of the gentlemen who have been dismissed in the Yukon territory has had his place supplied by another official. He was dismissed simply for the purpose of economizing, and so far as my having any malice against them I have been eager to induce the government to adopt a system by which when it becomes necessary to get rid of an official in the Yukon he shall not be set adrift like an old horse but that he shall

be transferred to some other branch of the service of the government, corresponding perhaps to the service he was in in the Yukon territory. I hope the members of the government will endeavour to carry out that idea, so that these officials may be transferred from places where they are not needed to offices where their services will be of benefit to the country. I am particularly desirous of reducing the expenses of administration in the Yukon in order that there may be a larger amount available for developing the resources of that rich country. I could spend hours, Mr. Speaker, dilating on the possibilities of the Canadian Yukon. There are, I know, some who imagine that its days of prosperity have passed, but I can assure them that the beginning of the development of the Yukon has not yet come. I am supported in this belief by those who know the territory best and who declare that the output from placer gold mining will increase year by year for many years to come. Apart from the placer yield of the country there are the most wonderful deposits of quartz that the world ever saw. You cannot turn in any direction without finding quartz leads, quartz ledges, and stringers, which were it not for the excessive cost of transportation would be developed at once. We have scores and scores of mines which were they situated at an accessible place would to-day be developed and yielding fortunes. There are, however, mines at the threshold of the territory at St. Michaels which are being developed. No enormous amount has been expended upon them because in the development of a large mine half a million dollars is inconsiderable, but they will no doubt greatly add to the mineral wealth of that territory. Then you pass to Whitehorse and you have a crescent twenty-five miles in extent on which you can scarcely go 100 yards without finding an outcrop of copper of the highest grade. Recently on the dome they have struck at one place on the 50-foot level, and at another place at the 100-foot level, indications of the best paying quartz. Last summer on the Mackenzie River side, the prospectors returned with specimens of some of the richest quartz ever known. Of course I do not know whether it will turn out as anticipated, but at all events the existence of these minerals in every quarter shows that the mining industry in the Yukon territory is practically only in the same initial stage that it is in British Columbia and in Ontario. I do not think it would be rash to say that within twenty-five years Canada will exceed any country in the world in its mineral production. Then experience has taught us, as in the case of the northern regions, and Cobalt, and Gowganda, that the best thing to promote settlement in a territory is mineral discovery, because the minerals will not only yield wealth themselves but they will bring in population which will remain there to develop agriculture and other natural resources. The subject is perhaps more entertaining to me than it is to the members of the House, and I must apologize for detaining hon. gentlemen at such length, but at all events I feel confident that the Yukon territory deserves the encouragement of the government and of the country in the development of its extraordinarily rich resources.

NOVA SCOTIA'S MINERAL OUTPUT IN 1908.

By Arthur S. Barnstead.

The total value of the products of Nova Scotia in manufactured goods, agriculture and horticulture, mining, fishing and lumbering, has been estimated for 1909 to be $114,400,000. Of this total the mining industry contributes a value of about $15,550,000, approximately about 12½ per cent. of the total. The development of the mines forms the basis of many of the manufacturing industries of the province so that Nova Scotia mineral wealth may be placed at a very much higher value than the figures given above. The contiguity of coal mines to such centres as Amherst, New Glasgow and Sydney has had very much to do with the development of these towns as industrial centres. It is difficult, however, to estimate the actual value that the mineral wealth means to Nova Scotian communities.

Another very important factor in connection with our mineral wealth is that it affords, by way of royalty, about 50% of the total revenues of the province. Depression in trade or any disturbance that affects the coal industry has a very serious result in diminishing the revenues at the disposal of the provincial government. This in turn prevents the necessary expansion that other industries of the province require.

During the past year a very unfortunate strike among the employees of certain of the coal mines of the province has interfered very seriously with coal mining. It will be seen, however, that the employee who has been striking and the employer are not the only parties in this test for supremacy. There is a third party in the manufacturing interests of the province and consumers in general; there is a fourth party, the State, all of whom suffer alike as a result of a diminished output.

At the beginning of 1909 the clouds of controversy hung heavy over our mining industry, the legal battle between the conflicting interests of the Dominion Iron and Steel Co., and the Dominion Coal Co., had not been decided. There was an incursion by the American coal operators into the St. Lawrence markets, which had been heretofore controlled by the Nova Scotia mine operators. A third serious difficulty arose out of a possible conflict between clashing interests in view of the determination of the United Mine Workers of America to gain a foothold among the workmen of the province. The two latter difficulties have been grouped together to a very large extent, invasion it is claimed being connected with and succeeding because of the partial tying up of our collieries.

The first cloud of controversy between the Dominion Iron and Steel Co., and the Dominion Coal Co., has happily cleared. The decision of the Privy Council was given early in the year, and in the spring the shareholders and directors of the warring companies agreed to sink their differences and link their interests. This propitious ending has been only recently brought about and both the Dominion Iron and Steel Co., and the Dominion Coal Co., are now practically one and

the same company. The amalgamation will mean much for the steady development of the steel industry because the company will be assured of a continuous supply of coal. On the other hand the coal company will have an assured market for certain grades of coal and there will be no disturbance about prices.

The second and third of the difficulties grew greater and more ominous as the months succeeded one another. The coal operators have had their St. Lawrence market very seriously interfered with by the United States operators who have dumped their coal into Canada because of the depression in the United States and because they are able to mine their product at a much cheaper rate. The strike operations have been for the most part directed against three companies in the province: the Dominion Coal Company, Cape Breton; the Cumberland Railway and Coal Co., at Springhill, and the Inverness Railway and Coal Co. at Inverness. So strongly organized were the United Mine Workers of America at Springhill that as soon as the strike was declared the management felt themselves under the necessity of closing down the mine and doing only such work as was necessary to comply with the law for keeping the mine in a good and safe condition. Since the first of August no coal has been mined at Springhill.

At Inverness the strikers were not so successful. After a short struggle the company was able to do without the services of the strikers and has mined nearly as much coal as in the previous year.

The main strength of the United Mine Workers was directed against the Dominion Coal Co. at its several collieries in Cape Breton. There the battle has been tense and long drawn out. The loyalty of the Provincial Workmen's Association has enabled the management to utilize these men in mining, to import others to take the place of the strikers and so to maintain a working output at most of the collieries. At the moment of writing the strike is still in active force at these centres though rumours are current that it has spent its strength.

Comparing the output for the province with that for 1908 there is a decrease of about 830,000 tons. This has been a serious loss to the miners as well as to the companies and the province. The Dominion Coal Company's output has been diminished by 1,031,640 tons. A few of the other companies who were not affected by the strike operations have as a result increased their output, so that the total provincial loss is not the combined loss of the three companies against which the strikers have contended for recognition.

The Dominion Coal Co. raised 2,785,318 tons of coal during the year, selling of this 2,576,004 tons. Though hampered by the continuance of the strike this company has carried forward its plans for the opening up of collieries on the Lingan and Victoria seams. As a result the new town of Waterford has emerged from the Cape Breton forests in the Lingan district. Its site has been laid out, streets plotted out, sewerage and water supply provided and everything arranged before dwellings are erected to accommodate the expected influx of population. Altogether two million five hundred thousand dollars will be expended in making this an up-to-date colliery town before operations are begun. Waterford is now a village of 300 or 400 inhabitants, but in a short time its population will be up in the thousands.

The Nova Scotia Steel and Coal Company, operating at Sydney Mines, has increased its output by 67,500 tons in excess of the production for the previous financial year ended September 30th, 1908. This company presents the best record that any coal company in the province can show for the past year. It has also continued to make satisfactory progress in plans for further expansion. The Nova Scotia Steel and Coal Company has had no labour difficulties in the past forty years, a record that few companies can present, but that many would welcome most heartily. A mine, abandoned by the General Mining Association a long time ago, was put into active operation during 1909, and is now sending up 500 tons of coal per day, with a prospect of continuous increase.

The North Atlantic Collieries Company at Port Morien has increased its output to 73,582 tons. During the past two years this company has continued its extensive submarine development and has come into prominence as a producer.

The MacKay Mining Company opened a new mine, from which it raised 13,587 tons. This company and that of the Sydney Coal Company operate their collieries at North Sydney. The latter company mined 4,733 tons. The Colonial Mining Co. entered the field the last month of the year, mining 633 tons.

About 40,000 tons less coal was mined in Inverness County than in the previous year; this is divided among the different coal companies as follows:—

Inverness Railway and Coal	19,000
Port Hood Coal Company	3,500
Mabou Coal Company	17,500

Though the strike did not affect the mining operations in Pictou County, yet there has been a decrease in the coal mined by approximately 100,000 tons. In Cumberland County there have been 17,000 tons less mined than in the previous year. The decrease in the output of the Cumberland Railway and Coal Company's mines amounts to 40,000 tons. On the other hand, the Maritime Railway, Power and Coal Company has increased its output by 33,000 tons, and the Eastern Coal Company at Maccan has produced 4,411 tons. The last-mentioned is a new producer. The other companies maintained their previous outputs, excepting the Strathcona Coal Co., which shows an output of 17,000 tons less than the previous year. The effect of the strike will be more apparent in the current year than in the year ended September 30th last, as the strike had been in force in the Springhill mines for only two months. As will be noticed, marked development has taken place both in Chignecto and the Joggins, and also at the collieries of the Maritime Railway, Power and Coal Company.

The following table giving the amount of coal raised during the twelve months ended September 30th, 1908, and September 30th, 1909, will show the different productions for the two years and the general effect of the strike and conditions of trade:—

Cape Breton—	1908.	1909.
Dominion Coal	3,816,958	2,785,318
Nova Scotia Steel and Coal	662,350	757,539
North Atlantic Collieries	58,777	72,582
McKay Mining	13,560	13,587
Sydney Coal	4,801	4,733
Colonial Mining	.....	633
	4,556,446	3,634,392
Inverness—		
Inverness Railway and Coal	283,705	264,773
Port Hood Railway and Coal	99,700	96,133
Mabou Coal	19,250	1,610
	402,635	362,516

Pictou—		
Acadia Coal	413,782	364,993
Intercolonial Coal	315,590	292,479
N. S. Steel and Coal	47,845	20,165
	777,217	677,637
Cumberland—		
Cumberland Railway and Coal.	416,132	376,283
Maritime Ry., Power and Coal.	66,963	100,011
Minudie Coal	48,397	49,791
Stratheona Coal	23,928	7,086
Great Northern	2,726	3,814
Atlantic Grindstone	861	644
Eastern Coal Company	.....	4,411
	559,013	542,040
Colchester—		
Debert Coal Company	3,951	1,330
	6,299,282	5,217,915

Gold.

About 25 gold mines were in operation during the year, employing 550 men. The total yield has been 12,600 oz., which is an increase of 600 oz. over the previous year. While comparatively little gold was mined during 1909, yet, facing the new year, it may fairly be stated that the work of installation and development carried on during the past year on gold mining properties will ensure a very much larger output during 1910.

The New England Mining Company crushed 44,375 tons of quartz at Goldboro, producing a yield of 5,027 oz. of gold. This is the one-time Boston-Richardson Company. The Oldham Sterling Gold Mining Co. at Oldham produced 2,710 oz. from 942 tons of quartz, showing a yield of 2.88 oz. per ton crushed. The Great Bras d'Or Company at Middle River recovered 708 oz. out of 783 tons crushed. The Sydney Gold Mining Company, at Country Harbour, Guysboro County, obtained 450 oz. out of a crushing of 510 tons. From these four companies about three-quarters of the yield has been received, the remaining 3,600 oz. have been obtained from the Ponhook Gold Mining Company at Malaga Barrens, the Eagle Mining Company at Renfrew, the Caribou Gold Company at Oldham, the Moose River Mining Company, the Consolidated Mines of Canada, Ltd., the Chester Basin Gold Syndicate, the Eagle Mining Syndicate at Salmon River, the Ophir at Brookfield and the Petpeswick at Lake Catcha. Other companies have either not secured any production or have worked on a very small scale. The Dominion Mining Company at Tangier has installed a hydro-electric plant generating 4 to 800 h.p., securing its power from Tangier River. It would seem that in gold mining the water powers of the province could be used to much greater advantage than they have been in the past.

Iron and Steel.

The total production of iron ore in the province during 1909 was 12,000 tons. The Dominion Iron and Steel and the Nova Scotia Steel Company, the two largest workers of iron ore, imported together about 656,000 tons from their mines at Wabana, Newfoundland. This accounts for the lack of development in Nova Scotia's rich iron ore beds.

The total production of the Dominion Iron and Steel Company in pig iron has been 255,912 gross tons (2,240 lbs. each) and 409,469 tons (2,000 lbs. each) of coke. This company has also produced 297,330 gross tons of steel ingots, from which were manufactured 140,091 tons of rails, 73,047 tons of wire rods, and 25,470 tons of merchant blooms. They have recovered in by-products 3,031 gross tons of sulphate of ammonia and 4,020,000 gallons of tar.

The Nova Scotia Steel and Coal Company has manufactured 51,408 tons (2,240 lbs. each) of pig iron, and has produced 88,237 net tons (2,000 lbs. each) of coke. It has also made over 63,000 tons of steel ingots, 54,000 tons of blooms and billets cogged, while it has shipped 53,000 tons of finished material, bars; plates and forgings from the New Glasgow plant. 70,000 tons of limestone and dolemite have been quarried for its operations.

Other Minerals.

The export of gypsum has increased by 50,000 tons, the total this past year amounting to 280,000 tons. Together with the amount that must be mined and used by farmers throughout the province, there must have been fully 325,000 tons of gypsum produced during 1909. 23,000,000 bricks have been manufactured from the clay, and a large number of men find employment in an establishment in New Glasgow, where the clay is manufactured into pipe for tile draining.

Owing to the increased use of cement, of which 50,000 barrels of slag cement were manufactured in Sydney, less building stones were quarried than in the previous years. 25,000 tons less of Wallace stone were taken from the quarries than in the previous year. Limestone is used in great abundance by the iron and steel industries; about 240,000 tons were quarried at Marble Mountain, Cape Breton, for the Dominion Iron and Steel Company. Further prospecting has taken place in connection with the important discovery of tungsten at Moose River, Halifax County. About 4,000 tons have been uncovered. This is about equal to the present production of the world for a year. The tungsten is found in the form of scheelite, which assays about 60 per cent., and is consequently a valuable discovery.

REPORT OF THE COUNCIL OF THE CANADIAN MINING INSTITUTE FOR THE YEAR 1909.

The Council, in presenting a report of the work of the Institute for the past year, is gratified to be able to state that the affairs of the society are now in a more flourishing condition than at any previous time in its history. Not only has there been a steady increase in membership, but greater interest is being evinced by members in the work of the Institute than ever before. The financial position of the Institute is also a sound one, and this is the more satisfactory since the expenses of publication, by reason of the considerable increase of volume of printed matter distributed to members have now become a very heavy annual charge. In this connection attention may, perhaps, be called to the fact that Volume VII. of the Transactions, for the year 1909, comprises rather over seven hundred pages; or, in other words, the Institute is at present publishing a volume of twice the size of that of four years ago, and it should be a matter of some pride to members that, in point of value and interest, the Institute's Transactions to-day compare most favourably with those of any mining society in the world. In remarking on this point, thanks and acknowledgments are specially due to those eminent gentlemen (many of whom are members of the United States Geological Survey), who in recent years

have attended the Institute's Annual Meeting, and have so generously contributed material of exceptional merit and value to the proceedings.

Referring to other activities of the year, the Institute has reason to congratulate itself on the repeal of the Quebec Mining Law of 1892 and of the substitution therefor of regulations decidedly more conducive to the encouragement of legitimate prospecting and mining in this province. This very welcome change is largely traceable to the Institute's influence and representations.

At the annual meeting in March, 1909 a resolution was adopted in which the attention of the Dominion authorities was directed to the urgent present necessity of introducing and placing on the statutes a Mining Act wherein proper regulations would be provided governing the acquisition, development and operation of mining lands under Federal control. That such a mining law might be of a nature to encourage rather than retard industry, it was further suggested that before framing such an act, the views of the mining community be ascertained thereon by the appointment of a Royal Commission to secure evidence. No action was taken by the Government in respect of this latter suggestion for the reason that Parliament had just previously appointed a Standing Committee on Mines and Mining, whose duties partook largely of those of a commission; but this committee immediately entered into communication with the Institute, inviting its cooperation and assistance. In consequence, four gentlemen, namely, Dr. A. E. Barlow, Mr. J. M. Clark, K.C., Mr. B. A C. Craig and Mr. J. B. Tyrrell, having special knowledge of the abuses incidental to the present Dominion system of regulating the granting of titles to mineral land, were requested by the Council to act as the Institute's representatives, and appear before the Parliamentary Committee as witnesses. They did so, representing to the committee that since all matters relating to mining on Dominion lands had been heretofore regulated by Orders in Council, stability of conditions was not ensured, and instances were quoted in proof of the contention. The witnesses also advocated the principle of discriminating between surface and mining rights in the granting of titles to public lands, and urged that all business relating to mines and mining be transferred, and be in future conducted by the Department of Mines, pointing out in this connection that although the Department of Mines had now been established for over two years, it was still requisite that applications for mining areas should be made to the Department of the Interior, which Department also was entrusted with the issuing of grants and patents.

The Parliamentary Committee, since this evidence was given, has issued a report recommending (1) that there be assigned to the Mines Department the administration of mines, including the issue of title thereto, and of all mining laws: (2) that an act be passed consolidating all the laws relating to mines under Federal control; and (3) that consideration be given to a policy which will have for its object the re-acquisition by the Crown of mining rights heretofore granted in patents of land.

In view of report, the Council hopes that the recommendations of the Institute, in respect of the introduction of favourable Dominion Mining Legislation, will, in the near future, be carried into effect, and advantage is taken of the present opportunity to congratulate the Parliamentary Committee on its useful labours in the interest of the mining industry.

Meetings.

The eleventh annual meeting of the Institute was held at the Windsor Hotel in the city of Montreal, on March 3rd, 4th and 5th, 1909. The attendance was exceptionally large, there being over two hundred members and others present. The occasion was also notable in that the Institute was honoured by the presence of several eminent gentlemen from the United States, including Mr. S. F. Emmons and Mr. Waldemar Lindegin, of the U. S. Geological Survey; Dr. A. C. Lane, State Geologist of Michigan; Dr. J. F. Kemp, of Columbia University, New York, and Dr. H. Ries, of Ithaca, New York, who presented addresses or papers of great value, and otherwise materially contributed to the success and interest of the meeting. The Institute was also privileged to entertain at its annual dinner His Excellency the Governor-General, who delivered a most interesting address; the Hon. Wm. Templeman, Minister of Mines for the Dominion, the Hon. Frank Cochrane, Minister of Mines of Ontario, and other eminent Canadian Parliamentarians.

Other meetings held during the year have included those at Rossland, Nelson and Spokane, under the auspices of the Western Branch, and branch meetings at Cobalt and Montreal.

Five regular meetings of Council have been held at headquarters, whilst a special meeting was held in Toronto in the month of July.

Publications.

The papers presented at the annual meeting, together with those read at the branch meetings, and also others transmitted direct to the Secretary, in all 41 papers contributed by members, associates and student members, together with the discussions thereon, have been published in Volume XII. of the Journal of the Institute, copies of which have been distributed to members in good standing.

There have also been published and distributed during the year four bulletins, in which have been printed papers "subject to revision," notices and other matters of interest to the general membership.

Branches.

Both the Cobalt and Western Branch have been very active during the year, and show substantial membership gains. In addition to holding two well-attended meetings in British Columbia, the Western Branch accepted an invitation to participate in a joint meeting in Spokane with the American Institute of Mining Engineers in September last, whilst under the leadership of the president of the Institute the Cobalt Branch acted as host to a party representing the geological section of the British Association, who had been invited to visit the mines of this district. The party, accompanied by representatives of the Institute, subsequently visited Temagami, Sudbury, Moose Mountain, Copper Cliff and Silver Islet, and after attending the general meeting of the association in Winnipeg, continued the journey across the continent to Vancouver.

Library and Reading Room.

The present location of the Institute's office in the Windsor Hotel, Montreal, has proved a very great convenience to members visiting headquarters, who have availed themselves freely of the facilities afforded them to consult the library, or make use of the reading room. Many visitors from abroad and foreigners desirous of obtaining information anent Canadian mines and mining have also called at the offices to seek the secretary's

assistance or advice, and it is believed that the possibilities of rendering valuable and useful service in this direction are considerable, more especially when the fact that the Institute is prepared to supply information to those requiring it becomes more generally known. In order to advertise its readiness in this respect in Great Britain, the High Commissioner's Office in London has been notified that the Institute is prepared to receive and reply to any enquiries on the subject of Canadian mining.

Little or no expenditures have been made this year on library account, but numerous donations of books have been received, particulars of which have been published in the Institute's bulletins.

Secretary's Office.

The following returns are taken from the secretary's records for the ten months ending December 31st, 1909:—

Letters received	2,274
Letters written, etc.	6,395
Circulars issued	7,400
Publications issued	6,200

Students' Competition and Awards.

In 1909 ten papers were submitted by student members in competition for the Institute's annual awards. After receiving the report of the judges, namely, Dr. H. Ries, of Cornell University, Ithaca, N.Y.; Mr. Arthur A. Cole, of Cobalt, Ont., and the secretary, who acted in an ex-officio capacity, the Council has awarded the president's gold medal to Mr. N. L. Bowen, of the School of Mining, Kingston. In addition, Mr. Bowen received a cash prize of $25, while cash prizes of $25 and $20 respectively were awarded to Mr. E. P. Cowles, of McGill University, and Mr. G. J. Burland, of McGill University. The papers submitted by Messrs. King, Rider, Rutherford and White received honourable mention.

Frecheville-Commans-Mariotti Competition.

Three of the gentlemen, namely, Messrs. R. E. Commans, Wm. Frecheville and Hugh F. Mariotti, who participated in the Institute's summer excursion of 1908, as representatives of the Institution of Mining and Metallurgy, desiring to give definite expression of their appreciation of the hospitality they received on that occasion, early last year, communicated with the Council, requesting permission to donate the sum of fifty guineas as a prize to be offered for the best paper contributed by a junior member (namely, one under thirty years of age) to the Institute's Transactions before January 1st, 1910, on a subject descriptive of any mining or metallurgical improvements effected in Canada during the year from October 1st, 1908. The offer having been gratefully accepted, the Council appointed three of its members, Messrs. J. Bonsall Porter, J. C. Gwillim and H. E. T. Haultain, a committee to direct the competition and to see that the conditions were properly complied with. Under instruction from the committee, a circular, in which particulars of and conditions governing the competition, was duly issued to members in April last. In response to this circular, five papers have been forwarded to the secretary for submission to the committee, and it is hoped that the judging will be completed in time for the results to be announced at the annual meeting.

Membership.

The membership of the Institute, inclusive of all classes, now totals nine hundred and thirty-six (936). The accessions during 1909 were as follows:—

Corresponding members	2
Ex-officio members	1
Members	70
Associates	20
Students	4

It may be here noted that the mining students of the "Ecole Polytechnique," Montreal, have recently organized a Mining Society, and have applied for affiliation with the Institute. The present membership of this society is 25.

With a view to establishing and promoting friendly relationship between the Institute and the Institution of Mining and Metallurgy, the Council in July last submitted a proposal to the Council of the latter organization, offering to provide in future that members of the Institution of M. & M. non-resident in Canada should be admitted to membership of the Institute upon payment of a reduced annual subscription of $5. This offer having been accepted, a by-law in accordance therewith has been prepared for submission to and for the consideration of the annual meeting.

Deaths.

The Council records with profound regret the deaths during the year of the following members:—

Members—Fraleck, E. L., Member of Council; Colville, Andrew; Fletcher, Hugh; Fowler, L. A.

Associates—Ferguson, John; Graham, Harvey D.

The following gentlemen have resigned their membership:—

Members—Auzias-Turenne, R.; Brainard, Dwight; Corbett, Geo. E.; Dickson, Dr. C. W.; Hayward, A. A.; Hidden, Wm. Earl; Hillis, J. T.; Hungerford, W. A.; Leach, Norman L.; MacLean, John S.

Associates—Allen, K. C.; Gaskin, R. G.; Hall, F. Asa; Horne, J. T.; Monk, Ed. W.; Naismith, Arthur P.

H. MORTIMER-LAMB, Secretary.

ACCIDENT AT GOODWIN LAKE MINE, TWP. OF LORRAIN, JAN. 15, 1910, WHEREBY FRANK SHEPHERD WAS KILLED.

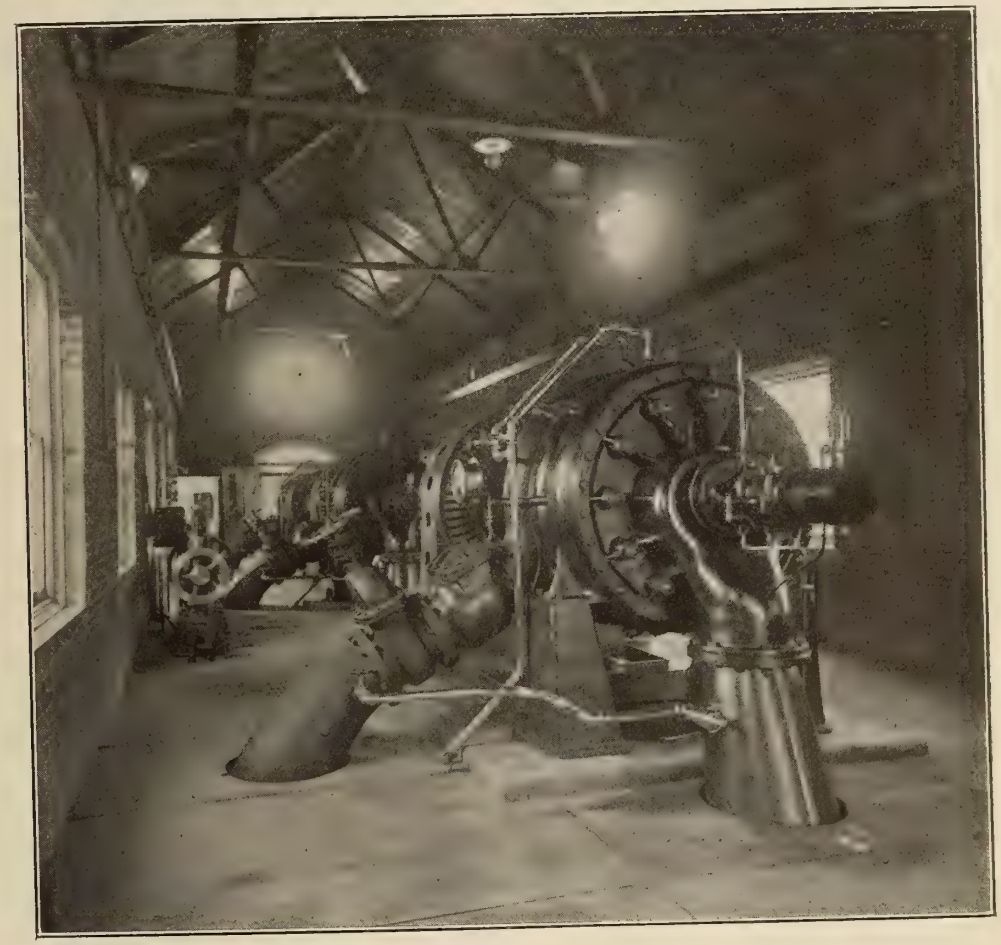
The accident occurred in a 90-foot shaft being operated by the Goodwin Lake Mining Company. Frank Shepherd and Leo Doyle were employed in shooting a round of four holes in the bottom of the shaft. The blasting signal was rung, and as soon as it was answered by the engineer, Doyle spit the four holes and he and Shepherd climbed on the bucket and rang the hoisting signal. As the bucket started, Shepherd fell and caught the edge of the bucket with his hands. He hung on until the bucket was up 60 feet, when he had the bucket stopped, but in trying to get a better hold he slipped and fell to the bottom. After Doyle reached the surface the bucket was sent to the bottom, but Shepherd was apparently unconscious from the fall. The four blasts went off shortly after, cutting Shepherd up in a horrible manner.

After an inquest was held, information was laid by Mr. E. T. Corkill, Inspector of Mines, before Magistrate Atkinson against the Goodwin Lake Mining Company and Contractors McDonald & Kenty, for a violation of Sections 164, 23 (a) of the Mining Act of Ontario, which calls for a suitable ladder to be always in the shaft to provide an auxiliary means of escape. Had this ladder been in position, as called for by the act, the deceased would have had an opportunity of dropping from the bucket when he first slipped and of climbing up the ladder. Both the contractors and the company, if proved guilty, are liable to a fine of not less than $100 nor more than $1,000.

THE ELECTRICALLY DRIVEN PUMPS OF LOCKPORT, N. Y.

The city of Lockport, N.Y., derives its water supply from the Niagara River, near North Tonawanda, thirteen miles away. From the electrically-driven pumping station at this point, the water is forced through 69,000 feet of 30-inch main to a stand pipe 25 feet in diameter and 120 feet high, at Lockport.

The pumping plant contains three independent units with a combined capacity of delivering 15,000,000 gallons in 24 hours against a pressure of 125 pounds. Each unit comprises a Westinghouse induction motor, designed for 500 horse power at 750 revolutions per minute, with three-phase current at 400 volts, direct connected to a single suction, enclosed impeller centrifugal pump made by the Holly Manufacturing Company, Buffalo.



Power generated at Niagara Falls is transmitted to North Tonawanda at 22,000 volts and is stepped down to 440 volts at the pumping station by three 500 kilowatt, oil insulated, water cooled transformers.

The three motor-driven pumping units were recently given a very complete test, which developed some interesting economies of electric operation. Each unit was run continuously for 15 hours, during which time readings of the electrical input were taken every five minutes; readings of the Venturi water meter every ten minutes; pressure gauge every five minutes, and revolutions of pump every fifteen minutes. The results are given in the accompanying table, which shows that all three of the pumps exceeded the duty requirement of 27,000,000 foot-pounds by approximately 4,000,000 foot pounds. It will be further noted that the temperature rises are well within the specifications, and that the pump capacities and horsepowers are well exceeded:—

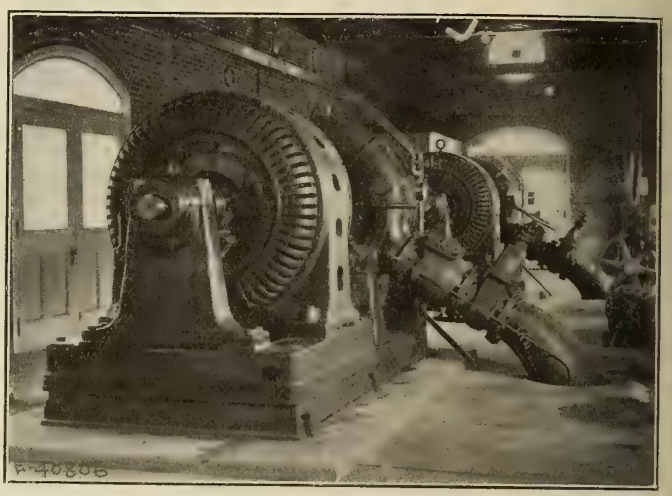
Results of Tests of Lockport's Motor-Driven Pumping Units.

	Pump 1.	Pump 2.	Pump 3.
Maximum revolutions per minute	746	752	744
Minimum revolutions per minute	738	738	739
Average revolutions per minute	743	744	744
Maximum gauge pressure, pounds	142.5	144.5	143.5
Minimum gauge pressure, pounds	119.5	139.5	134.5
Average gauge pressure, pounds	136.9	142.6	138.9

Average head, feet	315.8	329.1	320.6
Gallons pumped per hour..	238,000	236,300	236,700
Gallons pumped in 24 hours at this rate	5,712,000	5,672,000	5,712,000
Kilowatt input per hour....	342.4	346.1	341.5
Gallons per kilowatt hour	1,454	1,464	1,443
Hydraulic horsepower	318	327	319.5
Electric horsepower	456.6	456	455
Efficiency per cent.	69.6	71	70
Duty, foot-pounds per 1,000 kw. 30,800,000		31,600,000	31,000,000
Degrees temperature rise in 15 hours	41	38	43

In the case of the Lockport pumping station, electrical energy is purchased at $16.00 per horsepower year. The cost of power for this station is thus just about equal to that of steam operation under conditions assuming cross-compound pumping engines giving a duty of 130,000,000 foot pounds per 1,000 pounds of steam; coal at $3.00 per ton delivered into the boiler room; 8½ lbs. evaporation under working conditions, and including labour for making steam and handling ashes, as well as increased fixed charges against the additional plant for operating with steam. This electrically-driven pumping plant is thus developing duty equal to 130,000,000 foot pounds per 1,000 pounds of steam.

In connection with this plant, which is pumping its output 13 miles to Lockport, it may be of interest to note that last summer when a large fire broke out there eleven powerful fire streams through varying lengths of hose were maintained from the stand-pipe and pumps as long as needed for service.



The entire water supply of which this station forms a part, as well as the station itself, was designed by Mr. Charles A. Hague, consulting engineer, New York City.

SILVER IN 1909.

Messrs. Samuel Montagu & Co., Review the Past Year.

A retrospect of the silver for the year is singularly uninteresting in regard to price. During the first four months the monthly averages of the cash quotation kept within the narrow limit of about five-eights of a penny —23.226 and 23.834—and those of the concluding six months—23.351 and 24.030—show a slightly wider difference. The highest prices of the year were reached in the remaining two months, May and June, the averages for which were 24.342 and 24.166 respectively. The highest quotation of the year was 24⅞d on the 5th May, the lowest 23-1/16d on three dates—namely, 4th March, 26th and 30th October; the net difference between the highest and lowest of the year is therefore 1 13-16d. During seven months the average forward price was slightly above, and during the remainder, slightly below, that for cash. The difference between the two daily prices was rarely large except in the early part of January, when the cash stood for a week or so—3/16d to 5/16d higher than the forward price. Not only does a general view of prices reveal the narrow limits within which the quotation moved, but in certain periods fluctuation ceased entirely, and an absolute record for immobility in recent times was created in August, when the price stood at 23½d for eight successive working days. It is a curious fact that notwithstanding this remarkable rigidity of price the year has been prolific in business, with the turnover unusually large, and at the very time the pointer rested in August at 23½d, transactions were on quite a substantial scale. More or less throughout the year there has been a prolonged contest between India and China; this appears to be the chief reason for the exceptional stability of price. Owing to excessive imports into China in preceding years, merchants were encumbered with goods, and fresh imports were very small until the then existing stocks became absorbed. Meanwhile, the exchange being one-sided, the foreign banks were compelled to import silver, or more frequently to purchase forward silver, so as to adjust the balance of trade, and in consequence the stock of sycee, &c., at Shanghai rose until a record figure of 31,000,000 ozs. was reached on 18th October. At the same time the stock in Bombay amounted to 15,000,000 ozs. and in London 2,000,000 ozs., besides another 4,000,000 ozs. on the sea. Apart from the Cobalt mines of Ontario, there is little need to comment on the world's supply. It is anticipated that the total for 1909 is in the neighbourhood of 25,000,000 ozs. Favourable news continues to come from the mines, and, for the present at any rate, a possible advance on these figures must be taken into account. The ore is so rich that the silver markets of the world would soon be glutted if the veins were as large as those of the ordinary silver mine. But, while the ore is exceptionally rich, the veins are small. How this addition compares with the increase of the world's population is most vital to the future of silver.

The effect of railway development in China is most important. It is probable that the Chinese themselves will endeavour to finance and build most of the future lines, but of each million sterling of capital financed by the West it is estimated that at least two-thirds will be remitted in silver for labour and material on the spot. The awakening of China by the introduction of machinery and the opening up of its hidden resources will re-

sult in vast addition to its internal wealth. To sum up, development, railway facilities, and a cohesive Government in China, though slow in coming, are powerful factors to be taken into account as to the future. It must not be assumed that, even if a gold basis were to be fixed in China, it would seriously affect the need for silver. We have an example in India of such a change. The closing of the free mint for silver did not have that effect, for during the fifteen years preceding the date of the change, 1,056 million rupees were coined, against 1,011 millions in the fifteen subsequent years. Remembering that a very large proportion of the earlier total must have been melted down for jewellery, &c. (the value of the rupee, coined or melted, being about equal at that time, whilst in the later period the operation would involve a loss of, perhaps, 45 per cent.), the slightly lower total loses significance entirely.

In regard to India, there are two factors ever working increasingly for the prosperity of that country, and against the risk of famine. Inasmuch as the natives of India importd about £62,000,000 of silver in the fifteen years since the closing of the mints, over and above the £42,000,000 required for coinage, it is evident that the well-being of the native must have a very direct bearing upon silver itself. The first influence at work is irrigation. In the year 1906-7, as a result of irrigation, a net revenue accrued to the State of nearly £800,000 from an expenditure in previous years of only 5 millions, and an area of 36 million acres was brought into cultivation. Since that date much larger sums have been laid out each year, and the subsequent returns may be expected to increase proportionately. It is stated that, owing to irrigation, the monsoon is becoming of less importance to the wheat crops, and that much now depends on the after rainfall in June. A second influence for good is the extension of railway mileage, by which is afforded a readier market for produce and a speedier means of alleviating the distress caused by local famine.

It would be of extreme interest if the irreducible minimum of silver actually required by wastage and by the increase of population could be ascertained, but data in regard to the quantity used in the industrial arts for jewellery and manufactures is so vague that any approximate estimate is quite impracticable. On the best authority available the loss by wear of silver coin is about 10 per cent. in 43 years. Taking the value at present prices of the world's stock of silver coin at 2,700,000,000 ozs., the wastage amounts to about 6,300,000 ozs. per annum; adding 1 per cent. as the annual increase of population, 27,000,000 ozs. is obtained—thus 33,300,000 ozs. is demanded on the score of coinage alone. A further quantity is called for by the increase of wealth in India and China; both of these countries, especially the latter, place a large portion of their savings in silver. There is a certain increasing demand for silver quite irrespective of price, and fluctuations in the value of silver affect merely a balance, perhaps smaller in proportion than generally suspected. It is not reasonable to suppose that the yearly increase from Ontario will not be so great, for the area involved, though large, is limited in extent, and many mines are now in full working operation. It is fair to assume from the remarkable steadiness of the price during the year, in spite of such addition to the world's supply, that the world's consumption, barring disastrous crops in the East, is likely to keep pace with any reasonable increase from that quarter, and no fall in value need be expected specially from that cause. Some confident anticipation must exist in the minds of Indian operators who have held the large stock of about 12,000 bars throughout the period of the year when money was most dear that the inquiry for silver will not only prove sufficient for the absorption of such stocks, but lead to an enhanced demand in the near future. Should this year's monsoon be good, the reduction in the currency reserves may make purchases on Government account not impossible toward the end of 1910.

THE NICKEL INDUSTRY.

This unsigned article was written at the request of the Canadian Mining Journal. It presents the case for those who think that the market for nickel could be largely expanded were the market price lowered. The author desired to preserve his anonymity.

There are practically only two sources from which the world's nickel supplies are obtained, viz:—The Island of New Caledonia in the Southern Pacific Ocean, and the Sudbury district in Ontario. From the ores of the former, about 15,000,000 lbs. of nickel, representing 40 per cent. of the world's production are produced annually; whilst the ores of the Sudbury dictrict yield about 21,000,000 lbs. yearly, or 60 per cent of the world's production.

The New Caledonia ore occurs as a silicate of nickel and magnesia, in large surface deposits, covering a considerable area of the island. It is soft and easily mined but, owing to the isolated position of the island, its climatic conditions, the scarcity of labour and the absence of fuel, and necessary fluxes, it cannot be treated on the island itself, but is shipped to Europe in the raw state. This renders it necessary to bring the ore up to as high a nickel content as possible, which involves a large amount of handworking, as no mechanical concentration is practicable. The ore as shipped, averages 5½% nickel in the natural state, which, as the ore carries about 20% moisture, is equivalent to about 7% in the dry. The cost of the ore, delivered in European ports, is $8.50 per ton, or 7 cents per lb. of nickel contained in the ore. It is smelted with iron pyrites and gypsum to form a matte, and although the subsequent extraction of the nickel from the matte is considerably cheaper than the necessary separation of the copper from the nickel in the case of the Sudbury matte, yet the initial cost of the New Caledonia ore delivered at the smelter is so great that the ultimate cost of the production of nickel must remain in favour of Sudbury ores. All the output from New Caledonia is shipped to Europe.

The world's total production, therefore, is a little more than 36,000,000 lbs., or 18,000 tons, of which probably two-thirds is used in the manufacture of nickel steel, and one-third in the production of white metal, nickel coinage, electro-plating, etc. Of the output of nickel steel, by far the larger proportion is put into armour plate, turrets and heavy guns, for battleships; this steel contains usually 3½% nickel. It is also used

to some extent for other purposes, e.g. propeller shafts, crank axles, ship plates, deck plates, automobile frames, &c., but it would be used much more universally for these latter and other purposes, if manufacturers could secure supplies of the metal at lower prices than is now possible.

It is generally accepted as a fact that the control of the nickel market is vested in the International Nickel Company who, by agreement or arrangement with the French Company "Le Nickel" (the owners of the principal mines in New Caledonia) and with Mond's Nickel Company (the only other producers at Sudbury), fix and maintain the price of this metal in all markets. The supply of nickel may therefore be considered a monopoly, and the price has been kept at such a high level that the use of the metal for many purposes for which it is essentially adapted, has been made prohibitory. It is a significant fact that the consumers who pay the lowest price for nickel are those large and financially powerful firms who manufacture ships of war and their equipment for the Governments of their respective countries, and this was only brought about by a combination of the firms which the interests controlling the nickel market find too powerful to resist. The price of the metal to these consumers is about 26 cents per pound, but manufacturers requiring nickel for the production of nickel steel for any other purpose than ornaments have to pay about 35 cents per pound, whilst white metal manufacturers and nickel plating works, pay anything from that figure up to 60 cents per pound, according to the quantities they consume.

These prices are out of all proportion to the cost of production, from Sudbury ore, which certainly does not exceed 15 cents per pound. This statement is corroborated by the profits made by the two companies operating there; the profits of the International Nickel Co. are in the neighbourhood of $3,000,000 a year, on their output of about 17,000,000 lbs. of nickel, whilst Mond's Company's profits exceed $550,000 on an output of about 4,000,000 lbs.

There are millions of tons of proved and valuable ore in the Sudbury field awaiting development and exploitation. This district certainly affords an instance, unique in mining experience of such immense bodies of valuable ore lying unworked year after year, one might almost say decade after decade. And what is the reason for this state of affairs? It is not owing to the lack of a process for treating the ore, for notwithstanding the cloud of mystery with which the processes at present in use are purposely enveloped, they are perfectly well-known, and any patent rights that may have at one time attached to them, have expired long ago. Nor is it owing to the want of a market for the products of these ores, for anybody who has investigated the subject at all knows perfectly well that all steel manufacturers are anxious to secure supplies of nickel if they can be obtained at a price commensurate with the gain in strength and the saving in weight, which the use of nickel steel has over ordinary steel.

The only conceivable reason for the large bodies of ore lying unutilized is on account of the control of the market being vested in a powerful combination, who have bound the principal consumers to them in a most ingenious manner, and who deter capital from embarking in the enterprise. Naturally they are quite content with the profits they are making; why should they incur more capital expenditure in opening more mines, and increasing the capital of their plants—which they would be compelled to do in order to make the same profits from a lower price—when they know that their position is absolutely secure? So long as matters are left in their present condition, so long will the more universal use of nickel be prevented, and so long will the enormous and valuable deposits at Sudbury remain unutilized.

A NEW ELECTRIC PROCESS FOR PRODUCING AND REFINING STEEL WITH COMPOSITE ARC ELECTRODES.

By Frank C. Perkins.

A new process of producing a high grade of steel, low in phosphorus or with any analysis desired as described below is of interest, the construction and arrangement of the electric ladles or furnaces provided with special composite electrodes being seen in the accompanying drawings, the covers not being shown. This process on which United States patents have recently been allowed consists in electrically treating molten iron from a blast furnace or low grade molten steel as taken from a Bessemer converter or open-hearth furnace, with electric heat produced by arcs formed between the slag of the bath and specially designed electrodes. Several forms of composite electrodes are indicated in the drawings. It will be noted that one consists of a cored carbon or a mixture of carbon, and lime or oxide or iron or other slag producing materials. Another shows the slag materials packed in an iron or steel tube and still another surrounding a carbon or iron rod or rods with or without projections for supporting the slag materials with the usual binder employed in carbon electrodes.

It may be stated that the use of the composite or combination electrode, instead of the ordinary carbon electrode or an electrode of pure iron, introduces the fresh and additional refining slag materials to the bath fused and in a highly fluid state at the hottest points which are at the arcs or at the point of contact of the electrodes and the layer of slag floating on the bath of molten steel.

When two of these electrodes are used in an electric furnace of the double pole type, the current passes from one electrode into the slag, through the slag as a resistance and out of the other electrode, the two arcs operating at about 100 volts pressure. One electrode may extend into the slag or down into the molten steel below the slag, a single arc only being employed at this time formed at the other electrode, with a pressure of approximately 50 volts.

The double pole electric furnace is well adapted for practising this composite electrode process similar to the Heroult method because when the two electrodes are introduced into the refining slag, the latter acts as the resistance and forms one or two arcs according to whether one or both electrodes are out of contact with the bath and producing the arc and arcs. If one arc is used the other electrode may be raised and lowered by electric motor driven hoist stirring the molten bath by this action.

An ordinary basic lined ladle, crucible or pot may be used as noted in the drawings without cover which may be supplied in the same manner as a basic lined two pole electric furnace. This ladle having received the charge of molten steel from a Bessemer converter is electrically refined by eliminating the phosphorus and sulphur, as far as desired and the steel is deoxidized and recarburized. The steel is then poured into the ingot molds after an electric treatment of from a few minutes to an hour or more in the electric ladle according to the degree of refining desired.

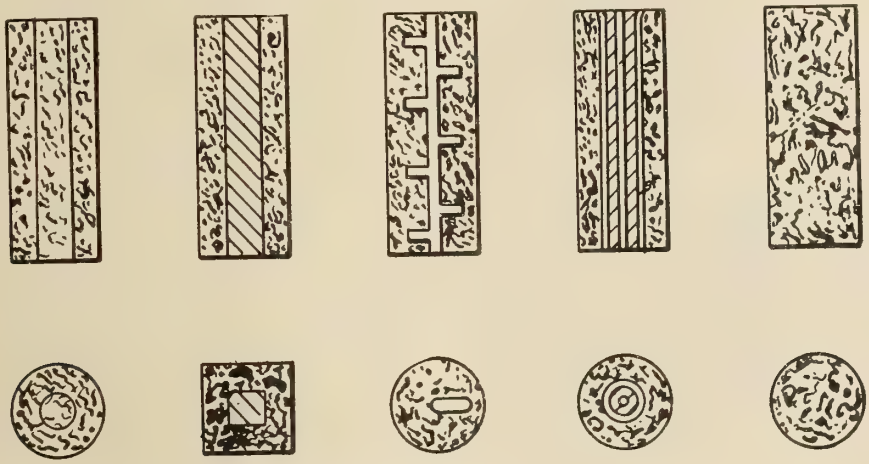


Fig. 1 Showing Suggested Forms of Electrodes to be Used in Ordinary Arc Furnace.

When only one of these electrodes is used in an electric furnace this electrode extends into the refining slag forming the arc at this point, the current being conducted through the molten bath and out through the bottom of the ladle similar to the Girod process.

Another construction shows double arc or single arc action taking place when the ring of cylindrical electrode is arranged on a level with the slag. A single arc action only at centre may be employed, the outer electrode dipping into the slag or molten steel.

By this electric arc process the molten metal continually circulates, all particles of the bath coming into contact with the refining slag at the arc or arcs and elsewhere and being rapidly refined, remaining at the highest temperature only a short time, then replaced by other particles of molten steel reaching the slag near the arcs.

It is held that in Heroult arc steel furnaces the circulation in the bath is always active and the average temperature may be kept as low as any other furnace and all parts of the bath come rapidly into contact with the slag. In case a deep bath of say 10 or 12 tons or more is used in the electric ladle and additional circulation is desired, one electrode may be plunged up and down in the metal by an electric hoist mechanism, while the other electrode produces the single arc then used with the slag.

By the use of these special electrodes made with slag producing materials the highly fluid slag at the arcs causes rapid circulation to take place and the gases are removed which are often retained in metal and cause bad steel when poured into the ingot molds directly from the Bessemer converter without electric refining.

Furthermore, in this electric refining process segregation of sulphur and phosphorus are largely avoided while any quality of steel may be produced regardless of the quality of the raw materials.

It is well known that the Bessemer converter process for making steel is far cheaper than the open-hearth process, but the quality very largely depends on the metal, ore and other material available, and it is not possible to test the metal during the operation. The resulting steel, therefore, from high phosphorus and high sulphur charges contains an injurious quantity of sulphur and phosphorus which cannot be eliminated by the existing acid Bessemer process. Too much or not enough carbon, manganese silicon or other elements can readily be corrected and gauged by the charge introduced into the converter, and subsequent treatment, but phosphorus and sulphur less than .09 and preferably below .05 is desired and this is not attainable by the existing Bessemer process.

With these special electrodes and the use of an electric arc for refining purposes, materials can be used in the electrodes or added to the bath for a neutral slag, as it is maintained that a thorough deoxidation of the steel is not possible when there are iron oxides in the slag as they will react to a certain extent with the molten bath of steel.

It is held that adding carbon under ordinary conditions will not result in complete deoxidation as both iron carbide and ferrous oxide readily exist together. By means of the electric process of steel refining with these combination or composite electrodes, however, carbon or a mixture of carbon and iron may be added to the slag as an auxiliary to the carbon mixture of the electrode, forming calcium carbide and resulting in deoxidation without the slightest difficulty at no great expense, and on any scale desired by providing electric arc apparatus for several electric furnaces, ladle cars arranged for serving various Bessemer converters or open-hearth furnaces.

The desired amount of manganese can be added for counteracting the bad effects from the ferrous oxide, the carbon reducing the manganese ore which has been

added to the slag and taking out the last traces of ferrous oxide leaving the steel bath protected by the layer of slag from oxygen in the air so that no further oxidation takes place.

The determining questions of the electric refining of steel, are cost and output. By shortening the time of treatment with these special composite electrodes combined with slag producing mixtures, and refining only down to such percentage of phosphorus and sulphur as are essential for rails and structural steel, the electric power consumed is so low, and the time required so short as to be practical for this work.

By this process cheap ore can be used having higher phosphorus and sulphur, these ores being abundant while high grade ores are nearly exhausted.

This new composite electrode process may be utilized as an auxiliary treatment to the Bessemer process for eliminating the phosphorus by employing an oxidizing slag in the bath as the molten metal is treated in the electric ladle with the arc, the auxiliary slag producing materials in the combination or composite electrode acting instantly on the metal, and the slag being in a highly fluid state as it melts in the high temperature of the arc.

The highly oxidized metal from a Bessemer converter overblown, may be utilized deoxidizing same in the electric ladle by this process. It may be stated that the desired end to be attained by this electric auxiliary process with the Bessemer converter for rail making particularly, is the reduction of phosphorus, to .05 or thereabouts by the oxidizing slag and electric arc, the other elements being easily controlled by existing Bessemer methods.

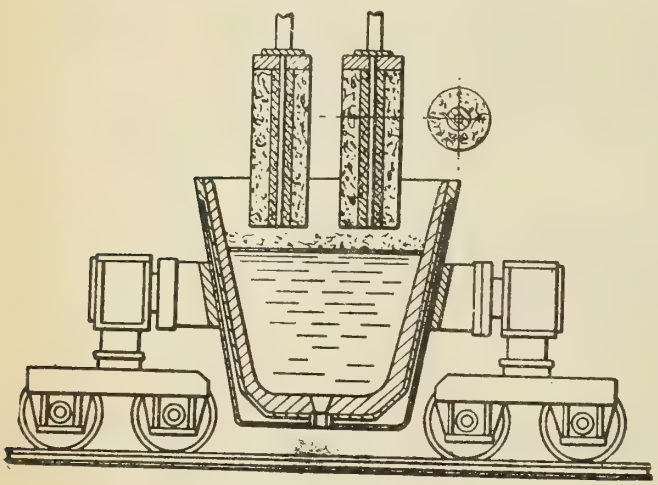


Fig. 2. Electrodes Used with Ladle.

It is well known that the Heroult electric furnace having pure carbon electrodes and a treatment extending from 75 to 90 minutes or more taking molten metal from an open-hearth furnace and electrically treating same with oxidizing and neutral slags, the phosphorus can be brought down to .003 per cent. and the sulphur down below .007 per cent. according to time of treatment.

By the use of composite electrodes containing slag producing mixtures it is possible to reduce the phosphorus to .03 or .05, which is 10 to 20 times as much as the above in a far shorter time and within practical limits for Bessemer working, only a small part of the phosphorus being removed.

It is also well known that the carbon is always eliminated before the phosphorus, and if it is attempted to carry the reduction far enough to lower the phosphorus, in an open-hearth furnace the metal is highly oxidized and decarburized.

This composite electrode process provides a means of taking the highly oxidized metal from the open-hearth furnace, if carried far enough to eliminate as much phosphorus as desired and by electric treatment with the arcs and these special electrodes having neutral slag mixtures, it is also impossible to eliminate, if desired, nearly the last traces of sulphur the metal being deoxidized and as much carbon being added as found desirable, producing a finished steel of any degree of perfection desired according to the length of time the electric treatment is carried on.

It may be stated that in metal taken from an open-hearth furnace, if the reduction is carried on long enough to reduce the phosphorus to .01 per cent. or less than this amount, the carbon is eliminated. It is of course true, that such a highly oxidized metal would be very unsatisfactory in practice but by means of the electric furnace treatment with these composite or combination electrodes, the arc and proper slag mixture in the electrode themselves acting as auxiliary slag producers, will bring most satisfactory results, eliminating the sulphur, adding the proper amount of carbon, and deoxidizing the steel completely.

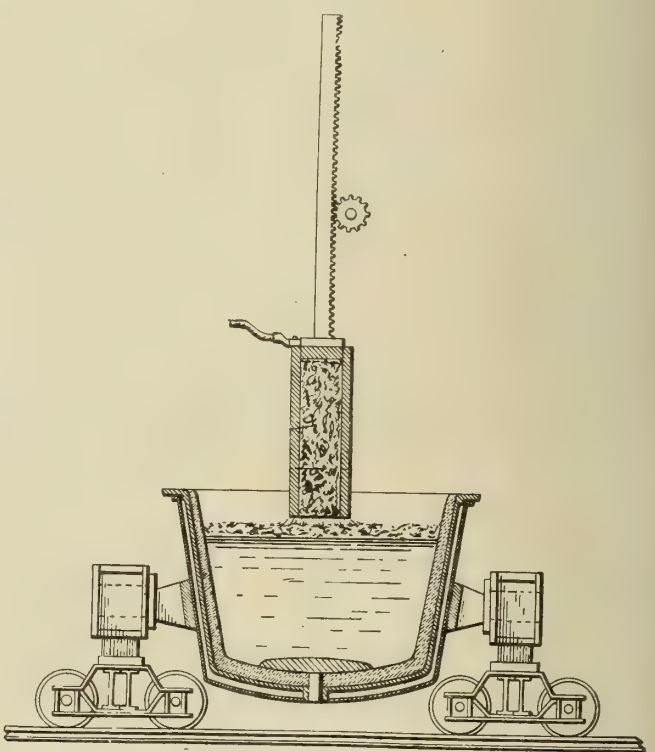


Fig. 3.

The proper mixture can be introduced into the molten bath and also provided in the electrode mixture to remove the sulphur on account of the high temperature of the electric arc even though the slags selected could not be used by any other than the electric treatment without addition of other slag materials to lower the melting point and this would interfere with the efficiency of operation. The slag mixture is also melted to a highly fluid state at the arc, largely from the mixture in the electrode itself, placed there for this purpose, in addition to that supplied in the ordinary way on the top of the bath.

Ordinarily there is great trouble and it is very costly to deoxidize the metal by existing processes and it is claimed that pipes and blow holes are produced in the ingot and other difficulties result from the presence of iron oxides. It is also maintained that when ferro-silicon and ferro-manganese are used to prevent these troubles, the oxides which result stay in the steel as an "Emulsion" in a finely divided state.

By this process of only taking the metal from the converter or open-hearth furnace when it is nearly finished steel and still molten, and merely completing the refining operation electrically, only ¼ of the electric power and less time is required than when electrically heating from cold metal. It is of value as an auxiliary process to the Bessemer converter and open-hearth furnace, taking the molten metal with little loss of heat and refining same to any degree according to time taken, the mixtures of carbon and iron or steel combination electrodes used and nature of slags employed.

While this process is specially adapted to the refining of molten steel taken from the Bessemer converter and open-hearth furnaces and treated in an electric furnace or ladle, it is not confined to this as the identical process will convert iron into steel from the molten or cold state without being previously treated in a Bessemer converter. Any grade of steel may be made regardless of quality of raw materials and carbon may be eliminated from electrodes for special steel making, the current being conducted to the arc by the iron rod instead of carbon and iron oxide, or composite electrode.

The neutral slag electrodes may work with a low current arc or dipping into slag and heating by resistance, and the steel may be kept for hours under this molten neutral slag without changing its quality. The metal may be cast, remelted or worked over to a higher or lower grade or it may be cooled, chilled, and melted a second time without injuring the quality of the steel.

The cost of production in this process is low as most of the work of steel making is done by the Bessemer converter or open-hearth furnace, only the removal of small percentages of the phosphorus or sulphur from the steel being attempted or the deoxidation of the metal, this being a good product for the larger rolling mills which supply the demand of rail and structural steel interests. The partial removal of the injurious phosphorus and sulphur reduces the time to a few minutes instead of hours, hence reduces the current required per ton.

It may be stated that the shorter time also lowers cost of linings and refractory materials per ton of metal and many charges may be treated in same time required for treating one open-hearth charge by existing process with gases alone. This shorter time process only reducing phosphorus from .09 to .05 for rail steel instead of to .003 which is possible by longer treatment, makes it a practical process for rail mills dealing with Bessemer converters treating full charges of 15 tons in electric ladles, handled by cranes taking same to positions where electrodes are inserted.

After treatment the metal is drawn from the bottom of ladle or tilted and poured into the ingot molds after slag has been removed. These simple methods are of vital importance as any new process for removing phosphorus and sulphur should not greatly increase the cost of power; should not cause excessive cost for basic linings or electrodes, or slag producing materials; and should be readily used as an auxiliary process in existing Bessemer plants.

THE RELATION OF MINING TO FORESTRY.

By B. E. Fernow, Dean of the Faculty of Forestry, University of Toronto (Annual Meeting, C. M. I., Montreal, March, 1909.)

In order to give to the discussion on the relation of the mining industry to forestry some local colour, rather than in the expectation of securing very valuable data, the writer recently sent a circular letter to mine managers in various parts of the Dominion, in which questions were put to them in regard to the use and the conditions of local supply of mine timbers. Their replies have been utilized in arriving at some general conclusions.

A canvass of the mines of the United States, made by the writer twenty years ago, afforded information showing a minimum consumption of not less than 150,000,000 cubic feet—the annual growth of at least three to four million acres. In the coal fields of Pennsylvania, for which the best data were available, the consumption varied at from one-half cubic foot to one and a half cubic feet of timber per ton of coal mined (bituminous). The iron mines of the Lake Superior field required over two cubic feet per ton; but the open pit mines were supposed to reduce the wood consumption for the total iron ore output to one cubic foot per ton.

In the precious metal and other mines the variation was found too extreme to afford data on which to base satisfactory conclusions. While the Bodie mine used 4.5 cubic feet per ton of ore, the Ontario could produce 100 tons with an average utilization of 6¼ cubic feet of timber. On the other hand, the timber consumption in such mines as those of the Comstock, the Montana and the Leadville mines, where large ore bodies are stoped and the Nevada system of timbering and cribbing is employed, is enormous. In 1887 the great Anaconda mine alone consumed over 1,000,000 cubic feet of mining and building timber, besides burning a large quantity of fuel-wood for smelting, this latter consumption in one camp alone amounting to 300,000 cords.

If it were assumed that the increased ore tonnage, during the last twenty years, was accompanied by a proportionate increase in wood consumption, the above figure would require to be increased to 500,000,000 cubic feet; roughly speaking, the annual growth of 10 million acres of well-kept forest.

We are not in a position to make even such approximations as these to the wood consumption by Canadian mines, for while most courteous replies were received from Canadian correspondents, they did not afford sufficient data upon which to issue a statement in any sense comprehensive. The impressions left by the perusal of the replies would, however, lead to the following generalizations:—

1. Canadian mines apparently use very little timber, conditions of rock in most localities being favourable, and roofs requiring little support. Shafts and shutes, and structures above ground, are responsible for the bulk of the consumption. Yet at some of the mines the consumption approaches that prevailing in the United States.

From the few reports available, the information points to a consumption of between one and eight cubic feet of wood per ton of ore mined. One of the Rossland mines indicates 1½ cubic feet, and at one of the Kaslo mines as much as eight cubic feet, which in these sections of the country can be purchased at a cost of about eight to twelve cents a cubic foot; while the Granby mines indicate a

consumption of hardly one-third of a cubic foot. A very complete report sent in by the International Coal and Coke Company, of Alberta, indicates a consumption of two cubic feet per ton; the cost varying from two cents per lineal foot for dead, to eight cents for green timber, largely poplar and spruce, or say an average cost of five to six cents per cubic foot of timber cut on the company's own limits. The consumption of the Nova Scotia Steel and Coal Company is also, probably, in the neighbourhood of two cubic feet at a cost of four cents per ton of ore. The Oldham gold mines use three cubic feet per ton, the cost of purchased material being from three to five cents per cubic foot for stulls and poles, and six to twelve cents for better class timber and lumber. The Dominion Coal Company, while using perhaps the largest absolute quantity of any Canadian enterprise in the neighbourhood, namely, of 1.5 million cubic feet, shows a very small per ton consumption, hardly one-half a cubic foot, the pillar and stall working being mostly employed.

2. The life of timbers underground, which is, of course, variable according to water conditions and mine ventilation, seems, on the whole and as one would expect, longer than in the warmer climate of the United States. In the well drained workings of the Oldham mines the timbers are crushed by the heavy hanging long before their durability is tested; while, curiously enough, in lower, flooded workings the same class of timber supported the hanging; but the theory of the writer's informant, that the water contributed to their support, is scarcely tenable. Moreover, the increased moisture contents of the wood reduces its strength to its minimum, so that the probable explanation can be sought only in a different distribution of pressures in the lower levels. In the dry climate of the Rossland district, seven to ten years' life, at least in shafts, is not uncommon, with a reduction in the drifts to five and even three years. The Granby reports timbers put in when first opened nine years ago, still in good condition. In many districts, mines have hardly yet been worked for a sufficient length of time to afford data on this point. The kind of timber employed would also require to be considered in this connection.

At the International mine of the Dominion Coal Company timbers have in some positions remained in good condition since 1869. In other parts their life has been less than two years, and they are mostly affected by rot in the first year, and that without distinction of species.

It is interesting to note that this company is experimenting with a process of treating timbers to increase their life, but as yet without arriving at valid conclusions.

3. Throughout the eastern provinces the most satisfactory timber seems to be furnished by the spruce. The statement is made that it is found to carry greater loads and to stand heavier shocks than any of the other timbers found in the northern country. This would seem strange wherever the pines and hemlocks are in competition.

At the Dominion Coal Company's mines tamarack is given the preference, and next to it black spruce, which is supposed to have longer life; but lately the balsam fir is becoming the main supply. It is the least desirable species in point of strength and life. This balsam, as the writer had reason to ascertain, forms fully 75 per cent. of the timber on the Cape Breton plateau, from which these mines are probably largely supplied. Another reason assigned by the reporter is that spruce on the mainland has been either largely cut out or brings a better price as pulpwood, and hence the mine is obliged to depend on the poorer material.

In eastern Ontario, the most satisfactory results underground are said to have been secured from the use of elm; except that its life is shorter than that of spruce. For lagging, cedar, which is the most lasting wood, is preferred if obtainable. In British Columbia the best timber is, of course, the red fir, while the larch is rather brittle, yet, in comparison with spruce and bull pine, superior.

4. The question of the continuity of supplies in the face of the relatively small supplies required, causes as yet little concern. Most of the Canadian mining enterprises are so young that local supplies have so far appeared ample, and prices low. Yet it is significant to note that in some instances not only is the increase in prices due to increased haulage, commented on, and felt to be a burden, but the needs of the future are beginning to be considered. From the General Chemical Company, operating at Sulphide at a depth of now 400 feet on an ore body 22 foot width, the statement has been received that "mine timbering was an expense to which we could not afford to go." And the writer expresses the belief that with proper management, timbering might be almost entirely dispensed with, except for shafts and shutes.

This statement recalls a similar example from the Menominee range, once one of the best timbered sections of Michigan, where a systematic rock filling method proved itself 50 per cent. cheaper than the use of timbers. A similar system is, in part, employed by the Canadian Copper Company, which uses not only rejected rock, but low grade ore, "this ore filling forming an ore reserve, mined and ready to hoist at a moment's notice."

Again: "The Eustis Mining Company of Capelton, Quebec, has experienced great difficulty of late years in getting satisfactory mine timber, and it is quite evident that this difficulty will increase from year to year. There is practically no satisfactory mine timber to be had within a reasonable distance from us. The probability is that we shall have to alter the system of mining to conform to the new conditions."

In other correspondents the question seems also to have stirred up the contemplation of diminishing supplies in the future, which future is being shortened by the much greater demand for wood materials from other than the mining industry.

Some of the mining companies own or control their own limits; but even these more providential concerns have, perhaps, scarcely realized that further wisdom may be applied in the manner of utilizing these properties, in order to insure continuous supplies. In other words, that just as they apply system and technical skill in exploiting their mines, they should manage their wood properties; they should practise forestry.

The first intelligent class of manufacturers, which has realized that provision for continuity of supplies of raw material is absolutely necessary, are the paper manufacturers, who have begun to practise forestry on their limits. Thus the Laurentide Paper Company employs a forester with a staff of 42 men to manage its large buildings. The Riordon Paper Company has commenced this work with a staff of a forester and 12 assistants to prepare for a regular management. These facts should stimulate other timber land owners to emulation.

To most people the word forestry is a synonym for tree planting; or else, if they do not dismiss it from their minds as a fad, they conceive its purpose is to make

mismanaged, culled woods again productive. What every timber land owner should realize is that forestry —intelligent planning—should begin when the first tree is cut, for by the mere manner of exploiting his property he may make or mar its future. Forestry in the timbered country means to so cut the timber as to secure a natural reproduction without the necessity of planting; the mere use of the axe securing this result. The forester is then a logger who besides harvesting the logs can direct the wood chopper to do his work so as to secure a desirable aftergrowth.

How this is done may not be stated briefly and in general terms, for each case requires its own diagnosis and prescription, but it requires more than is generally believed—more than merely cutting to a given diameter limit, or removing only the "mature" timber, to secure this reproduction.

To describe silvicultural methods would be beyond the scope of this paper, the object of which is merely to invite mining engineers to a fuller realization of the fact, that wood supplies are an exhaustable but restorable resource, and that by proper management exhaustion can be prevented.

If the needs of their mines do not call as yet for provident measures to secure continued supplies, the writer would remind mine operators that besides being managers of properties, they are also citizens, who should take a general interest in the conditions of their country. Moreover, they are, by their occupation, placed in localities and positions where they can exercise—more than any other educated class—a wholesome and intelligent influence on the rest of the community.

While the mining industry has not directly consumed much of the timber wealth, it has indirectly been responsible for untold damage to forest growth. For a large part of the devastation by fire is chargeable against prospectors who burn over the ground to facilitate their work, and forest destruction, particularly in the Rocky Mountain regions, is largely attributable to this cause.

For this damage, atonement should be made by a special effort on the part of the more intelligent mine managers to assist in preventing further damage and to throw their influence into the balance to raise the standard of commercial morality to a proper realization of the enormity of the offence of the "fire-fiend."

THE NISSEN STAMP IN COBALT.

The two Nissen single-stamp units installed last autumn at the mill of the Northern Customs Concentrators Company (nee Muggley), Cobalt, started dropping early in September; but throughout the latter half of October and through the former half of November the stamps were out of commission. owing to lack of power. On November 25th they were again started, and have been working continuously ever since.

The two stamps, each of which has a circular individual mortar, developed a capacity of 5½ tons per stamp per twenty-four hours through 30-mesh screens. The ore, La Rose dump stuff, is extremely refractory. Each stamp weighs 1,650 pounds.

As a basis of comparison, it may be mentioned that the corresponding duty performed by each stamp of the ordinary 5-stamp battery (stamps 1,250 lbs. each) was about 2¼ tons per day per stamp.

Thus the two Nissen stamps are credited with 11 tons per day, the 5-stamp battery with 11¼ tons. The power consumption is, roughly, 40% to 50% less for the Nissen stamps than for the 5-stamp battery.

Record of Trial.—Ore was fed to the Nissens at a size of one inch or slightly larger. The ore consisted entirely of conglomerate, and was extremely hard.

The stamps dropped 100 drops per minute, height of drop 7½ inches. The foundations were of 8" x 8" timbers, set on concrete. The timbers were grouted with concrete. Had the foundations been entirely concrete, absorption of shock should not occur.

The Nissen individual mortar weighs only 3,000 lb. The ordinary 5-stamp battery mortar weighs about 10,000 lb. Hence the Nissen stamps are handicapped by a more or less resilient foundation.

Contrary to the expectations of some of those interested in the trial, the screen wear on the Nissen mortars was not excessive. The shoes and dies wore evenly and smoothly.

The Nissen independent circular mortar is provided with a screen that represents roughly a segment of a circle slightly greater than a semi-circle. The screen is vertical, and thus every aperture is normal to the splash radiating from the centre of the die. This, of course, makes for rapid discharge. Wear on the stamps is compensated by means of weights placed upon the boss-head, which extends out of the mortar. Thus the stamps can be kept up to maximum duty.

The above remarks are given to shew a few of the advantages claimed for the Nissen stamp. The tabulated records below speak for themselves. Attention is drawn to the percentage of silver in the different sized products, also to the proportion of slimes produced by the Nissen and by the ordinary stamps.

Sample from Five-Stamp Batteries, Dec. 2nd, 1909.	Percentage of Sized Pulp.	Assay Value per ton of 2,000 Pounds.	Silver in each Fraction Calculated on 1-T. of Ore.	Percentage of Silver Contents of Ore in each grade of sized pulp.
Pulp retained on 40	5.19	13.8 oz.	0.73 oz.	3.50
" passing 40 retained on 60	13.75	25.4 "	3.57 "	17.15
" " 60 " 80	18.23	20.5 "	3.78 "	18.35
" " 80 " 100	3.21	23.8 "	0.78 "	3.74
" " 100 " 200	8.48	23.4 "	2.02 "	9.70
" " 200	48.82	19.8 "	9.89 "	47.51
" as sampled		22.2 "	20.81 "	

Sample from the Nissen stamps, Dec. 3rd, 1909.	Percentage of sized Pulp.	Assay value per ton of 2000 pounds.	Silver in each fraction calculated on 1-T. of Ore.	Percentage of Silver contents for Ore in each grade of sized Pulp.
Pulp retained on 40	8.56	12.8 Ozs.	1.11 Oz.	9.88
" passing 40 retained on 60	13.92	10.0 "	1.41 "	12.55
" " 60 " " 80	19.73	12.6 "	2.52 "	22.43
" " 80 " " 100	3 40	8.4 "	0.29 "	2.58
" " 100 " " 200	6.39	11.2 "	1.06 "	9.43
" " 200	43.39	11.0 "	4.84 "	43.09
" as sampled.		12.0 "	11.23 "	

Details of Rough Classification Test on 200-Mesh Product from Nissen Stamps. — 20 grains of pulp were taken and thoroughly mixed with clear water, and settlement was allowed to take place for a very short space of time (less than a minute), and the water holding the finer portion of the pulp in suspension was poured off. This process was repeated with the pulp four times, thus obtaining four products from settlement and one of float matter. Results were as follows:—

First settlement 24.50%
Second settlement 15.75%
Third settlement 36.75%
Fourth settlement 18.30%
Fifth floating matter .....4.05%, slimes

LEGAL COLUMN.

LEGAL COLUMN.

The Office of Mining Commissioner.

It has been claimed as one of the features of the Mining Act of Ontario that the office of Mining Commissioner does away with the cumbrous proceedings of the courts and facilitates the trial and disposal of disputes regarding mining claims.

One may have doubts, however, as to the advisability of the practice which is growing so common of creating commissions and commissioners to supersede the regular courts. The machinery of the courts, while cumbrous, is adequate. Its movement is as certain as it is slow. We should not be too hasty to discard the result of many years' growth and adaptation.

The success of the Dominion Railway Commission has been responsible for the creation of numerous other commissions, including the Ontario Railway Board, the Public Utilities Commission in Nova Scotia, and doubtless also the Mining Commissioner for Ontario. The Dominion Railway Commission is successful, however, rather in spite of itself. It has been singularly fortunate in having for its three chairmen one man of long legal and administrative experience and two of judicial experience, all of them exceptionally able men. While its power is great, its jurisdiction is concentrated on a few corporations whose means of communication and transportation are exceptional, consequently its localized and comparatively meagre machinery does not limit its effectiveness.

The same results have not followed the erection of the Ontario Railway and Municipal Board nor, it is submitted with due deference, that of the Mining Commissioner's office.

The Mining Commissioner, as a general inspector and referee of mining recorders, is doubtless an expedient and useful official, but his jurisdiction is much more extensive than is thus implied. Under Section 123 of the Mining Act of Ontario, subject to certain exceptions, "no action shall lie nor shall any other proceedings be taken in any court as to any matter or thing upon which before the issue of the patent any right, privilege or interest conferred by or under the authority of this Act depends, but save as in this Act otherwise provided, every claim, question and dispute in respect to such matter or thing, shall be determined by the Commissioner, and in the exercise of the power conferred by this section the Commissioner may make such order and give such directions as he may deem necessary for making effectual and enforcing compliance with his decision." Under this section a great variety and volume of cases arise in which no special knowledge of mining law or mining is required. Proceedings under the Mechanics' Lien Act are expressly excepted. But all questions relating to the ownership of unpatented claims, whether arising from trust, partnership or sale agreements, disputes depending solely on the facts and on principles of commercial law, are obviously of equal importance with purely technical disputes.

For these there is absolutely no machinery provided to the Mining Commissioner. It is often necessary that immediate proceedings should be taken, an injunction obtained, or the like. A certificate of "Lis Pendens" putting every purchaser on notice of a litigant's rights to any real property may be obtained from the court and registered in half an hour at a disbursement of $2.60. The same thing under the Mining Act cannot be done within, at best, two or three days, and a disbursement (exclusive of telephone and agency fees) of $10. The Mining Commissioner's only settled office is in St. Thomas. His duties require him to spend a great part of his time in the mining districts, where his movements are uncertain and communication difficult. He is not provided with any staff or office in Toronto, and, as everyone in actual practice knows, it is sometimes impossible for days to get before him. The inconvenience and foolishness of this is obvious, while at the same time the courts are right at hand with ample, accurate and well-known machinery for the relief of the litigant.

We do not wish at all to reflect on the present Mining Commissioner. Under a less industrious and painstaking official the situation would be worse.

Re Perkins and Dowling.

Appeal by the claimant Perkins from the decision of the Mining Commissioner for Ontario, by which he affirmed the validity of a certificate of record issued by the Mining Recorder of the Gowganda mining division to the respondent Dowling in respect of a mining claim in that division. The appellant asked that the certificate should be set aside, and that the respondent's claim should be declared forfeited for non-performance of the working conditions required by Sec. 78 of the Mining Act of Ontario, 8 Edw. VII., ch. 21.

The appeal case came on for hearing before Meredith, C.J., C.P., Teetzel and Sutherland, JJ.

Counsel for the respondent took the preliminary objection that no appeal lay from the decision of the Mining Commissioner confirming the validity of the

certificate of record issued by the Mining Recorder, citing Sub-Sec. 4 of Sec. 78 of the Act, which provides that "the Recorder, if satisfied that the prescribed work has been duly performed, may grant a certificate, . . . but he may first, if he deems proper, inspect or order the inspection of the work, or otherwise investigate the question of its sufficiency, and his decision thereon shall be final unless appeal is made to the Commissioner, whose decision shall be final."

Counsel for the appellant argued that the decision of the Commissioner was not final unless he had made an inspection or investigation under the above provisions of the Act.

At the conclusion of the argument on the question of jurisdiction, the judgment of the Court was delivered by Meredith, C.J., dismissing the appeal, on the ground that the decision of the Commissioner was final, whether or not any inspection or investigation had been made by him before giving his decision.

As the point was a new one, no costs were awarded.

PERSONAL AND GENERAL.

Mr. R. B. Lamb, of the C. L. Constant Company has left New York for Central America, on important examinations. He expects to be gone some time.

In our issue of January 1st, 1910, in the list of members elected to the Canadian Mining Institute, the name of Mr. D. G. Wilson, should have appeared as superintendent The Hosmer Mines, Limited. Hosmer, B.C.; instead of superintendent Crow's Nest Pass Coal Co.

EXCHANGES.

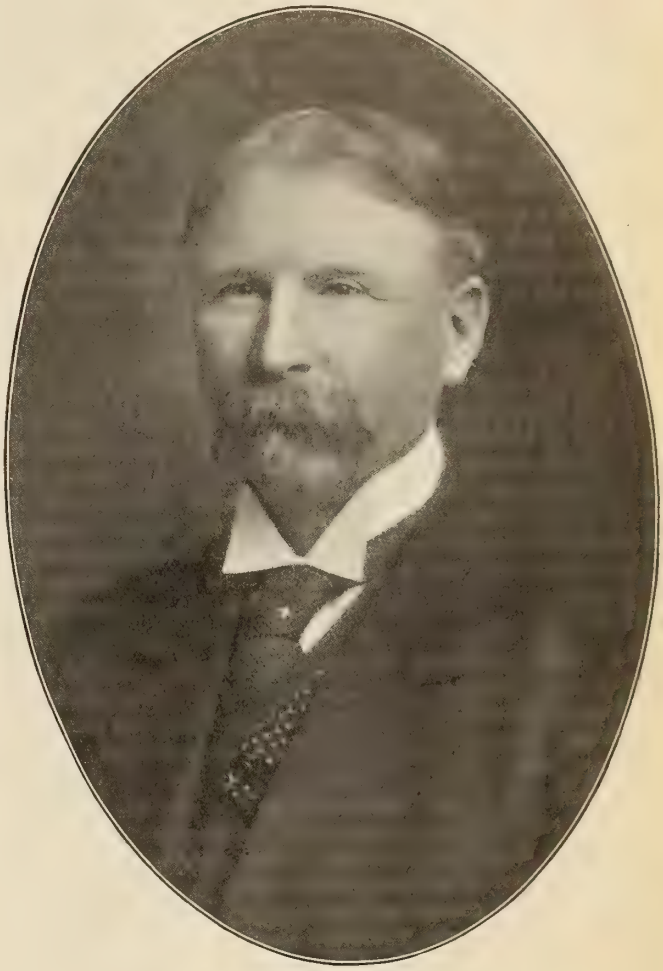
The Engineering and Mining Journal, Jan. 15, 1910.—According to the E. and M. J., neither Mr. Ballinger nor Mr. Pinchot will have lived in vain, if their row over Alaskan coal-lands leads Congress to appreciate the national importance of the immense coal deposits of Alaska. While making no attempt to excuse those persons who have been evading the law, the E. and M. J. very reasonably points out that Alaska is not a poor man's field. The coal lands will have to be exploited by rich corporations, or by nobody.

OBITUARY.

Harold A. Wiley.

To Ontario mining men, the death, on January 15, 1910, of Mr. H. A. Wiley, was a most unwelcome surprise. Mr. Wiley was a partner in the firm of Thomas Marks & Co. Associated with him, were his brother Mr. F. S. Wiley, and the late Messrs. Thomas Marks and George T. Marks.

Twenty years ago Mr. Wiley undertook the first diamond drill in the Atikokan Iron Range, and was instrumental in interesting Belgian capital. He was connected with the development of several silver mines, in the Port Arthur district. One of these, the West End Mine, shipped over half a million ounces during Mr. Wiley's connection with it. Mr. Wiley also was one of the pioneers in the exploitation of the Animikie Iron Range at Loon Lake, 25 miles east of Port Arthur. Along with his brother and the late George T. Marks, he was largely interested in the Port Arthur Mines Company Limited, of which, Messrs. MacKenzie & Mann are directors.



Mr. H. A. Wiley.

During recent years Mr. Wiley became interested in Cobalt, and was one of the owners of the Nugget Claim, and a director of the Smaltite Mining Company.

His interests were by no means confined to mining. As president of the Canadian Northwest Steamship Company he occupied an important office.

His sense of citizenship was broad. He was a member of the following clubs and associations:—The Albany Club, Toronto; The Jockey Club; Royal Canadian Yacht Club; Empire Club; Lake Shore Club; the Port Arthur and Fort William Clubs; the Boards of Trade of the Cities of Toronto and Port Arthur; and the Dominion Marine Association.

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt.—The Little Nipissing property has been coming into prominence again on account of the good results obtained in the development of the new vein found some time ago. This vein was found about 500 feet east of the shaft on the 165-foot level, and it has now been drifted on for over 60 feet, thirty feet of which is in good ore. The vein in places is about 5 inches of smaltite, carrying high values in silver.

The physical condition of the Cobalt Lake Mine has much improved of late, due largely to the developments on the vein found some time ago on the 190-foot level. From the work done

so far, it promises to be the most important ore body that the Cobalt Lake has ever discovered. Since this property was first bought from the Government it has been a great disappointment, but the work done during the past six months has given the most promising results in its history.

The new vein discovered on the 75-foot level of the Hargraves a couple of weeks ago has now been drifted on for over 20 feet, and already several tons of high-grade ore have been bagged. The vein in the face of the drift is about 5 inches in width, and carries high values in silver. The company is making preparations to sink the shaft an additional 50 or 75 feet, and from this point drifts will be run on the vein. High-grade ore is also being produced in the No. 3 shaft. This working was put down on what was supposed to be a continuation of the famous Jacobs vein of the Kerr Lake. Drifts on four levels failed, however, to give any evidence of silver. A couple of months ago a cross-cut was run north from the lowest or 380-foot level, and when in 60 feet encountered an ore body that has since been proved to be a continuation of the Jacobs vein. A drift was run on this for over 30 feet, and this ore is now being stoped.

The Wettlauffer Mine in South Lorrain, which has come in for a good deal of prominence on account of the shipments it has made lately, has received the smelter returns for the first three cars of high-grade ore sent out, showing a total content of over 200,000 ounces of silver. Up to date this company has shipped about 110 tons of ore, and it was the first property in New Ontario, outside the Cobalt camp, to make shipments. Practically all this ore has been taken out in development work, as the company had ore from the grass roots down. Sinking is being continued in the main shaft, which has now reached a depth of 160 feet.

The Temiscaming and Hudson Bay Company was the first to declare a dividend for the year 1910. The dividend amounted to 300 per cent. on the issued capital of the company. This brings the total dividends paid by this company up to 75,400 per cent.

Gowganda has at last commenced to ship ore, the first consignment from that camp being made by the Blackburn mine. The shipment consisted of 20 tons of high grade and 10 tons of medium grade ore. The former will probably carry in the neighbourhood of 2,800 ounces per ton, and the medium grade will assay about 500 ounces. There are already a large number of teams carrying supplies into the district, although the number is, of course, small as compared with last year. It is estimated that there will be about ten carloads of high grade ore to send out. The Blackburn will probably be one of the heaviest shippers as it is generally conceded to be the best property in that part of the country. It is rather a remarkable thing that this property is the only one in the Gowganda district that is in the conglomerate. The Bartlett, about which so much was heard a year ago, has been closed down and has reverted to the original owners, McLaughlin and McIntosh, the Bartlett Company having failed to make the last payment. The property, which is well located and has some good surface showings, might have made good had it been properly managed. It is a significant fact that absolutely nothing in the way of surface prospecting was accomplished last summer.

The new road into South Lorrain, which is being built by the merchants of Cobalt and the mine managers of Lorrain, is nearing completion, and as it will be about ten miles shorter than the old road, it will effect a considerable saving in time and freight charges, and teams will be able to make the round trip in one day. The shipments for the present year should show a large increase, as there are now seven prospects that are producing high grade ore.

Negotiations between the City of Cobalt Mining Company and Northern Customs Concentrator have been concluded whereby the City of Cobalt's dump is to be treated on a royalty basis. It is estimated that the dump contains about 11,000 tons that will assay approximately 25 ounces of silver per ton. This dump will augment very considerably the revenue from the mine, and with the reduction in the royalties that has been effected, and the bettering of the physical condition of the mine that has taken place within the past few months the company should make a very favourable showing.

The Otisse-Currie Company has decided to sell the plant that it originally had on its property. This plant was supplemented by a larger one to meet the growing needs of the mine and is now of no further use. It is understood that it will be bought by the Berlin Mine.

It has been determined to shut down the Union Pacific Mine, which is one of the leases of the Peterson Lake Company, for the present. The shaft was being sunk with steam, but having reached the point where this power was not satisfactory the directors decided to shut down till air from one of the power companies is ready. The shaft will be timbered and put in shape to recommence work as soon as the power is available. In the meantime work is mainly confined to the development of the Michigan Cobalt.

Despite the many promises made by the power companies regarding the date for the delivery of air and electricity, it is hardly probable that they will be able to fill their contracts before the month of May. The company that has made the greatest progress is the Mines Power, Limited. This company only commenced operations about last June, and since that time it has made remarkable progress. At one time it carried about 1,300 men on its pay roll, but this number has now been reduced to 750. The sub-station at Cobalt is practically completed and in a few weeks the large compressors will be installed. The pipes for the delivery of air are being distributed, and as these are of no great size it will not take long to connect them up. The Cobalt Hydraulic Company has still a large amount of drilling to do in its underground workings, and its facilities for handling the muck have decreased on account of the work to be done in the intake shafts. At the present time the whole camp is greatly handicapped by the lack of power, and the probability is that most of the mills now under construction will be finished before the power arrives. The work on many properties is less than it would be on account of the managers not wishing to go to the expense of putting in machinery for a few months to supply the extra needed power.

It is stated that at the Victoria mine a shoot of high grade ore has been encountered on the 80-foot level.

Stoping has commenced on the Waldman vein at the 75-foot level. At this point a drift was run to the west for about 70 feet, and from the end of the drift a raise will shortly be started on the vein. At the 75-foot level the vein was in one place about a foot under eight inches of smaltite carrying considerable quantities of native silver and about four inches of calcite. A diamond drill has been installed at the bottom of the shaft to locate the vein at a depth of 150 feet. Several tons of high grade ore have been obtained from development work and are ready to ship. Two veins have been found on Lot 99, bought by Waldman in the recent Government sale, but they do not contain any silver values. When air can be obtained a shaft will be sunk. The Waldman vein and the one on the York and O'Brien lots are the only discoveries of importance that have yet been made on the limit. It was largely due to the Waldman vein that the prices in the last sale of lots ruled so high. The great majority of purchasers are already regretting the prices paid as they were altogether out of proportion to the value of the properties.

Porcupine.—Less than three months ago Porcupine Lake was a place practically unheard of except by a few prospectors, and now it is one of the busiest portions in New Ontario. The big

gold discoveries made there have caused a rush of very considerable proportions, which even yet is only in its infancy. So far the best known claims are the Wilson, Bannerman, Hollinger, Miller, and Gillies; but many more important discoveries have been made. The Wilson has the most spectacular surface showings yet discovered, the vein being in places 75 feet wide, with the free gold scattered through it in various places. The Bannerman group of claims has been taken over by the firm of McArthur & Co., of Glasgow, Scotland, and they are making all preparations for carrying on operations on an extensive scale. The O'Brien people have taken an option at a large figure on the Gillies properties and they have a diamond drill working to test the vein at a depth of about 100 feet. As the time for the option has nearly expired the results of the boring are looked forward to with a great deal of anxiety by all who are interested in this new camp. It is understood that an effort will be made to get the option extended. The Tummins have an option on the group of claims known as the Hollinger and have a large force of men at work sinking test pits. As far as can be learned the results obtained have been very satisfactory. The option on these properties will not expire till the middle of February. Another important discovery of free gold is stated to have been made on the south-east corner of Tisdale, adjoining Shaw and Whitney, the samples showing free gold in remarkable quantities. A large number of Cobalt engineers and mine managers recently paid a visit to the district to look over different properties there and they were all very favourably impressed with what they saw. These men are well-known mine operators and their opinions carry considerable weight.

Considerable discussion has been raised by the action of Father Paradis in cutting through High Falls on the Frederickhouse River. As a consequence Frederickhouse Lake and Wilson's Creek are dry and Night Hawk Lake has been lowered about seven feet, a beach over a mile in width being formed around the lake. This action was taken without permission of the Dominion Government. An official has been sent up to see what is necessary to be done in the matter. The district as a whole is getting along wonderfully well, and with the good roads and easy transportation important developments may be expected before spring.

KENORA MINING DIVISION.

Kenora.—The Prospectors' and Mine Owners' Association of the Kenora Mining Division held its annual general meeting in the Town Hall, Kenora, on January 11th, at 8 P.M., when the following report was made by the secretary:—

Mr. Chairman & Gentlemen:—Since you have all taken an active part in the business of this Association it will be unnecessary for me to go into details, but I will take this opportunity of reminding you of some of the more important moves made by this Association during the past year.

First I may say that our paid up membership list for 1909 comprised 86 members, 24 of whom are now residents of Kenora and nine now residents of the province of Ontario, some coming from Manitoba, but the major portion from Detroit and its vicinity through the co-operation of the Shareholders Protective League whose head office is in that city.

Almost the first matter of importance taken up by this Association was the question of obtaining for the prospector and mine owner more consideration from the hands of the Government in connection with the timber of a mining location whether patented or not.

Next we took up an advertising campaign with the object of attracting the attention of those desirous of investing in mining enterprises, to this district, which campaign was inaugurated and to a large extent carried on by a series of articles and notices in The Canadian Mining Journal, which is probably the most reliable disseminator of mining news in Canada. And not to be forgotten among the other actions of this association is that of introducing to its members Mr. Geo. Thurber and allowing them to judge for themselves the advances made in his process for gold extraction. Finally I would point out that apart entirely from any actual results in Government action, or reaction caused by or obtained through the workings of this body, the very fact of having such an association in this district, has called attention to a greater or less degree to this country and has exerted an influence beneficial to the town and district as a whole.

Financially the Association is on its feet. Its books audited by your auditors, Messrs. Geo. W. Fullerton and C. H. Challoner, and by them found correct show a balance to your credit of $34.50, all liabilities having been discharged. I have the honour to remain,

Sincerely yours,
H. P. THOMAS,
Sec.-Treas.

After this report had been received the following officers were elected:—

Honorary President—Capt. H. A. C. Machin, M.P.P.
President—Major the Hon. J. E. P. Vereker (by acclamation).
Vice-President—Harding Rideout, Esq. (by acclamation).
Secretary-Treasurer—Herbert P. Thomas.
Auditors—F. W. Hockley, Thos. Walsh.
Committee of Twelve—J. S. Whiting, Thos. Walsh, Jas. Weidman, C. W. Chadwick, P. H. Austin, Leo. Stevenson, A. McMeekin, John Nash, A. Woods, Geo. Thow, T. J. Cherry, J. S. Harvey.

When the routine business had been completed, Capt. H. A. C. Machin took the opportunity of impressing upon the members the value of such an institution as that to which they belonged and roused the enthusiasm of the meeting by informing them that he had that day signed an option on the Mikado Mine and expected to see it in operation again this spring. The Mikado Mine has always been admittedly one of the largest gold mining propositions in this district, and in spite of bad management and a too lax overseeing of the miners, the mine has in the past been a paying proposition. The main shaft, however, which by the way is an inclined one, gave the former owners of this mine the impression that the vein had pinched out at a depth of approximately 250 feet. From Capt. Machin's own observations on a recent trip to the mine, by taking the strike and dip of the lode, he has come to the conclusion that the main shaft has passed outside of the containing wall of the vein through miscalculation on the part of those formerly in charge of the mine and that the mine is to-day in a position to equal its previous good record of gold output. This conclusion as to the direction of the lode has been reached, not by Capt. Machin alone, but by others of his party as well as by the man who for the last few years has been left in charge of the mine and plant by the company. This new conclusion relative to the former misjudgment of the strike and dip of the lode will account for the apparent pinching out of the vein, inasmuch as since the shaft of the retaining wall and the vein were not running parallel, but more gradually approaching each other it would give the effect of the vein gradually pinching out, while in reality a little drifting on the opposite side of the shaft would have proved the original lode to be there in its full width and not to have pinched at all.

The opening of this mine, in which many of our local men have such a firm belief, will, we feel sure, show the public that this mining district has not failed in the past through poverty in ore values.

BRITISH COLUMBIA.

Rossland.—The ore shipments from this camp for the first week of the year amounted to over 5,700 tons, which is far above the average that was maintained during 1909. The three

leading mines have started the new year with substantial shipments, the Centre Star over 4,000 tons for the week, the Le Roi 2, Limited, over 700, and the Le Roi nearly 400 tons. Rossland is in a good position to make a record year of 1910, and as a greater interest in mining seems to be awakening over the country generally it is highly probable that several of the companies that have been letting their mines lie idle here for the last few years will resume work during 1910. The situation certainly seems ripe for it. There are vast areas of mineralized ground about this camp and there is no doubt at all but other rich deposits lie hidden in Rossland's seven hills than those already uncovered. The coming year will be a propitious one for companies owning mines here to do development work as there is little doubt but what they would receive good financial support from the investing world. The valuable work done here by the Geological Survey of Canada and the vast amount of work done at depth in the leading properties of the district have changed things for the better from what they were five or six years ago. While there is nothing definite there are prospects of the Blue Bird Co. doing development work in the South Belt, and the Jumbo is also likely to resume operations late in the spring. The Hattie Brown will no doubt be worked, and rumour has it that a plan of development may be carried on at the O. K. gold property. The I. X. L., adjoining the O. K., is now being worked under lease. The gold in this ground occurs in a pockety form in a quartz vein on a contact between porphyrite and serpentine. This property is paying a little more than its own way and there is the element of chance in the probability of opening up a pocket of more than ordinary richness.

The Boundary.—The Granby mines, Mother Lode, Snowshoe and Oro Denoro mines, for the week ending January 8th, shipped ore aggregating over 40,000 tons. The outlook for the Boundary mines for the coming twelve months is probably brighter than it has ever been, but it is more than likely that the usual crop of drawbacks will creep in and hinder matters. Already a strike cloud is hovering over Greenwood, where the Miners' Union is demanding the closed shop of the B. C. Copper Co. As this is a most unreasonable demand, there being no other difference, apparently, if it is pressed it will surely end in a deadlock. As the miners of the surrounding districts, however, deem their Greenwood brethren somewhat temerarious and are not giving them the moral support that they would like, it is thought that the affair will not go much farther than it has.

The development of the Rawhide property of the New Dominion Copper Co. is being energetically executed and it is expected that the mine will begin shipping ore to the Greenwood smelter of the B. C. Copper Co. within ninety days. It is stated that as soon as the B. C. Copper Co. is assured a steady supply of ore for its three furnaces as is highly probable, it is the intention to resume the payment of dividends. The smelter is at present treating about 1,600 tons per day from the Mother Lode and Oro Denoro, but as some of this ore is being taken from the glory hole workings inclement weather is liable at any time to interfere with operations. For this reason the company is desirous of securing a steady supply of ore from the Dominion properties until its mine in Wellington camp has better shipping facilities, which are now being built.

The Greenwood-Phoenix Tunnel people have abandoned the idea of using a tunnelling machine for the present and have installed an air compressor at the mouth of the adit, with a view to using machine drills, which will be at work in a week or two.

The shaft on the Alaska-Buster property, near Beaverdell, is now down 90 feet, and the ledge has been opened up three feet wide with a 6-inch paystreak carrying $100 to $200 silver and lead. The Standard Fraction, adjoining, is also being worked. The Riverside, another West Fork property of promise, was recently examined by experts and may be soon worked by a local syndicate. Near Greenwood the E. P. U., Tip Top and Dynamo claims are being worked steadily. Operations are about to be resumed on the Bay mine with a crew of five men. The new machine shop at the Granby mines is about completed and the labour-saving machines are being installed. The new shop will prove a time and money saver for the mines of the company, being up-to-date in every particular.

Nelson.—The St. Eugene, Blue Bell, North Star, Richmond-Eureka, Van-Roi and other steady shippers appear on the list for the week ending January 8th, and in addition the Broadview mine, which has not shipped for a couple of years, sent out 31 tons of select ore. The Arlington shipped 20 tons. The total quantity of ore shipped and milled in the district for the first week of the year amounted to over 3,500 tons.

The prospects for the Slocan-Kootenay district for the coming year are very good. The Sullivan group of lead mines, at Kimberley, which were idle all of last year, will be extensive producers this year, under the lease held by the Consolidated M. & S. Co.; the Slocan Star is to be worked by the B. N. White Co., the Big Ledge zinc property will likely join the list of shippers and increased production may be looked for at the Richmond-Eureka and Van-Roi mines, while several new shippers will enter the list from the Sheep Creek section. W. J. Milne, of Vancouver, has bonded the Golden Gate, Fancy and Golden Fate claims in Poplar Creek camp, and work has been started with a crew of five men. It looks as though Poplar Creek district would have another innings this coming year. The Ethel mine in the Lardeau is under bond to Spokane mining men and a quantity of high-grade ore is being taken out of the property. A good strike of silver-lead ore has been made on the Iona group near Ymir. The Yankee Girl mine, near this group, is working a crew of about thirty men and shipping steadily. The Vancouver men who held the bond on the Alma M. property have permitted their bond to lapse and the original owners have put a crew to work on development on their own account.

Shipments from the Lucky Jim zinc mine are averaging about 355 tons per week, of about $12 per ton net. A new tunnel is now being driven 200 feet below the present workings, which will permit of more economical operation, gravity being used extensively in taking the ore out of the mine. It is said by the management that there is a body of about 60,000 tons of ore "in sight," from every five tons of which one ton of 50 per cent. zinc ore can be hand sorted; while it is expected the "second-class" ore will concentrate four into one of 50 per cent. zinc ore.

It has been said that some of the coal mines in the Crow's Nest district were thinking of building a number of coke ovens similar to those now in use in Germany, which save some of the by-products, lost in the ordinary bee-hive oven. This would seem to be a great step toward economy. It is said that as much as four gallons of tar useful for aniline manufacture and two pounds of sulphate of ammonia could be saved per ton of coal coked. In fact, the by-products have been found more valuable than the coke itself. As an instance, at the Crow's Nest Pass collieries, Michel and Fernie about 1800 tons of coke is made per day in the bee-hive ovens, a loss ensuing, roughly speaking, of about 14,000 gallons of valuable tar product and about 3500 lb. of sulphate of ammonia, to say nothing of possible illuminating gas, which could be used to advantage for lighting, possibly, and generation of power, surely. Without knowing all the actual conditions it seems as though it would pay the companies along the Crow's Nest to put in apparatus for distillation, providing a method that is not too slow can be found and adopted. Furthermore, the loss of these valuable by-products of coal year in and year out is not only a loss to the operating companies themselves but is a national loss that will surely make itself felt in due time.

GENERAL MINING NEWS.

NOVA SCOTIA.

Glace Bay, Jan. 17.—J. H. Plummer, President of the Dominion Iron and Steel Co., and Coal Co., and M. J. Butler, General Manager of Companies, spent this afternoon in town, and visited the various departments of the company's works here. They were accompanied by D. H. McDougall, General Superintendent of Mines and Quarries, and Hector McInnes, the company's solicitor. The early afternoon was spent in conference with General Manager Duggan, Mine Supt. B. McKenzie, Messrs. McEachern and P. Christianson, the managers of the general collieries and other officials.

Answering the inquiry as to whether he would meet a representative of the strikers, Mr. Plummer said that he had not met the representatives of the United Mine Workers Association, and that he did not consider it necessary that he should meet them. The position of his company ,as regards its employees had already been plainly stated, and a meeting with these representatives to discuss the terms on which the men now out of employment may return to work, might be misconstrued as a recognition of the United Mine Workers of America, which would be against the policy of the company since the beginning of the present disagreement.

President Plummer intimated though that any of the men now out of work would be taken back as soon as places could be made for them, should they desire to return.

ONTARIO.

Verona.—From the McDonald feldspar property at Verona shipments amounting to more than 3000 tons of this mineral were made in the last six months of 1909. The present output is about 500 tons per month.

Brockville, Ont., January 17.—Clifford E. Smith, mining engineer, of Brockville, has issued a writ in the High Court against Dr. Milton L. Hersey et al., of Montreal, purchasers of mining claims A26 and A39, and against the Wyandoh Silver Mines Ltd., of Cobalt. Smith claims his agreement was for a one-tenth interest in these properties, and asks for a declaration of his title to the same, and also for damages to the extent of $55,000.

Toronto, January 18.—A car load of silver ore from Gowganda, en route to Thorold, is expected in some time to-day. This is the first carload from Gowganda country. It comes from the Reeves-Dobie mine. It is consigned to the Conagas smelter at Thorold, where it will be treated.

Only a little more than a day sufficed in transportation along forty-five mile road through mush. On Friday morning twenty-five sleighs started, each one loaded with sacks containing about one thousand pounds of ore, and on Saturday afternoon the railroad was reached.

BRITISH COLUMBIA.

Greenwood, Jan. 7.—The local branch of the Western Federation of Miners has notified the British Columbia Copper Company that members in its employ at Mother Lode mine and local smelter will quit work on Tuesday, January 10th, unless the company agrees to employ members of the order exclusively.

The demand has been refused by Frederick Keffer, general manager, who, in reply, states that it would be impossible to coerce non-union employees to join the federation. As long as an employee was efficient he did not care anything about the man's creed, nationality, or connection with labour unions.

The situation here is acute, but it is hoped that a strike, involving the suspension of mining and smelting operations, resulting in the enforced idleness of 500 men, will be averted.

There has been a strong feeling in the ranks of the union employees because many of their fellow workmen refused to join the federation. Recently, as a test case, one of the non-union employees was fined $50 for refusing to join the federation, and later an additional $10 was imposed for failure to pay the fine.

MINING NEWS OF THE WORLD.

RUSSIA.

A report on the Russian naphtha industry has been furnished to the "Frankfurter Zeitung" by its St. Petersburg correspondent. "As far as can at present be judged," he writes, "the past year has brought retrogression rather than progress in the Russian naphtha industry. Over-production is on the increase, and the circle of customers is not being extended. As I learn from a competent source of information, the stocks of petroleum in 1909 show a considerable increase as compared with those of previous years. Prices at the same time display unusual fluctuations. This is a state of affairs that utterly contradicts the rumours current both here and abroad as to a secret syndication of the Russian oil-works. On the contrary, embittered competition prevailed the whole year through in the Russian oil market. Exact statistics of the petroleum output up to 1st December, 1909, are now to hand, and give a total of 449,580,000 poods, as compared with 433,180,000 poods for the corresponding period of 1908. That makes an increase of 16,400,000 poods of raw oil for the eleven months, which is to be attributed exclusively to developments in the Bibi-Eybat district. In all the other districts the output has receded considerably, a circumstance which appears to confirm the view that the old areas of exploitation in Baku are petering out. As to export, the estimated figure for 1909 is 28,000,000 poods, as against 90,000,000 poods in former years."

The Russian Ministry of Commerce is said to be considering the question of reducing the royalties levied by the Treasury on small-sized petroleum plots at Baku.

GREAT BRITAIN.

A meeting of the South Wales Coal Conciliation Board was held at Cardiff, January, 11th, to commence negotiations for a new wages agreement. The proceedings were preliminary in character. The men have given three months notice to terminate the present agreement, and unless a new agreement is decided upon before the notices expire the men will come out on strike. At present their demands are—the raising of the minimum wage from 30 to 40 per cent. above the 1879 standard and the abolition of the maximum wage, the payment of a

special allowance to colliers working in abnormal places, the payment in respect of small coal, the payment of six turns for five worked by night men, and that the lowest paid workman shall receive a standard wage of not less than 3s 4d per day. On the other hand, there was to be dealt with employers' claim to damages for the men's refusal to work the extra sixty hours provided for in the Eight Hours Act, and in respect of which the employers had obtained a Divisional Court decision in their favour. This matter was discussed at length.

The employers have not framed their proposals, but intimated that they would forward them to the Miners' Federation on Saturday. The owners expressed surprise at the men's demand for payment for small coal, pointing out that it was a violation of the Conciliation Board agreement, which provided that the cutting price paid upon the weight of the large coal included all services in respect of small coal. The men's representatives replied that, while anxious to carry out the provisions of the existing agreement in reference to small coal, they were bound by this demand to protect the men against the owners' claim for damages for the refusal of the men to work the extra sixty hours under the Eight Hours' Act. The owners declined to withdraw this claim for damages, and it was agreed that the differences between the parties on this point should not be a bar to proceeding with the negotiations for a new agreement. In order to prevent injury to the trade which would result from the prolongation of the negotiations up to the date of the termination of the men's notices on 31st March, it was agreed that a definite arrangement should be arrived at by 28th February, and that for this purpose the Conciliation Board should meet on Wednesday and Thursday in each week. The Board then adjourned.

The situation in the Northumberland coal trade continues unsettled. The miners are concentrating their efforts to resist the introduction of the three-shift system, under the Eight Hours Act. Several collieries have resumed work under the new system, but this does not mean that they are satisfied with the arrangement, but only that they are endeavouring to give the new working conditions under the new Act a practical trial.

The North-West Durham Miners' Federation, at a mass meeting attended by 3,000 men at Medomsley, on January 5, decided to remain loyal to the ballot of the local lodges and remain out on strike against the Eight Hour agreement, and also to ask other collieries at present working to cease until the dispute was satisfactorily settled. An amendment that the men resume work under protest for three months pending modification of the three shifts per day agreement was supported by about 50 men. It was announced that the Langley Park Colliery had struck work, and it was agreed to appeal to the collieries unaffected for financial assistance until a settlement had been effected.

UNITED STATES.

Colorado Springs, Colo., Jan. 11.—Not less than 30 high-grade fences are being operated in the Cripple Creek district, according to the mine owners who held the annual meeting of their association here yesterday, and the fight against the illegal traffic in ore is to be waged more earnestly than ever. The subject was the principal business discussed by the association members, more than 50 attending the meeting and outlined plans for the next year.

The reports showed that during the year $250,000 had been stolen in ore by the high-graders of the district, although much had been accomplished, it was reported, by the association in running down the thefts. Four convictions were secured during the year and the men are serving terms in the penitentiary.

CUBA.

The Havana Asphalt and Bitumen Company has been registered with a capital of £80,000, in £1 shares, to acquire a license to work the asphalt, bitumen and oil-bearing deposits known as the Mariel group of mines, Cuba, and also to adopt an agreement between the Havana Exploration Company of the first part, Havana investment Syndicate and the liquidator thereof of the second part; and to carry on the business of miners, refiners of and dealers in asphalt, bitumen, oil and other mineral substances.

Company Notes

The International Coal & Coke Company has increased its dividend from 1¼ to 1½ per cent. quarterly. The dividend is payable February 1, to shareholders of record January 20.

The management of the Nipissing Mines Company has sent shareholders the following brief statement showing the physical and financial conditions of the operating company on January 1, 1910 as compared with conditions on January 1, 1909.

1909 company shipped 6,510 tons, ore valued at net..	$2,210,364
1908 company shipped 3,505 tons, ore valued at net..	1,363,783
Increased tons, 3,005; net inc	846,581
On January 1, 1910 our cash surplus was	$1,322,985.50
On January 1, 1909, our cash surplus was.....	$920,475.16
Increase	$402,510.34
1909 dividends	$1,500,000
1908	840,000
Increase	$660,000

From this statement it will be noted that although dividends during the past year have been almost doubled, the cash surplus has been increased more than $400,000. The general manager reports that the ore reserves are greater to-day than at any period in the company's history

---

STATISTICS AND RETURNS

SOUTH AFRICA.

Johannesburg.—The dividends declared by Rand gold mining companies for 1909 total £9,217,071.

Transvaal gold mines outside the Rand have declared £184,298.

AUSTRALIA.

Sydney, Jan. 4.—Leave has been granted by the courts for the prosecution, under the amended Industrial Disputes Act, of four union officials, including Mr. Bowling, the president of the Miners' Federation.

OPERATIONS OF THE ROYAL MINT IN 1909.

The Deputy Master of the Royal Mint has issued the following summary of the operations of the Mint during the past year compared with 1908:—

IMPERIAL COIN ISSUED AND WITHDRAWN.

GOLD.

	Issued.		Withdrawn.	
	1908.	1909.	1908.	1909.
Sovereigns	12,600,000	11,800,000	1,705,000	1,618,000
Half Sovereigns ..	2,000,000	2,000,000	1,595,000	1,382,000
Totals	14,600,000	13,800,000	3,300,000	3,000,000

SILVER.

	Issued.		Withdrawn.	
	1908.	1909.	1908.	1909.
	£	£	£	£
England & Wales	362,876	496,699	150,300	640,350
Scotland	48,400	32,000	25,630	40,240
Ireland	12,000	126,500	64,295	37,000
Colonies	392,475	734,400	15,194	17,531
Totals	815,751	1,389,599	255,419	735,121

BRONZE.

	Issued.		Withdrawn.	
	1908.	1909.	1908.	1909.
	£	£	£	£
United Kingdom	138,135	102,401	5,260	20,275
Colonies	17,445	19,410	200	600
Totals	155,580	121,811	5,460	20,875

NUMBER OF PIECES STRUCK.

	1908.		1909.	
Imperial:—				
Gold	15,725,998		16,167,814	
Silver	23,804,187		22,846,050	
Bronze	52,391,808	—91,921,993	36,748,544	—75,762,408
Colonial:—				
Silver	9,510,829		2,750,072	
Bronze	99,000		525,000	
Nickel	12,817,152		34,102,000	
Aluminium	12,134,068	—34,561,049	nil	—37,377,072
Totals	126,483,042			113,139,490

The operations of the Dominion Steel Company for the year just closed were affected adversely by the disturbance in supply of coal through the strike at the Dominion Coal Company's collieries.

The company suffered from an actual shortage in quantity, which could not be promply made good by purchases elsewhere, and also from the variation in the quality of coal brought from other sources.

Notwithstanding this the production of steel was considerably increased, and the other figures make a satisfactory showing. The production in 1904 and 1908 respectively were as follows:

	1909. Tons.	1908. Tons
Coke	401,182	411,086
Pig Iron	256,496	262,839
Steel ingots	296,950	279,513
Blooms	262,052	248,621
Rails	140,738	152,440
Wire rods	73,004	40,420

The receipts of iron ore, and the shipments of iron and steel were as follows:

Ore from Wabana	530,682	556,255
Ore from other sources	14,765	44,212
Shipments	267,286	246,041

Considerable progress has been made in the work of enlarging the plant. The new coke ovens are well under way. Contracts have been let for the new blast furnace, the additions to the open-hearth, and for most of the other additions proposed. By next autumn the capacity of the plant will have been very greatly increased.

Kalso Shipments During December.

The ore shipments through Kaslo for the month of December totalled 1,160 tons, of which 620 were silver-lead and 540 zinc, The latter class of ore was shipped exclusively by Lucky Jim with 320 tons and the Whitewater 220. In addition the Whitewater and the Deep under the same management, shipped 420 tons of silver-lead or about two-thirds of the entire tonnage of that class of ore. The December tonnage puts the total output of the Kaslo-Slocan mines for 1909 up to 19,852 tons of silver-lead and zinc ores.

Three new properties appear in the shipping list, namely, the Utica at Sproules, the Gold Cure up South Fork and the Ohio at Whitewater. Nine properties shipped the last month of the year, they and their tonnage being as follows:—

Mine	Tons.
Silver-Lead.	
Rambler	60
Utica	40
Cork	20
Flint	20
Gold Cure	20
Ohio	20
Whitewater Deep	240
Whitewater	180
Zinc.	
Lucky Jim	340
Whitewater	220
Total	1,160

The output for 1909 totalled 19,852 tons of silver-lead and zinc.

B. C. ORE SHIPMENTS.

Nelson, Jan. 8.—Following are the details of the ore shipments for the first week of the new year:

Boundary	
Granby	26,034
Mother Lode	9,250
Ore Denoro	370
Snowshoe	4,196
Total	39,850
Rossland.	
Centre Star	4,602
Le Roi	393
Le Roi No. 2	711
Total	5,706
Slocan-Kootenay.	
St. Eugene	340
Broadview	31
Silver Cup	76
Arlington	20
Richmond-Eureka	67
Standard	68
North Star	87
Whitewater	78
Blue Bell	110
Van Roi	47
Total	924
Grand Total	46,560

The smelter receipts follow:

Granby, Grand Forks	26,034
Consolidated Co., Trail	10,906
B. C. Copper Co., Greenwood	9,620
Total	46,560

B. C. ORE SHIPMENTS.

Nelson, January 15.—The ore shipments and smelter receipts in detail are as follows:

ORE SHIPMENTS.

Boundary

	Week.	Year.
Granby	26,572	52,606
Mother Lode	9,875	19,125
Oro Denoro	350	720
Snowshoe	1,432	5,708
Total	38,229	78,159

Rossland.

	Week.	Year.
Centre Star	3,199	7,801
Le Roi No. 2	152	863
Velvet	69	69
Other Mines		393
Total	3,420	9,126

Slocan-Kootenay.

St. Eugene	398	738
Richmond-Eureka	187	254
North Star	40	127
Blue Bell	66	176
Whitewater	42	120
Queen	19	19
Belcher	57	57
Rambler-Cariboo	23	23
Emerald	64	64
Highland Buckeye	67	67
Ferguson	31	31
Yankee Girl	87	87
Nugget	32	32
Granite Poorman	33	33
Eastmount	32	32
Other mines		242
Total	1,178	2,102
Grand Total	42,827	89,387

SMELTER RECEIPTS.

	Week	Year.
Granby	26,572	52,606
Consolidated Co.	6,156	17,062
B. C. Copper	10,225	19,845
Total	42,953	89,513

The Transvaal gold output for December showed an increase in value of £30,676, but the daily average production was lower. The gold output for the year was a record. Native labour showed a gain of 4,674 "boys" for the month.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending January 21, and those from January 1, 1910, to date:—

	Jan. 21. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	47,644	112,144
City of Cobalt	.....	64,000
Cobalt Central	.....	40,000
Cobalt Lake	132,000	132,000
Coniagas	.....	119,542
Crown Reserve	123,353	245,785
Drummond	264,200	664,200
Kerr Lake	182,392	302,605
King Edward	49,952	49,952
La Rose	256,059	577,031
McKinley-Darragh	50,329	98,370
Nipissing	302,939	365,240
O'Brien	64,056	64,056
Right of Way	64,902	127,963
Temiskaming	60,000	60,000

Ore shipments for week ending January 21 were 1,597,826 pounds, or 798 tons. Total shipments from January 1 to January 21 were 3,022,888 pounds, or 1,511 tons.

TORONTO MARKETS.

Metals.

Jan. 24.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 6½ cents per lb.
Lead, 3.75 cents per lb. (very strong).
Antimony, 8¼ to 9 cents per lb.
Tin, 35¾ cents per lb.
Copper, casting, 14¼ cents per lb.
Electrolytic, 14¼ cents per lb.
Ingot brass, 9 to 12 cents per lb.

Jan. 24.—Pig Iron—(Quotations from Drummond, McCall Co.)
Summerlee, No. 1, $23.50 (f.o.b. Toronto).
Summerlee, No. 2, $23.00 (f.o.b. Toronto).
Midland, No. 1, $22.50 (f.o.b. Toronto).
Coal—Anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

Jan. 20.—Connellsville coke (f.o.b. ovens).
Furnace coke, prompt, $2.60 per ton.
Foundry coke, prompt, $3.00 per ton.

Jan. 20.—Tin (Straits), 32.45 cents.
Copper, prime Lake, 13.95 cents.
Electrolytic copper, 13.62½ cents.
Copper wire, 15.25 cents.
Lead, 4.70 to 4.75 cents.
Spelter, 6.25 cents.
Sheet zinc, 8.50 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 21.75 to 23.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum (hard), $34.50 per oz.
Platinum (ordinary), $29.00 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $51.00 to $51.50 per 75-lb. flask.

SILVER PRICES.

		New York. cents.	London. pence.
January	6	52½	24 3-16
"	7	52¼	24 1-16
"	8	52⅜	24⅛
"	10	52½	24 3-16
"	11	52½	24 3-16
"	12	52⅜	24⅛
"	13	52⅜	24⅛
"	14	52½	24 3-16
"	15	52½	24 3-16
"	17	52⅜	24½
"	18	52⅜	24½
"	19	52½	24 3-16
"	20	52¼	24⅛
"	21	52¼	24⅛

GOLDORA MINES LIMITED
Suite 1608 - 80 King Street, West,
Toronto (1) , Ontario

PROGRESS REPORT:

Goldora Mines reports that Hole No. 2, driven to cut a magnetometer anomaly along the sedimentary-lava contact on the Westerly projection of the Obaska Mines orebody, was terminated at 500 feet. Considerable delay was caused by caving which necessitated cementing the hole on three occasions. Core returns showed abundant quartz and carbonate veinlets, considerable pyrite mineralization, some chalcopyrite and lastly, a fine grained andesite similar in appearance to the one in which the ore occurs at Obaska Mines.

Drilling of Hole No. 3 , sited 700 feet West of No. 2 with design to cross-section the same contact and general conditions associated with the latter, is in progress.

August 16, 1944

GOLDORA MINES LIMITED.

Inside Page

Also Shelves

Color

SAFETY = SPEED = SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" OF THE ATLANTIC

FASTEST and FINEST
in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records
between Liverpool and Canadian Ports

---

900 Miles on Enclosed and Sheltered Waters
LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent,
Board of Trade, - MONTREAL.

ANNOUNCEMENT

IN PRESS—WILL BE ON SALE EARLY IN FEBRUARY.

THE HANDBOOK OF THE COBALT DISTRICT

Including a Manual of Incorporated Companies.

By H. P. DAVIS.

¶ The first section of this volume is a treatise on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 paper Cover. - - $2.00 Stiff Cover.

BOOK DEPARTMENT

CANADIAN MINING JOURNAL

TORONTO

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Campbell & Deyell
DeMorest, Stull & Low
Evans, J. W.
Gwillim, J. C.
Gillespie, G. H.
Hassan, A. A.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Ramsay. J. D.
Roland, W.
Scott, O. N.
Tyrrell, J. B.
Willmott, A. B.
McGee, Boyd

Astley, J. W.

Quebec

Hardman, J. E.
Hersey, Milton L.

Nova Scotia

Brown E. Percy

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

Nova Scotia

McCallum, A. L.

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

BARRISTERS, SOLICITORS, ETC.

Ontario

Bartram, Wadsworth & Sherry

Ontario

Ryckman, Kerr, MacInnes & Mahon

British Columbia

Hallett, I. H.

Ontario

McPherson, Laug & Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N.Y.

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

WILLMOTT, A. B.
M.A., B.Sc.
Consulting Mining Geologist
Sault Ste. Marie, Canada
Consulting Geologist
Lake Superior Corporation

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 James St. Montreal

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA, ELK LAKE, TORONTO
Bartram, Wadsworth & Sherry
J. B. Bartram, W. R. Wadsworth, C. J. Sherry.
Continental Life Building, Toronto, Ontario
Solicitors for { Imperial Bank of Canada, Elk Lake / Royal Bank of Canada, Gow Ganda
Cable Address, "Barwad." Western Union Code

W. D. MCPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: MCPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

GOWGANDA PORCUPINE LAKE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98
Porcupine Claims—Write Matheson Post Office

A CROWN MINERAL PROPERTY

Suppose the Government should say to you there is a property worth $10,000. We will sell it to you for $10,000, payable in 20 annual instalments and won't charge interest on deferred payments. In event of your death at any time during the 20 years, we guarantee to cancel the balance due and execute a warranty deed to your wife, or if she prefers, we will pay her $10,000 in cash. If you live to complete all payments, we will pay you $10,000 cash, plus interest earned on your annual deposits. Chances are you would jump at it. We are making just such an offer backed by assets of over $45,000,000. Better investigate it.

ROYAL INSURANCE COMPANY Limited OF LIVERPOOL, ENGLAND Founded 1845

Full particulars on application to

A. R. HOWELL, Superintendent
Royal Insurance Building, Montreal, Que.

OR

W. H. LEACOCK, Inspector
Royal Insurance Building, Toronto, Ont.

Newton & Treloar

Commercial & General
PRINTERS

14 Johnson Street, Toronto

FOR SALE—Three 125-ton Copper Smelting Furnaces. Four Connersville Blowers; capacity 72 cu. ft. per revolution; direct connected to Erie Engines. Three Converter Stands and fourteen Shells, 84 x 126, for electric drive.

Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONTARIO.

FOR SALE—One Double-Drum Hoist; drums 8 ft. diameter, 6 ft. 3 in. wide; frame 24 ft. x 11 ft. 6 in.; cylinders 14 x 18; capacity 2½ tons at 700 ft. per minute. One 100 H. P. and one 75 H. P. Boiler, both tested to 100 lbs. pressure. One Northey Sinking Pump, 8 in. x 4 in. x 12 in. One Worthington Duplex Pump, 20 x 10¼ x 10. One 40 H. P. Jenckes Machine Company Engine, 10 x 14. Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONTARIO.

Second Edition With New Material

Simple Mine Accounting

By David Wallace

78 pages, 6x9, with forms. $1.00 (4/6) net postpaid.

Some very good material has been added to this excellent little book. It has some new sections on card systems for warehouses, shipping documents, sheets of costs and profits, etc., etc.

From the first publication the book has proved most useful to every Superintendent or Mine Manager who wasn't an expert accountant and whose business wouldn't warrant employing one.

It is essentially *simple*. It shows how to develop the ordinary books and systems of a small mine (or a large one) so as to preclude the slipshod, inaccurate methods which are so expensive to every business. It isn't an expert accountant's book, but it shows how to keep records that are accurate and tell the real facts.

BOOK DEPARTMENT
Canadian Mining Journal
Confederation Life Bldg. - TORONTO

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite,
etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL. 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. **Cable Address, BATHOTA, London**

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

SOLIGNUM

Preserves wood under any conditions. For MINING TIMBERS it is invaluable. **Solignum** goes right into the wood. **Solignum** treatment works out ⅓ price of paint.

Write for Booklet with Particulars to

F. STURGEON *34 Yonge St., Toronto*

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.



An Accurate Ore Test on any metal in 10 minutes For Five Cents.

Thats what the Mining Man or Prospector can have, provided he has a Way's Pocket Smelter Outfit. Anybody can make his own tests right in his office or in the field on **any ore**. Think of what this means to a prospector "miles away from nowhere" or to the mining man who must make dozens of tests a day.

Write for folder giving full information about **Way's Process** and describing both field and laboratory outfits.

WAY'S POCKET SMELTER CO.
Box 954, South Pasadena, Cal.

NOW READY

Mining Law of Canada

BY

ALFRED B. MORINE, K. C.
(Of the Bar of Ontario, Nova Scotia and Newfoundland)

The following table of contents conveys a fair idea of the scope of the work :

CHAPTER I
Mining Terms and Phrases.

CHAPTER II
PART 1—Laws in force.
PART 2—Dominion Legislation.
PART 3—Provincial Legislation.
(*a*) Manitoba, Alberta, Quebec, Nova Scotia and New Brunswick.
(*b*) Ontario.
(*c*) British Columbia.

CHAPTER III
PART 1—Crown Lands.
(*b*) Indian Lands.
(*c*) Railway Belt.
PART 2—Railways and Highways.

CHAPTER IV
Capacity to Work, Sell, Lease or License.
PART 1—Extent of Rights.
PART 2—Capacity to Lease.
PART 3—Partnerships and Companies.

CHAPTER V.
CONTRACTS
PART 1—Making.
(*a*) Statute of Frauds.
(*b*) Part Performance.
PART 2—Enforcing.
(*a*) Statute of Limitations.
(*b*) Specific Performance.
PART 3—Terminating.
(*a*) Rescission.

CHAPTER VI.
Mining Licenses and Mining Leases.
PART 1—(*a*) Bare Licenses.
(*b*) Profits à Prendre.
(*c*) Leases.
PART 2—(*a*) Parcels.
(*b*) Term.
(*c*) Covenants.
(*d*) Forfeiture and Re-entry.
(*e*) Reservations and Exceptions.

CHAPTER VII
PART 1—Easements.
PART 2—Fixtures.

CHAPTER VIII
PART 1—Employer's Liability.

CHAPTER IX.
Wrongful Abstraction.
Criminal Offences.

CHAPTER X
PART 1—Assessment.
PART 2—Registration.

GLOSSARY
APPENDIX I.—Statutes and Regulations of the Dominion, and Statutes of Ontario British Columbia and Quebec.
APPENDIX II.—Working Forms.

HALF CALF - $7.50

Book Dept. Canadian Mining Journal - - Toronto

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ainsworth, Wm., & Sons xiv
Ackroyd & Best, Ltd xiii
Allan, Whyte & Co. v
Astley, J. W. xx

B

Beatty, M., & Sons, Ltd. ix
Baszanger, Jacques & Co.....xi
Belliss & Morcom, Ltd viii
Berger, O. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply..... xxvii
Bartram, Wadsworth & Sherry xx
Behrend Concentrators Ltd..... xi
Brown A. H.....xx

C

Canada Metal Co..... xv
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute xiv
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Canadian Northern Ontario Ry..xxi
Curtis & Harvey, Ltd.....xxvii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xiii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks.... viii
C. L. Constant Co., outside back cover

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus xii
Drummond, McCall & Co.....xii
Dominion Coal Co., Ltd. xiv
Dietzgen, Eugene, Co., Ltd.... xvi
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables.....iv
Davis, John & Son..... xvi
Dessau's, S. Sons.....vii

E

Evans, J. W.....xix

F

Fleck, Alex., Ltd. viii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gillespie, Geo. H. xix
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v
Grand Trunk Ry xxix

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iii
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C. xx
Laurie & Lamb viii
Lymans Ltd.....xiii
Link Belt Co. xii
Leckie, J. Edwards xx
Ledoux & Co. xx
The Lancashire Dynamo and Motor Co., Ltd..... x

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Metal Shingle & Siding Co.... xiii
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxi
Nova Scotia, Province of.....xxvi

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros. .....vi & vii
Patterson Mfg. Co. xii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx
Royal Insurance Co. xxi

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co.....viii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Sydney Cement Co., Ltd..... xiv
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,. Ltd xi

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Seperating Co. x

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905. Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

WHY IS IT

THAT SALES OF

MORTON'S "BC"

Drill Steel

ARE INCREASING EVERY DAY?
MUST BE IT IS BETTER MATERIAL,

Gives Best Satisfaction

AND THE DRILL

Lasts Longer.

COULD ANYONE EXPECT MORE?

IN STOCK WITH

E. G. PRIOR, Victoria, B.C.
CANADIAN RAND CO., Cobalt.
BAINES & PECKOVER, Toronto.
ANGEL ENGINEERING & SUPPLY Co. St. John, Nfd.

Canadian Representative

D. W. CLARK, P.O., Box 521, **Toronto.**

GRAND TRUNK RAILWAY SYSTEM

The Longest Continuous Double Track Railway in the World Under One Management.

The Great Double Track Route Through Canada.

Fast passenger service from the Atlantic Ocean to the head of the Great Lakes. The line taps all the principal commercial centres in Canada and reaches the important points in the States of Maine, New Hampshire and Vermont, the principal towns and cities in the Provinces of Quebec and Ontario, and many important places in the States of Michigan, Indiana and Illinois.

The "International Limited" (Canada's Railway Greyhound)

The Finest and Fastest Train in the Dominion

Runs every day in the year leaving Montreal at 9.00 o'clock in the morning for Toronto, Hamilton, Niagara Falls, Buffalo, Detroit, Chicago and intermediate points.

Write for copy of "Trains 3 and 4" descriptive of the route from Chicago to the sea, to J. Quinlan, Bonaventure Station, Montreal, or to J. D. McDonald, Union Station, Toronto.

W. E. DAVIS,
Passenger Traffic Manager,
MONTREAL.

G. T. BELL,
Assistant Passenger Traffic Manager,
MONTREAL.

GEO. W. VAUX,
General Passenger Agent,
MONTREAL.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
N. J. Holden Co.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
A. M, Ellicott Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
A. M. Ellicott Co,
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.
Drummond, McCall & Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.

Crossings (Diamond —
Montreal Steel Works, Limited

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cement—
Sydney Cement Co., Ltd.
Link Belt Co.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.
Peacock Bros.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Drummond, McCall & Co.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Peacock Bros.
A. M. Ellicott Co.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Eugene Dietzen Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Drummond, McCall & Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.

Girders, Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
A. M. Ellicott Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Peacock Bros.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Metal Shingles—
Metal Shingle and Siding Co.
Pedlar People.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
The Hardy Patent Pick Co.
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.

Pipe (Cast, Wrought, Spiral, Riveted)—
Drummond, McCall & Co.

Roofing, Steel—
Metal Shingle & Siding Co.
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Peacock Bros.
Canadian Cleveland Drill Co.
N. J. Holden Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Durmmond, McCall & Co.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
The Hardy Patent Pick Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.
Drummond, McCall & Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Eugene Dietzgen Co.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Drummond, McCall & Co.
Morton & Co.
Thos. & Wm. Smith
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Smith, Thos. & Wm., Ltd.
Drummond, McCall & Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

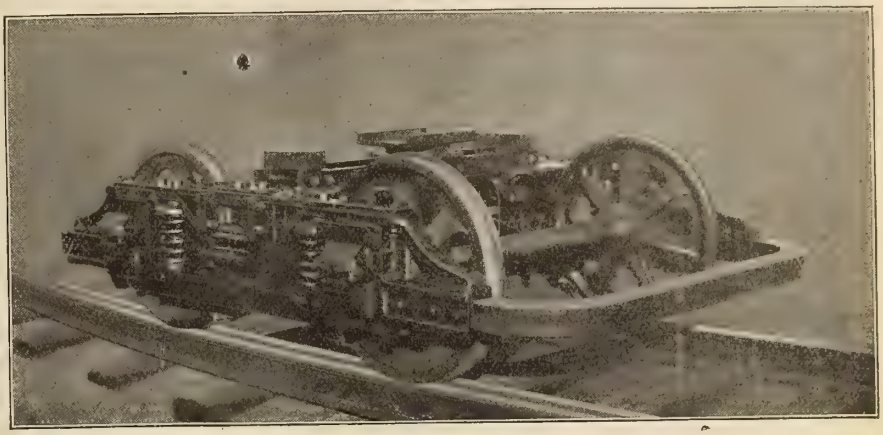
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"

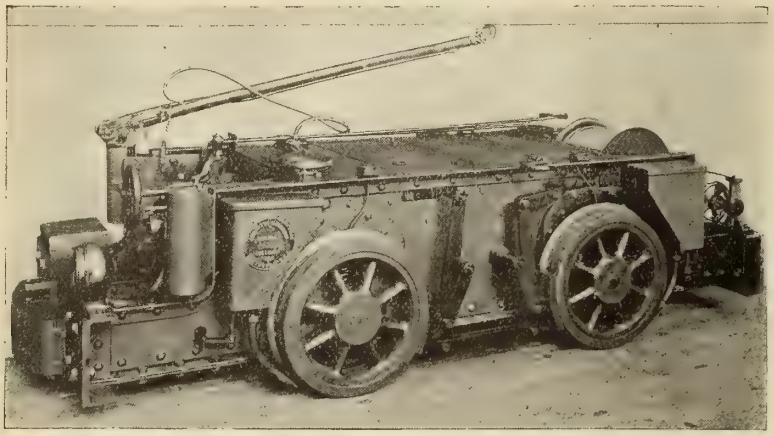


A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Baldwin-Westinghouse
ELECTRIC MINE LOCOMOTIVES



Baldwin-Westinghouse Steel-Frame Gathering Locomotive

B-W Mine Locomotives represent the combined experience of the Baldwin Co., as builders of locomotives, and the Westinghouse Co., as builders of electrical apparatus.

Built in all Types and all Capacities

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
252 St. James Street, MONTREAL.
158 Granville Street, HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.



BUY YOUR OUTFIT AT SIMPSON'S

We'll supply you with an outfit complete from tent to pick-hammer.

We'll pick out a prospector's outfit for travelling light or an outfit for developement work at a stationary camp. Don't overload yourself. We can help you choose what you really need and we can do it at a minimum expense.

THE SIMPSON MINER'S KHAKI DUCK SHIRTS.

A Shirt with "no end of wear." A Shirt made of the strongest khaki duck—in the strongest kind of way—by men who are highly experienced in miners', surveyors' and prospectors' outfits. Buying these shirts in very large quantities, we are able to offer you a shirt worth in every way $1.50 for - **One Dollar per Shirt.**

Miners', surveyors' and prospectors' shirts, heavy khaki duck collar, two pockets with buttoned flaps, dome fasteners, sizes 14 to 18. Our special value at **$1.00**.

OUR SPECIAL UNDERWEAR FOR MINERS.

We recommend heavy pure wool, the kind that feels warm and is warm, all the time, whether wet with perspiration or not. Try our heavy all wool with just a little camel's hair mixed with it—making a very soft garment next the skin, and giving "the highest degree imaginable," of cold weather protection and comfort. This underwear we specialize at - - - - **One Dollar per Garment.**

SIZES 34 to 48.

OUR SPECIAL TARTAN FLANNEL SHIRTS.

The cashmere flannel in these garments can only be made in Glasgow, Scotland. We import it in large quantities and have it made by skilled workmen into shirts to our own specifications, making the price of the very best quality only **$3.00 per shirt.**

Men's, all wool, cashmere, flannel, tartan, shirts, made with reversible collars, and pockets, genuine fabric, best tailoring, they fit perfectly in every way. Our Special Price is - - - - - - - **$3.00.**

THE ROBERT **SIMPSON** COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

Mining and Metallurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

THE CANADIAN MINING JOURNAL

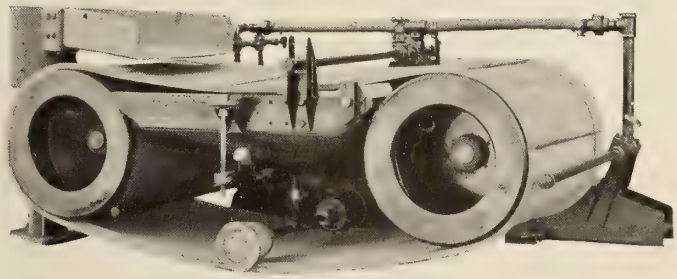
L. 31 TORONTO No. 4

We have been appointed Sole Canadian Agents for the well-known



Callow Tank—The quickest tank for settling and pulp thickening.

Callow Tanks and Screens



Callow Screen.

WRITE FOR FULL PARTICULARS

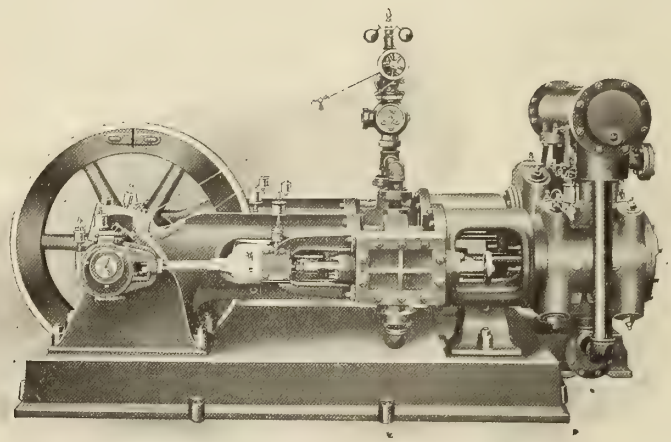
MUSSENS LIMITED

Head Office: MONTREAL

Branches TORONTO, 73 Victoria Street
COBALT, opposite Right of Way Mine
WINNIPEG, 259-261 Stanley Street
VANCOUVER, Mercantile Bldg.

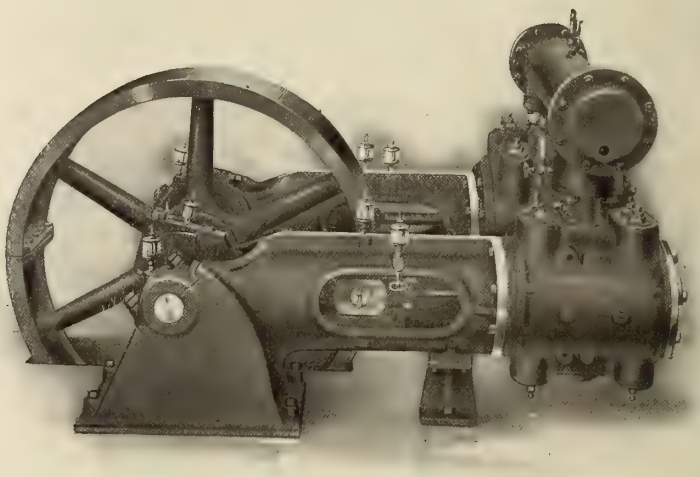
LAIDLAW - DUNN - GORDON

AIR COMPRESSORS



STEAM DRIVEN

POWER DRIVEN



Send for Bulletin L-521 which gives an index of special bulletins covering compressors suitable for the more important uses to which compressed air may be applied.

The John McDougall Caledonian Iron Works Co.

LIMITED

Works: Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

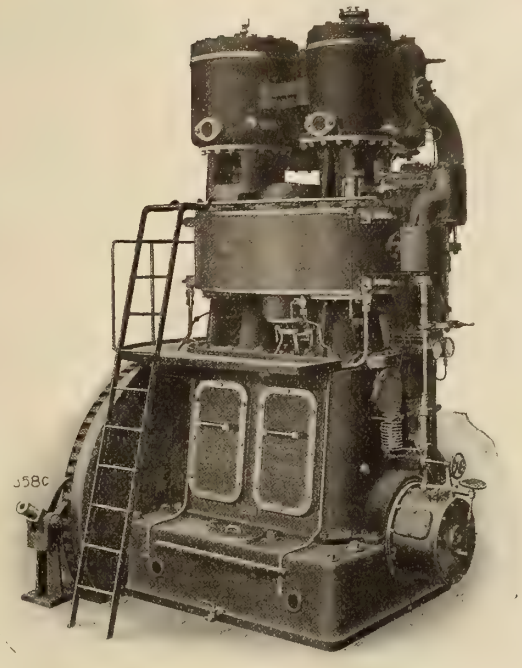
BELLISS AIR COMPRESSORS

STEAM OR ELECTRIC DRIVE

SINGLE and TWO STAGE

Capacities: 250 to 10,000 cubic ft. Air per minute.

BUILDERS:
BELLISS & MORCOM
LIMITED
Birmingham, England



Steam units embody the principal features of the Belliss Forced Lubricated Engine.

Can be depended on to run continuously for long periods.

LAURIE & LAMB, CONSULTING AND CONTRACTING ENGINEERS, **Montreal**

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.

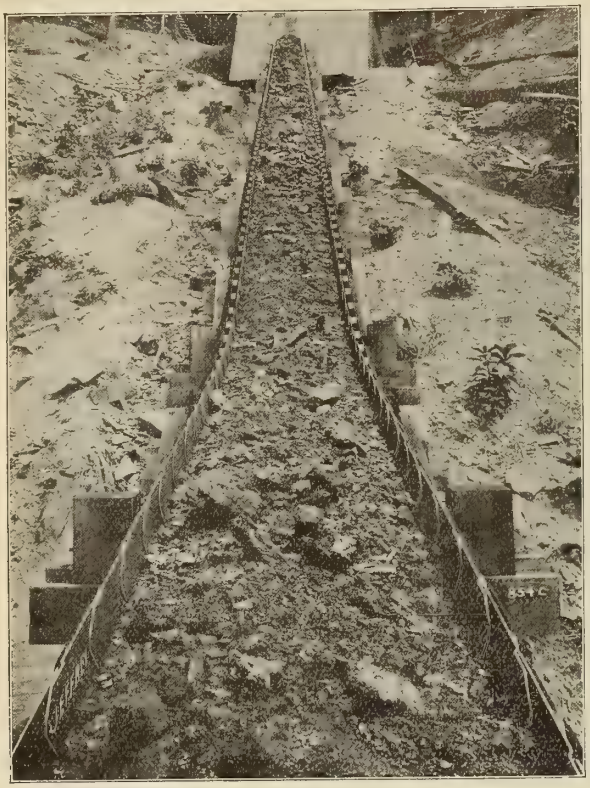


Write us for Bulletin 40-A

CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 522, Cobalt, Ontario



JEFFREY
Retarding Conveyers

are the best means of delivering coal from upper to lower tipple without breakage. We have Conveyers of this type in operation handling from 50 to 500 tons, distances as great as 1150 ft.

Descriptive Catalogue 67

WE BUILD

Complete Coal Mine and Tipple Equipments

including

Electric Locomotives, Coal Cutters, Drills, Car Hauls, Coal Washeries, Screens, Crushers, Fans, Cages, Pumps, Hoists, Elevators, etc.

General Catalogue 81

THE JEFFREY MFG. COMPANY

COLUMBUS, OHIO, U.S.A.

Canadian Office and Works. Cote and Lagauchetiere Sts., Montreal
Toronto Office, Room 6, Dineen Bldg. Temperance Street

Rock Drilling Efficiency



Sullivan "UE11" (Tappet Valve) Drill in a soft iron-ore mine in Northern Michigan.

is measured by air consumption plus wear and tear, plus labor, divided by the footage drilled.

If you will keep a record of these items from month to month, or year to year, you will find that your Sullivan Drills are drilling more feet, at a lower cost per foot, that is, are more efficient than any other drills working under the same conditions.

Try it. If you have no Sullivan Drills at your mine, let us send you one.

CATALOGUE 660.

Diamond Drills
Air Compressors
Hoists.

SULLIVAN MACHINERY CO.

CHICAGO, U. S. A., CLAREMONT, N. H.

Birmingham, Pittsburgh — Butte, Rossland — Cobalt, Ont., Salt Lake — Denver, San Francisco — El Paso — Joplin, Seattle — Knoxville, Spokane — New York, St. Louis — Paris, France, Sydney, N.S.W.

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Successfully used at the following

EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English,
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE

Write at once for Free Catalogue.

RICH. JACOBSON
.0 SHOE LANE, LONDON, E.C. ENGLAND

We carry in stock a complete line of Mining Machinery and supplies in our

Cobalt Warehouse

Our representatives cover the whole Northern mining district and are in a position to quote good delivery on our mining equipment.

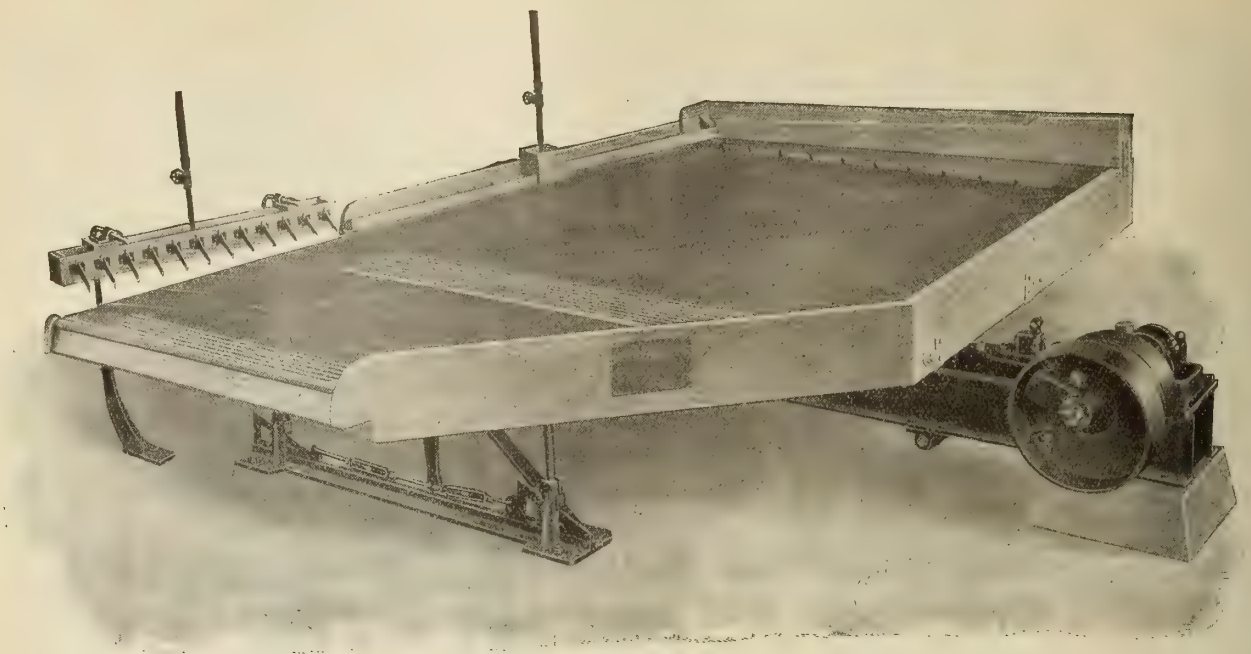
AIR COMPRESSORS ROCK DRILLS BOILERS
HOISTS ORE CARS ORE BUCKETS
WIRE ROPE STEAM AND AIR HOSE
OCTAGON AND CRUCIFORM DRILL STEEL

ALL SMALL SUPPLIES

CANADIAN RAND CO., LIMITED

Montreal, Canada

ELK LAKE COBALT ROSSLAND VANCOUVER WINNIPEG TORONTO HALIFAX



24 Additional Improved No. 3 Deister tables are being installed in the new addition to the Goldfield Consolidated Mines Company's mill as the result of efficiency in operation and small cost of maintenance of a previous installation of 70 tables.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

THE CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Philippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faros Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

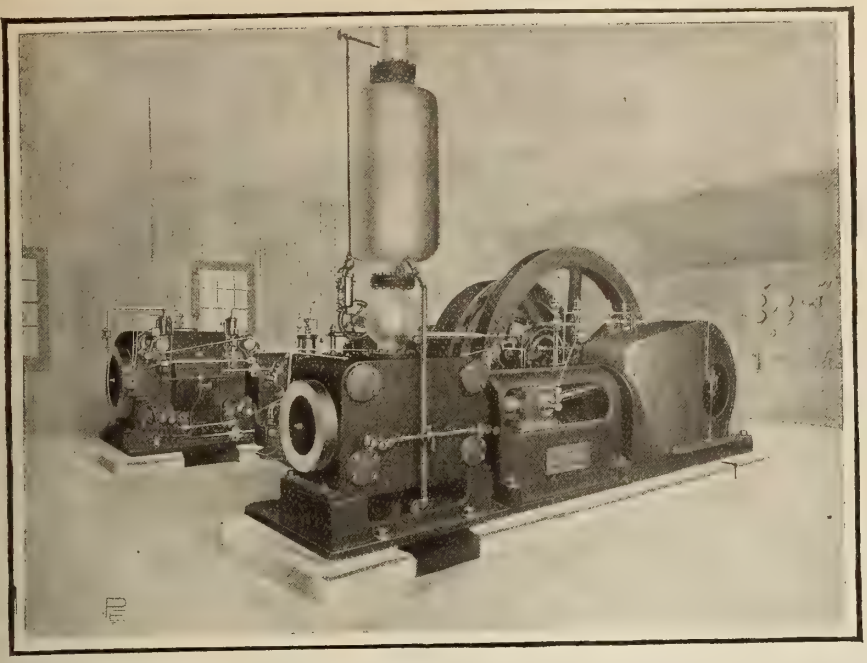
The Canadian Laboratories

Chemical and Physical tests of all Materials.

Mining properties examined and reported upon.

Write for prices for Ore analysis.

37 Melinda St. Toronto



POWER PLANTS
FOR
MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS
Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

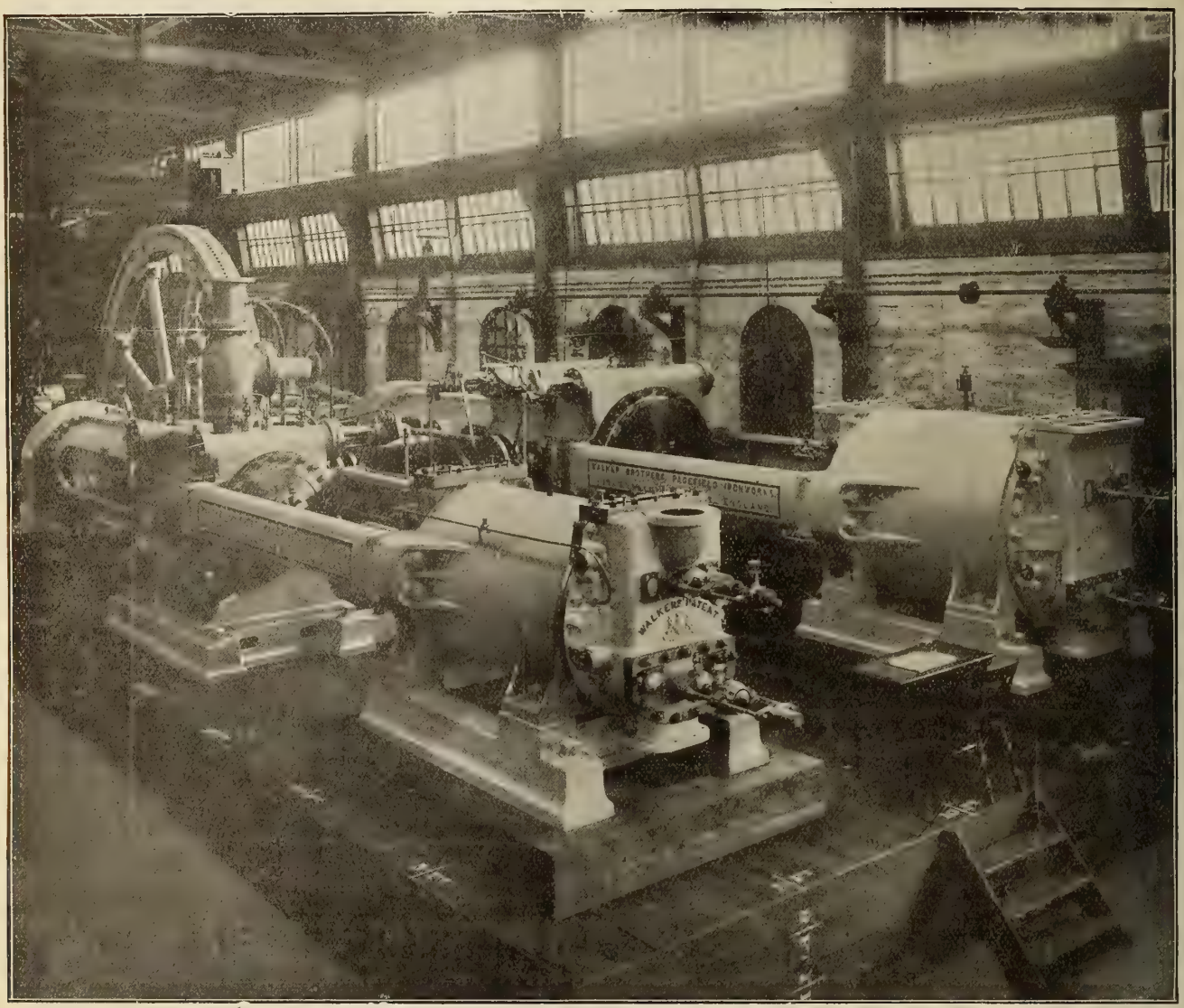
Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

Walker Brothers (Wigan) Limited,

Wigan, England



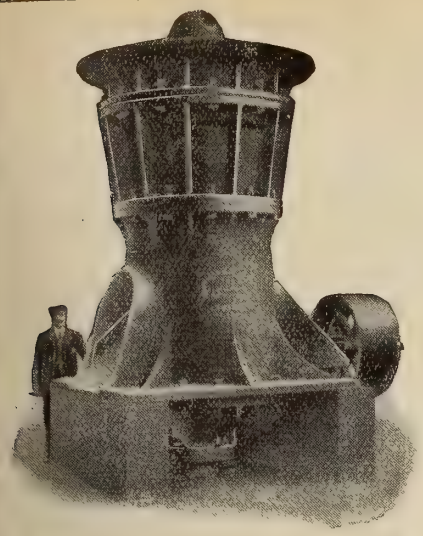
Largest Air Compressors in Canada

are of WALKER BROTHERS (Wigan) LIMITED manufacture.

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

lucluding
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF
AND ALL KINDS OF
BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

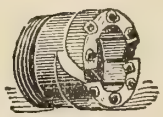
THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

We personally break all our carbons

Goods sent on approval for selection

CARBONS
Black Diamonds)
and BORTZ for
DIAMOND DRILLS



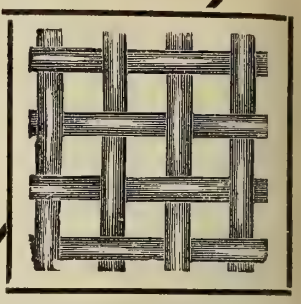
S. DESSAU'S SONS
Importers
180 B. Broadway,
N. Y.

Carbon for all mechanical purposes

Bortz for all mechanical purposes

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalog 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

ANNOUNCEMENT

BRUCE PEEBLES

EDINBURGH & COMPANY, LIMITED - - SCOTLAND

are now represented in

CANADA

by

VANDELEAR AND NICHOLS

DINEEN BLDG., - - - TORONTO

SPECIALTIES:

DIRECT and ALTERNATING CURRENT.
DYNAMOS and MOTORS for all Conditions of Service.
PEEBLES-LACOUR MOTOR CONVERTERS.
STEAM TURBO ALTERNATORS. TRACTION MOTORS.

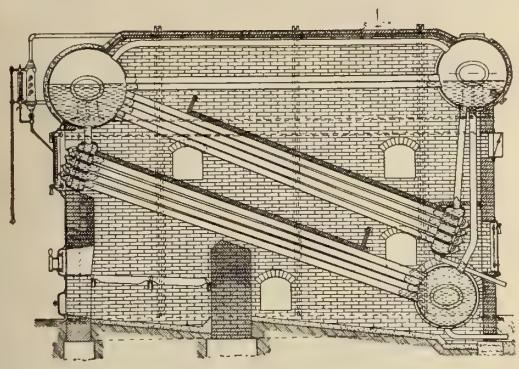
ORE DRESSING

By R. H. Richards. 4 Vols. $20.00.

Index to four volumes now ready.

Book Department, CANADIAN MINING JOURNAL

Robb Water Tube Boiler



Straight tubes. Perfect water circulation.
Dry or superheated steam.
Half the usual number of handholes.

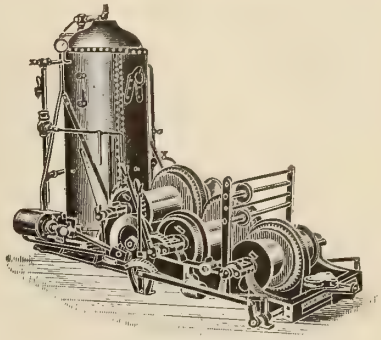
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
Calgary Block, Calgary, - -	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors' Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

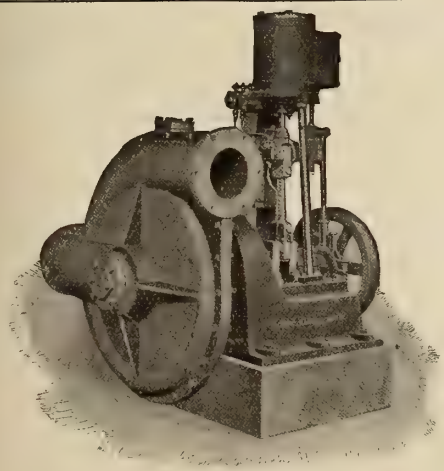
Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



Morris Machine Works
BALDWINSVILLE, N.Y.

Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

New York Office—39-41 Cortland Street

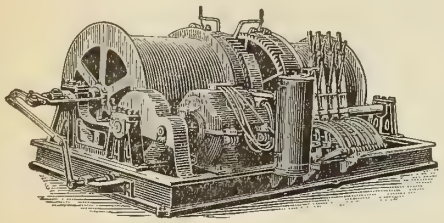
AGENCIES
Henion & Hubbell, 223-231 North Jefferson St., Chicago, Ill.
Harron, Rickard & McCone, San Francisco, Cal.
Zimmerman-Wells-Brown Co., Portland, Ore.
H. W. Petrie, Toronto, Ont.

Flory Hoisting Engines

STEAM AND ELECTRIC

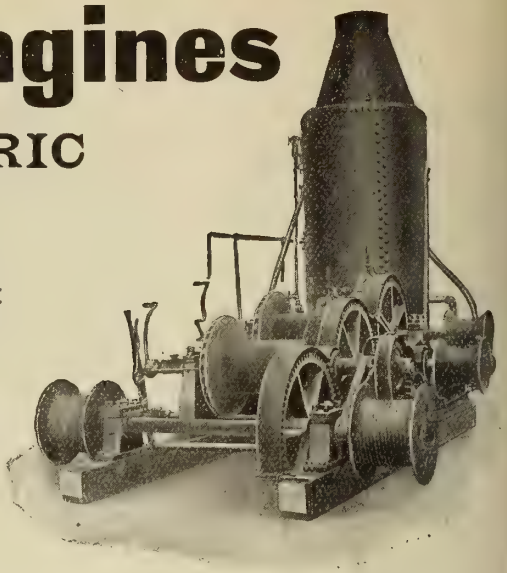
Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines

CANADIAN PACIFIC RAILWAY

THE SHORTEST, CHEAPEST AND BEST ROUTE
TO
GOWGANDA
IS
Leave Toronto 10.10 p.m. daily, Ar. Gowganda 9.00 p.m. next day.

THROUGH FARE $15.80

Through sleeper to Sudbury; dining car on C. N. O. train to Gogwanda Junction. Stops made at Phoenix for lunch and Elkhorn for dinner by stage line.

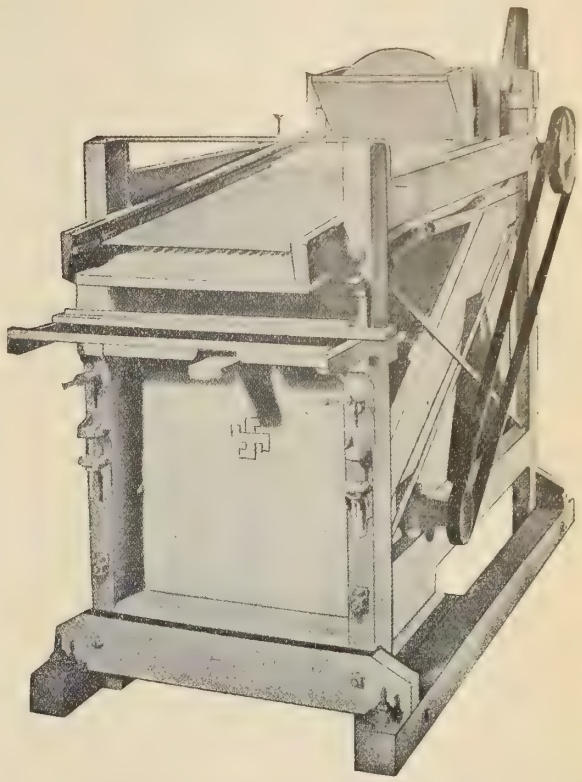
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A comp'etely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

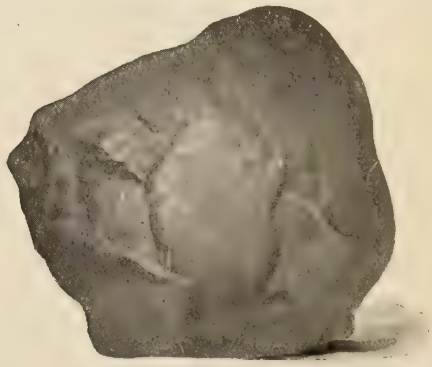
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



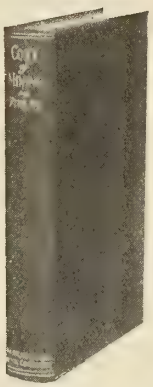
Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scrantan, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

An Important Trio

Economics **Principles** **Methods**





Within a few months three highly important mining books have appeared, covering the practical, the fundamental and the economic phases. They are valuable books by thoroughly sound men of established reputations.

The Cost of Mining

By JAMES R. FINLAY

415 pages, 6x9, illustrated

$5.00 (21s.), net, postpaid

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover costs of mining **coal, iron, lead, zinc, copper, gold** and **silver.**

Contents: Value of Mining Property, Factors Governing Variations, Partial and Complete Costs. Statistics of Coal Production. Costs of Mining Coal. Cost of Mining Lake Superior Iron. Occurrence and Production of Copper. Lake Superior Amygdaloid Copper Mines. Conglomerate Copper Mines of Lake Superior. Copper Mines on Fissure Veins in Montana, Australia and Arizona. Various Copper Mines of Arizona and Mexico. Copper Mines in various other Districts. The Copper Mining Business in General. Lead. Silver-Lead Mining. The Cost of Silver-Lead Smelting. Zinc Mining. Occurrence and Production of Gold. Quartz-Pyrite Gold Mines. Cripple Creek. Kalgoorlie and Goldfield. Silver Mining at Cobalt and Guanajuato.

Principles of Mining

By H. C. HOOVER

200 pages, 6x9, illustrated

$2.50 (10/6), net, postpaid

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Part I deals fully with the determination of value, prospective and in sight—the sizing up of the mine—and in this Mr. Hoover's work has been extensive and highly successful.

Part II discusses the development of tunnels, shafts, crosscuts, etc., with chapters on mechanical equipment and efficiency.

Part III. Administration of mines with all the problems of labor efficiency, labor unions, wages, working costs, accounts, division of expenditure, etc.

The main chapter headings are: Valuation of Copper, Gold, Lead, Silver, Tin and Zinc Lode Mines. Mine Valuation. Development of Mines. Stoping. Methods of Supporting Excavation. Mechanical Equipment. Ratio of Output to the Mine. Administration. The Amount of Risk in Mining Investments.

Timbering and Mining

By W. H. STORMS

300 pages, 6x9, fully illustrated

$2.00 (8/6), net, postpaid

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Contents: Introduction. Timber Used in Mining. Preservation of Timbers. Drifting and Drift Sets. Driving Lagging in Drifting. Driving in Running Ground. Breast Boards. Structural Steel in Mine Workings. Timbering Drift Gravel Mines in California. Shafts. Location, Kind and Size of Shafts. Prospecting Shafts in Good Ground, and Those Requiring Close Timbering. Cribs and Single Compartment Shafts. Size and Division of Working Shafts. Drainage. Position of Temporary Hoisting Plant and Permanent Plant. Size of Shaft Compartments. The Collar. Hanging Belts. Cross Head in Sinking Shafts with a Bucket. Stull Methods in Many Small Mines of the Cobalt District, Ontario. Bucket Dumping at Vertical Shafts. Bucket Dumping at Inclined Shafts. Framing Shaft Timbers. Butt Corner and Dove-Tail Corner Methods. Framing for Vertical Shafts. Divider and Spliced Wall Plate. The Template. Placing Timbers of Shaft Sets in Position. Placing Timbers in Inclined Shafts. Lining the Sets. Difficulties in Sinking Through Running Ground. Sinking Through Running or Loose Ground. Combination Vertical and Inclined Shafts. Bearers in Shafts. Fenders for Protection of Shaft Timbers When Blasting. The Cable Mat. Extension Tracks for Sinking. Inverted Rails. Sinking Ladders.

We can supply any engineering book in print.

Book Department **Canadian Mining Journal**

Confederation Life Building, Toronto

ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F). Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

1910

We shall appreciate your enquiries and orders for Assay Apparatus and Chemicals during the year 1910.

LYMANS, Limited

(ESTABLISHED 1800)

MANUFACTURING CHEMISTS

Importers and Dealers in Chemical and Assay Apparatus

MONTREAL,

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

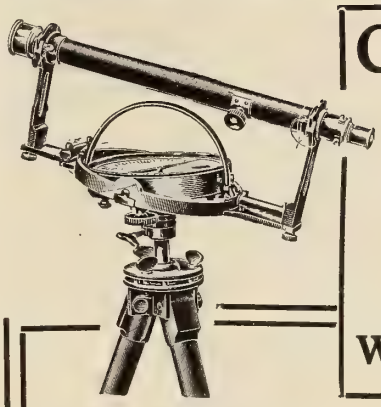
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Casartelli's Patent Mining Dial With Telescope

Sight limb moves on axes cast on the Compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indices attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Supplied without telescope if desired.

Tangent Motion fitted at slight extra cost.

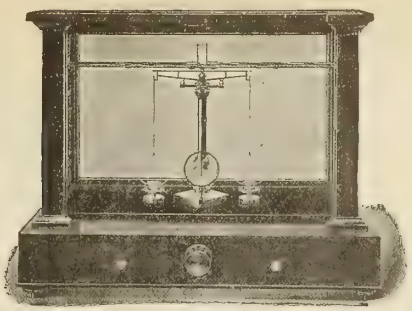
Sizes 5 inches and 6 inches

Joseph Casartelli & Son

Scientific Instrument Makers

43 Market Street

Manchester, Eng.



TYPE D. PRECISION BALANCE

4 INCH BEAM SENSIBILITY $\frac{1}{10}$ MILLIGRAM

This balance is used extensively by Assayers in Smelters, Mines Cyanide and Chlorination Mills having a large volume of very accurate weighing to make.

It is representative of the output of

THE PRECISION FACTORY

Among its many excellent features we show below

THE UNIT BASE

which carries the level vials, center lift rod and pan rest bearings thereby maintaining their perfect alignment, regardless of the warping of the case, and by the removal of three screws the entire mechanism may be removed for cleaning.

CATALOG A-16 DESCRIBES OUR LINE



WM. AINSWORTH & SONS

Denver. Colo., U.S A.

CANADIAN AGENTS

Lyman Sons & Company,
380 St. Paul St., Montreal.

B. C. Assay & Chemical Supply Company,
Vancouver, B. C.

Dominion Coal Company

Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

CANADIAN MINING INSTITUTE

NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 & 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.
Office hours: 9.30 a. m., to 1.30 p. m. and 2.30 p. m. to 6.00 p. m.
The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

Springhill Coal

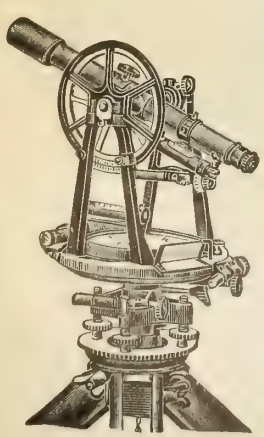
The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

RAMPART CEMENT

Perfectly Sound. Never swells or bursts.

Reliable for all purposes for which hydraulic cement is used.

Fineness 92 per cent. through a 200 mesh sieve.

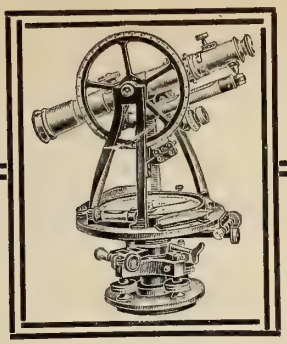
Strength up to standard specification and permanent.

Used by the leading Mining Companies of the Maritime Provinces.

Sydney Cement Co., Ltd.

Rampart Brand

SYDNEY, NOVA SCOTIA, CANADA



K & E
Engineering Instruments

The superior design, high quality of material, workmanship and finish which characterize our Surveying Instruments, account for their use on nearly every important engineering enterprise.

When in the market for a new surveying outfit, we will be pleased to quote on your requirements, as we can furnish every requisite of the engineer for field or office.

Send for our Solar Ephemeris for 1910.
Our complete Catalogue sent free on request.

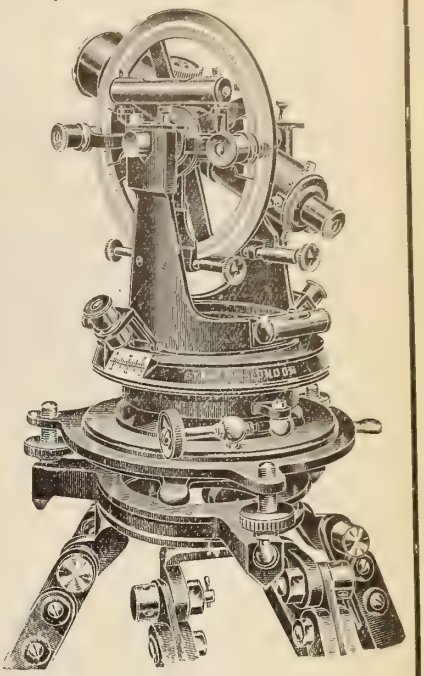
KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

STANLEY, LONDON

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our H 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK



Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

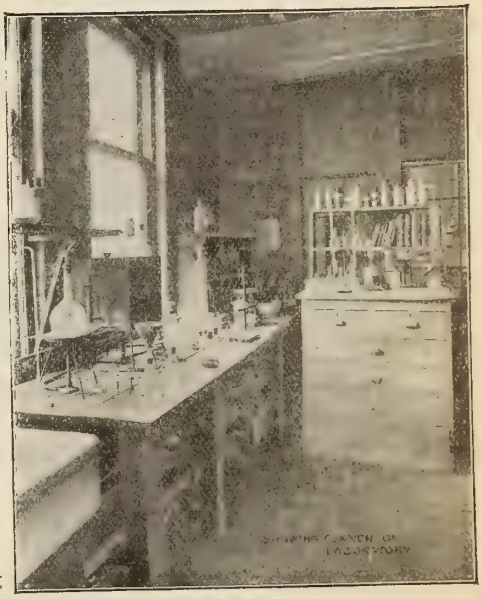
W. F. Stanley & Co., Limited
Great Turnstile, London, England

WE DON'T GUESS

This is our Chemical Laboratory. We know our Metal from the raw material to the cases it is packed in.

Harris Heavy Pressure Bearing Metal

Will keep your Bearings Cool, save you money in Oil and Fuel.



Chemical Room.

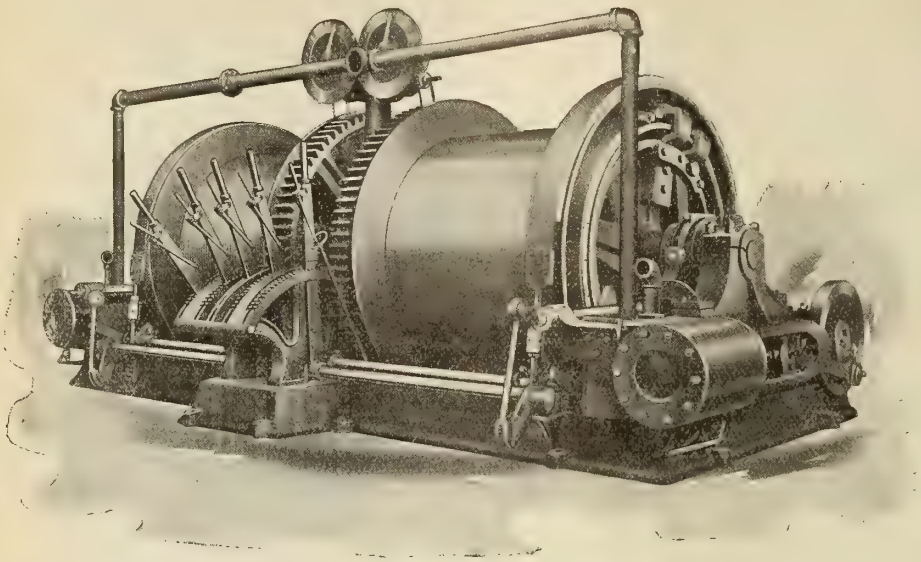


This Factory behind the Metal.

These are Facts

Would you like a sample shipment

THE CANADA METAL CO., LTD.
TORONTO



Why Is It?

Our hoists are specified in nearly every case throughout the Mining Districts of Canada.

Must be their past reputation.

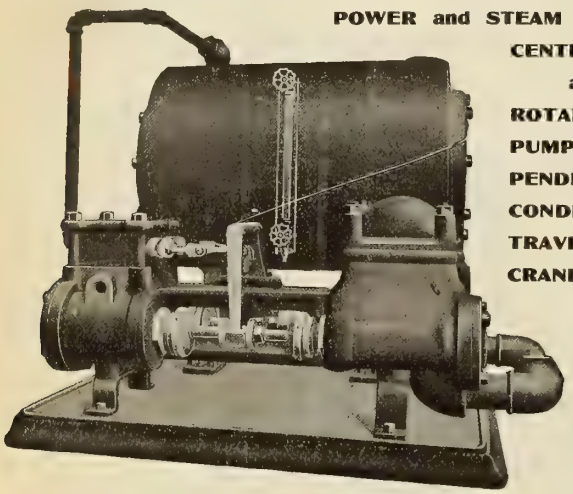
WE STOCK THE SMALL SIZES.

ARE YOU INTERESTED

The Jenckes Machine Co., Limited

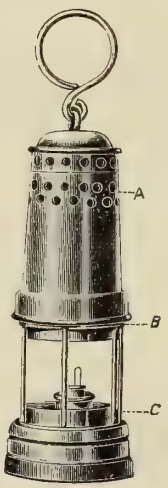
Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland

Works: Sherbrooke, Que. St. Catharines, Ont.



POWER and STEAM PUMPS, CENTRIFUGAL and ROTARY PUMPS, INDEPENDENT JET CONDENSERS, TRAVELLING CRANES, ETC.

THE SMART TURNER MACHINE CO., LIMITED, HAMILTON, CANADA.



DAVIS

MINERS' SAFETY LAMPS

GAS TESTING LAMPS

(STOCK AT MONTREAL)

SEND FOR CATALOGUES

PEACOCK BROS.

68 BEAVER HALL HILL

MONTREAL

WANTED

Copy of Canadian Mining Review, January, 1907

STATE PRICE

CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING
TORONTO

LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, February 15, 1910 No. 4

The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials—	Page
(a) Mr. Clifford Sifton and Natural Resources	97
(b) Engineers and Institutes	98
(c) The Portland Canal Mining Company	98
(d) The Tyee Copper Company, Limited—A Correction	99
(e) The Cost of living	99
(f) The Davis Handbook of Cobalt	99
(g) Editorial Notes	99
Sheep Creek District, B.C. By A. H. Gracey	100
Exchanges	101
Hours of Work in Belgian Coal Mines	101
Costs of Producing Compressed Air in a Canadian Mining Camp. By R. L. Webb	102
Our London Letter	111
Mining Engineers and Mining Institutes. By A. B. Willmott	113
Legal Column	114
Industrial Section	115
Bruce, Peebles & Co.	116
The Largest Rock Crusher in the World	117
Correspondence	117
In the High Court of Justice	118
Special Correspondence	119
General Mining News	123
Mining News of the World	124
Company Notes	125
Statistics and Returns	127

MR. CLIFFORD SIFTON AND NATURAL RESOURCES.

For the position of President of the Commission on the Conservation of Natural Resources, the Hon. Mr. Sifton is specially fitted. His executive ability and his business acumen have been proved and amply recognized. While his appointment as president is acceptable to Canadians, it is obvious that in labours so wide and so diversified he must have the advice of strong and disinterested specialists. This statement is borne out by the recent utterances of Mr. Sifton himself.

In his exceptionally forceful address, delivered at Ottawa on January 18th, Mr. Sifton covered a great deal of ground. He dealt with many matters of moment. With only one of these are we concerned. Mr. Sifton made certain specific references to mining and minerals. Several of these are absolutely incorrect, one or two are absurdly wrong, and others are tinctured with error.

Before discussing these in detail, it is well to state that we are perfectly in accord with the spirit that pervades Mr. Sifton's address. It is obvious, however, that in facts and figures relating to mining some one has been leading him very much astray. For various good reasons, including strong internal evidence, we believe that Dr. Haanel is responsible. As a former protege, and as a present friend of Mr. Sifton, Dr. Haanel has been permitted to retain a position that he cannot fill. His past and present relations to Mr. Sifton warrant a strong assumption that it was he who supplied the "dope." In any case, Mr. Sifton should be long in forgiving the fatuous offender who put him so much off the track.

We shall now proceed to quote: "In the Cobalt camp," says Mr. Sifton, "the mine owners are largely at the mercy of foreign smelters and refiners. Much valuable mineral . . . is lost to the owners and to this country because there is no effective method of treating these ores in Canada. Thorough investigation by experts is highly necessary. Probably the valuable mineral lost in the Cobalt camp in one year would pay for the whole investigation and build the plant necessary to treat the ores under proper guarantees."

This is awful. Look at the facts—and how shall we excuse Dr. Haanel for blinking them! The Ontario plants at Copper Cliff, Thorold, and Deloro can treat all the high-grade ore produced at Cobalt. Moreover, as these plants purchase by far the greater part of the high-grade ore of the camp, it is self-evident that they can treat that ore more economically than can foreign plants. Therefore, also, the Ontario plants pay higher prices.

Further, the ores mined at Cobalt are singularly complex. It is not to be expected, at the present stage of metallurgical knowledge, that all the constituents can be refined commercially at once. And where, in heaven's name, could they be marketed after refining! Silver and arsenic are now extracted. The residues, containing cobalt and nickel, are held for further treatment. Cobalt oxide can be turned out to meet all present demands. All the Canadian refineries seem satisfied with their processes. Their owners have secured, and paid for, the best technical assistance. A government experimental plant, such as Mr. Sifton suggests, could not secure as highly qualified men, simply because no government will pay such high salaries as do private companies. A government that will let a corporation outbid it for the services of Mr. M. J. Butler cannot be expected to compete successfully for the services of expert metallurgists, men who belong to a profession in which high salaries are demanded as a matter of course. On the other hand, a government plant, under the management of the Mines Branch as at present constituted would be an unmitigated farce.

Mr. Sifton, in his reference to mine accidents, has been again misinformed. It is not true that "Canada makes almost the worst showing in the world." As we have repeatedly pointed out, the coal mines of Nova Scotia are among the best regulated anywhere. Our Western coal mines show lower death rates per thousand men employed than do the majority of United States collieries. The death rate, due to accidents, at Cobalt in 1908 was not "24.8 per 1,000 employees working underground," but only about one-quarter of that rate. Moreover, to compare the 250 scattered mines and prospects of Ontario, with the large highly developed mines of the Transvaal, is patently unfair. It is fair, however, to institute such a comparison between these latter mines and the Copper Cliff mines. In this case we find that the fatality at Copper Cliff is, roughly, about half that obtaining in the Transvaal mines. Obviously the better record at Copper Cliff, as compared with Cobalt, is due to the concentration of attention to a few large workings.

In his statement that in electric smelting, "we have led the way in investigations," Mr. Sifton will find remarkably little support. The experiments in producing pig iron at Sault Ste Marie, were made under the direction of a French inventor, brought to Canada for the purpose. Just how far Dr. Haanel wished to advance the cause of science, and just how far the experiments were designed to exploit a private patent, we can only guess. But the actual truth (and it is high time that some one should tell it) is that economic results were not obtained at the Sault. In fact, about all that has been done in Canada is to describe the work of others. Our much heralded production of pig iron in the electric furnace has failed absolutely to materialize.

But enough of correction. We are sincerely glad that Mr. Sifton is to devote his unquestioned talents to national economies. If we have spoken very plainly, it is entirely because we think that the time for talking official balderdash about mining has passed. Mr. Sifton can conserve our mineral resources and our patience best by reorganizing the department that he himself created. Meanwhile, we wish him all success.

ENGINEERS AND INSTITUTES.

Mr. A. B. Willmott contributes to our columns a profitable discussion of Mr. Kendall's paper on "Mining Engineers and Mining Institutes," It will be noticed that Mr. Willmott opposes strongly any radical restriction of the membership of the Canadian Mining Institute. Mr. Willmott points out that the Institute, as at present constituted, "is a wide-open congress . . . where all interested in mining, whether technically qualified or not, can meet and discuss matters of common interest. . . . Let us move slowly in the matter of change. . . . We want the broker and investor to attend our meetings and learn the views of our leaders on the ethics of mine finance and on the duties of directors to their shareholders."

To conserve professional standards Mr. Willmott suggests the formation of a Mining Engineers' Guild, to be composed of members of the Canadian Mining Institute, possessing certain qualifications.

The scheme outlined by Mr. Willmott will probably meet with both approval and censure. We are of the opinion that it is essentially sound and practicable. But there are many points that require the fullest discussion. And we hope that our readers will not be backward in expressing their views. We hope, also, that the whole matter will be thoroughly threshed out at the annual meeting of the Canadian Mining Institute.

THE PORTLAND CANAL MINING COMPANY.

Interest in the Portland Canal mining district is growing . The fact that Messrs. McKenzie and Mann, have acquired large holdings has given advertisement to the region. As usual, however, United States capitalists have been most energetic. But many British Columbia investors have sent, and are sending men north to stake properties.

One company, the Portland Canal Mining Company, Limited, with headquarters at Duncan, B.C., has issued its second annual report. From this report we learn that $100,000, raised by the sale of a block of treasury stock, is being expended in erecting a 100-ton concentrator, an aerial tramway, and a water-power plant.

Three tunnels have been driven into the mountain side, aggregating a total footage of about 600 feet. Tunnels No. 1 and No. 2 are reported to be in rich ore. Tunnel No. 3, cuts a downward continuation of the ore body disclosed above. The ore carries from $10 to $30 in gold, and about $45 in silver per ton. In thickness the vein apparently exceeds 13 feet. The ore contains galena, argentite, and native silver.

From all that can be learned at present, the Portland Canal region affords one of the best opportunities known in Canada for profitable mining.

THE TYEE COPPER COMPANY, LIMITED,—A CORRECTION.

We greatly regret that there appeared in our issue of January 1st, 1910, in the review of mining in the province of British Columbia in 1908, by Mr. George A. Ohren, a statement that "the Tyee Copper Company is reported in considerable debt."

The facts, as stated officially, are that this company, in addition to the large value of its properties, smelting plant, and stores, has available a cash reserve fund invested in Trustees' Stocks, of about $350,000 and its financial status is so well known that its credit has never been questioned.

We deeply regret this statement, which was obviously based on misleading information, and we take the first opportunity of making this correction.

The good name of the Tyee Company throughout the Western country for prompt payment, and for honourable treatment of all parcels of ore sent to their customs smelting works, is so well and favourably known, that we trust the inaccuracy of our inadvertent statement did not cause a moment's embarrassment.

THE COST OF LIVING.

The Wall Street Journal, in an exceedingly sane and timely editorial, alludes to the "growing division of labour and specialization of functions," as a distinguishing tendency of modern commercial life. Our contemporary glances at the burden carried by each unit of population in the highly organized city of New York. According to the recent census report, the annual per capita civic expenditure for every man, woman, and child in New York, is $23.84; or practically $120 for a family of five. In addition to these astonishing figures, the per capita Federal Government expenses amount to about $8, or $40 per year for a family of five.

The Journal remarks that, while civilized nations are far from the unhappy state of Rome, which broke down largely because the burden of taxation stifled agriculture, yet conditions are becoming serious, In short, it is the object of the editorial to indicate that the multifarious and increasingly differentiated functions assumed by governments, whilst they may have a high ethical value, are uneconomic. How far they can be multiplied, is one of the questions that affects the grand problem of the cost of living.

THE DAVIS HANDBOOK OF COBALT.

Cobalt still looms large on the financial horizon. Its importance shews no sign of waning. The number of investors and others, interested directly and indirectly in the camp, is daily increasing. Meanwhile there has been created a demand for some ready and complete book of reference covering the Cobalt district.

Such a book is soon to be published. Its compiler, Mr. H. P. Davis, is one of the pioneers of Cobalt. For three years he has been collecting material. His book, "The Davis Handbook of the Cobalt Silver District," is a compendium of all information necessary to guide the investor and to instruct the general reader. Following a sketch of the geology, mining methods, ore markets, etc., come full statistical statements and an exhaustive directory of all companies operating, or incorporated to operate, in the Cobalt district.

We have no hesitation in commending the Davis Handbook. It will be found reliable, exact, and perfectly unbiased. On another page, we publish part of an advance chapter from this volume.

EDITORIAL NOTES.

It is gratifying to Canadians to learn that to Dr. A. P. Coleman, of Toronto University, has been awarded, by the Royal Geological Society, the Murchison Medal for distinguished geological investigation. The honour is well deserved.

The Le Roi Mining Company faces a net loss of $47,150 on its operations for last year. Its new exploration scheme includes about 35,000 feet of diamond drilling. Special attention is to be paid to the 1,650 foot level, where good ore was encountered last year.

The School of Mining, Kingston, Ont., is advertising for applications for the position of Assistant Professor of Geology. Applications will be received until March 15th, 1910. Particulars are set forth in our advertising section.

In the deep mines of the Rand, drill sharpening by means of electric furnaces installed underground has been introduced.

The peat electric station at Skabersjo, Sweden, which has been quietly worked more than five years, is supplied by a small bog of 37 acres, with peat averaging five feet in depth, and in this source is estimated to have fuel for about 30 years. The electric current is yielded by two generators of 150 horsepower each, which are coupled direct to two gas engines, receiving the peat gas from two Korting suction-gas producers. The current is conducted two or three miles to Svedala, and is used for lighting the streets, and for power for several small industries. The price to consumers is only about one-half cent per horsepower hour. Tar is the only by-product saved, but the experiments now in progress at different places indicate that the sulphate of ammonia and other by-products recovered in a somewhat larger station—one of a few thousand horsepower—will be so profitable that they will pay all expenses, leaving the entire power production as clear gain, or a product costing nothing.

SHEEP CREEK DISTRICT, B. C.

Written for the Canadian Mining Journal by A. H. Gracey.*

The gold camp known as Sheep Creek, is situated about 25 miles south-east of Nelson, B.C. The nearest railroad point is Salmo, a town on the Nelson-Spokane branch of the Great Northern R. R., 25 miles south of Nelson.

Gold mining in the district was first undertaken about thirteen years ago, when a ten stamp mill was installed at the Yellowstone mine, but about a year later the property was closed down. An adjoining property to the Yellowstone is the Queen group, which at that time was but a prospect. Several leases were afterwards taken on the Queen by different parties, and besides several shipments of crude ore to the smelter, considerable milling ore was treated in the Yellowstone mill, rented for that purpose. It is understood that these leases were financially successful but the development of the mine was not extensively pushed. Wm. Waldie, one of the owners, then took hold with such success that later on he was able to purchase the interests of his partners and also the Yellowstone mine and mill. From this time on the Queen was quietly and successfully operated by Mr. Waldie, until in the spring of 1908 he sold out to an American syndicate for $175,000.

For three or four years previous to this sale different leases had been taken on other near by properties, chief among which were the Mother Lode and Kootenay Belle. Although the results were usually encouraging, to the extent of making small shipments of high grade ore, development was not undertaken and the leases lapsed with little accomplished.

In the fall of 1907 a prospect then little known, was taken up under lease and bond, by Mr. W. B. Pool and a partner. This was the now well known Nugget mine. During the following winter, as the result of less than 150 feet of development, Mr. Pool was able to ship to the smelter 190 tons of sorted ore, (taken practically from development faces only), which gave gross smelter returns averaging over $100 per ton. This achievement attracted real notice to the camp. Up to date, with comparatively little development, properties within a radius of three miles have produced approximately $1,000,000 in gold.

Mr. R. W. Brock of the Dominion Geological Survey, in his summary report of 1908, thus describes the geology of the camp: "The veins being worked at present occur in a band of quartzites, slates and schists, which extend northward from about Lost Mountains across Sheep Creek and Wolf Creek, and up the ridge between Sheep and Fawn Creeks. To the west is a wide band of crystalline limestone. Some granitic and aplitic dikes are intruded into the formation, and also some basic mica dikes. The general strike of the rocks is about N. 12 degrees E. with a dip of 50 degrees to the east. The veins are fissure veins cutting the formation, usually the quartzite."

During the seasons of 1908 and 1909 considerable progress has been made in both development and production. The Queen mill has been enlarged to 20 stamps, a new hoist and compressor installed and deep development undertaken. This latter is interesting for the reason that the Queen is the lowest property in altitude in the camp. The present lower workings are from 200 to 300 feet below the bed of Sheep Creek, where the vein maintains its size and values. The milling ore, stoped to widths of from 6 to 12 feet, has averaged $15.00 per ton. This persistency in depth, is an encouraging feature in considering the camp's future. Ore from these lower workings carries a high percentage of sulphides, principally iron pyrites, but the percentage of recovery by amalgamation remains satisfactory and the concentrates, from Wilfley and Overstrom tables, amounting to about 7% of the ore milled, are shipped to the smelter.

In the spring of 1908 the one half interest of Mr. Pool's partner in the Nugget bond was purchased by A. H. Gracey and associates of Nelson, and the Nugget Gold Mines, Limited was organized. A four stamp mill, with Frue vanners, was installed and started crushing ore November 1st, 1908. This is a temporary plant for use during the preliminary development stage. Since its installation it has been in continuous operation and up to the end of 1909 approximately 6,150 tons have been treated, averaging in bullion recovery by amalgamation $15.00 per ton. The concentrates amounting to from 2 to 3% of the ore milled, average $90.00 per ton. In addition to ore milled and concentrates shipped, and also in addition to the 190 tons previously shipped, 350 tons of crude ore shipped since the mill started averaged $115.00 per ton.

The total underground development, the deepest being 350 feet below the surface, amounted to 1,750 feet at the end of 1909. One ore shoot has been proved for a length of 400 feet and the stoping width varies from 4 to 10 and 12 feet. The average value of the ore has been $28.00 per ton.

The Mother Lode Group adjoins the Nugget on the south. It was bonded from the owners in the spring of 1908 by J. L. Warner, of New York, who operated it during the following season, shipping considerable crude ore to the smelter, averaging as high as $145.00 per ton. In February 1909 he sold his interests to Mr. John McMartin of Ontario, and under Mr. W. Watson, of New York, as consulting engineer, development has been vigorously pushed with very encouraging results. The deepest workings in the third level, prove the existence of extensive high grade ore shoots. From surface work various former leasers shipped over $50,000 worth of ore.

It is the intention of the present owner to install a large treatment plant in the near future.

The Kootenay Belle Group, lying across Sheep Creek from the Mother Lode, has produced over $100,000 under lease. It was also bonded by Mr. Warner at the time he acquired the Mother Lode. A four stamp mill was rented, and 1,300 tons of second class ore treated averaged in bullion recovery by amalgamation $14.80 per ton. Crude ore shipped averaged $70.00 per ton. It is understood that the property has recently changed hands and extensive development will be undertaken.

Adjoining the Nugget on the north, is the Golden Fawn Group, and while as yet in the prospect stage, the surface croppings of a large vein are very promising.

The Searchlight Group adjoins the Nugget on the east and lies in the strike of the Nugget veins. The group was bonded last fall by the Sheep Creek Development Syndicate, of Nelson. Surface croppings of good ore have been found which are probably extensions of the Nugget veins and during the coming season will be systematically developed.

*Manager Nugget Gold Mines, Ltd., Sheep Creek, B.C.

Last summer a good vein of high grade ore was found on the Clyde-Belt, a property adjoining the Mother Lode on the south-west, and shipments are now being made to the smelter. All indications point to the development of a valuable property. An extensive group adjoining the Mother Lode on the south, is known as the Golden Belle, and while little development has been done, two or three veins are reported which will be explored this season by a Vancouver syndicate, to whom the property was recently sold.

The Bonanza Group, consisting of five full claims lies just south of the Queen. Last summer the owners found and traced on the surface for 1,200 feet, a vein which is now being developed under a bond held by a company known as the Sheep Creek Bonanza Mining Co., of Vancouver. A substantial cash payment has been made and the company is now shipping sorted ore. The indications are that this property will develop satisfactorily with milling ore, averaging from $10.00 to $25.00 per ton. It is the intention to install a stamp mill next fall.

The Vancouver Group adjoining the Kootenay Belle, on the south, has lately joined the shipping list with ore averaging $98.00 per ton.

Lying south of the Queen is the Ore Hill Group. Several veins are more or less developed, and a small mill was installed some time ago which was destroyed by fire and since that time little active work has been done.

The most southerly property which has so far been operated is called the Summit Group. The contact between the quartzite and limestone belts passes through the group, and accompanying this contact is a mineralized zone containing, as exposed by surface cuts, large lenses of ore carrying considerable galena, iron pyrites and zinc blende. The chief value contained is, however, gold and average samples assay from $10.00 to $45.00 per ton. No underground development has been done in this contact vein.

In the limestone three or four small fissures have been found which intersect the contact vein and from them, at some distance from the contact, several shipments have been made which averaged from $200.00 to $450.00 per ton. This property has also been bonded by Vancouver people who are now developing and shipping ore.

Over 25 strong and permanent looking fissures have so far been discovered in the above mentioned properties. They are all approximately parallel in strike and occur within a radius of 3 1-2 miles. There are, of course, many other claims and groups less known, located on veins, some of which may prove valuable.

The developed milling ore of the camp averages from $15.00 to $30.00 per ton, and the more extensively developed veins have steadily improved in depth. Experiments have shown that with the cyanide treatment in addition to the present simple methods of amalgamation and concentration, a total extraction of 95% of all values may be expected, and no doubt within the next two years several large reduction plants will be in operation.

Up to the present time the camp has the unusual record of having practically from its own production developed and equipped itself, but outside capital is now seeking investment and the prediction frequently made by those well qualified to judge, that Sheep Creek will prove a very important lode gold camp, seems justified.

EXCHANGES.

The Engineering Magazine, January, 1910.—"Concentration of Magnetic Iron Ores" is the title of an interesting paper by N. V. Hansell, a writer well known to Canadians. Mr. Hansell's article sketches the development of magnetic concentration, and gives practical instances. One plant, now being built at Syd Varanger, Norway, contains 12 parallel grondal units, and will have a rated capacity of 3,600 tons per 24 hours. 1,500 tons of concentrates will be obtained daily. From an ore containing only 34 per cent. of iron, a concentrate running as high as 69 per cent. will be produced. The total product will be exported to German iron works.

The Mining Journal, January 15, 1910.—Mr. W. H. Cutten, himself interested in the manufacture of dredges continues in this issue of the **Mining Journal**, a heated discussion of the relative merits of American and New Zealand dredging practice. In the course of his communication, Mr. Cutten challenges any reader to mention a single instance in either Russia, Africa, or South America where an American dredge is paying its way, "For although" says he, "I can hear of many failures, so far I have not heard of any success."

The Labour Gazette, January, 1910.—The Labour Gazette is the official organ of the Federal Department of Labour. It will, hereafter, be noticed regularly in this column.—We note that in the fatal accidents reported for the whole Dominion for December, 1909, mining comes sixth in the list of industries and trades. For agriculture, 28 fatalities are recorded; for navigation, 24; metal trades, 16; railway service, 14; lumbering, 12; and mining, 11.

The Quarry, January, 1910.—Attention is drawn editorially to the fact that Great Britain imports annually, ordinary rock products, such as cement, slate, sand, glass, earthenware, etc., to the value of nearly seven million sterling. The total value of the yearly output of these materials in the United Kingdom is approximately equal to the value of the imports. **The Quarry** raises the very pertinent question as to whether tariff reform would not double the home output.

HOURS OF WORK IN BELGIAN COAL MINES.

The hours of work in the coal mines of Belgium are restricted to nine a day by the new law recently passed by the Belgian Senate. It is only in the large mines that mechanical appliances are used underground, and the new law will either shut many of these down or compel them to adopt these appliances; or it may be they will be absorbed by the larger companies. But the undulating character of the coal seams in many of the mines makes it difficult to use coal-cutting machines, so that the result of the new law with nine hours' work from bank to bank must restrict the coal output.

The Department of Mines of British Columbia is sending out to all interested persons a notice directing attention to the following amendment to the Mineral Act, which comes into force on April 1st: "The owner or agent of the owner of a mineral claim for which the mining recorder's certificate, under form 1 of the schedule of this Act, has been granted, shall within three months from the date of such certificate, make application to the Gold Commissioner for a certificate of improvement, and in default of such application being made within such time, such mining recorder's under form 1 shall lapse and become absolutely void."

COSTS OF PRODUCING COMPRESSED AIR IN A CANADIAN MINING CAMP.

Written for the Canadian Mining Journal by Richard L. Webb.

Copyright Pending.

Surprising as it may seem, no data have been published about the effective horsepower of air compressors. Heretofore, it has been customary to divide the indicated horsepower of the steam cylinders by the indicated horsepower of the air cylinders as determined by indicator cards, the difference being the friction of the machine. In other words, the manufacturer of air compressors has rated his machine by its

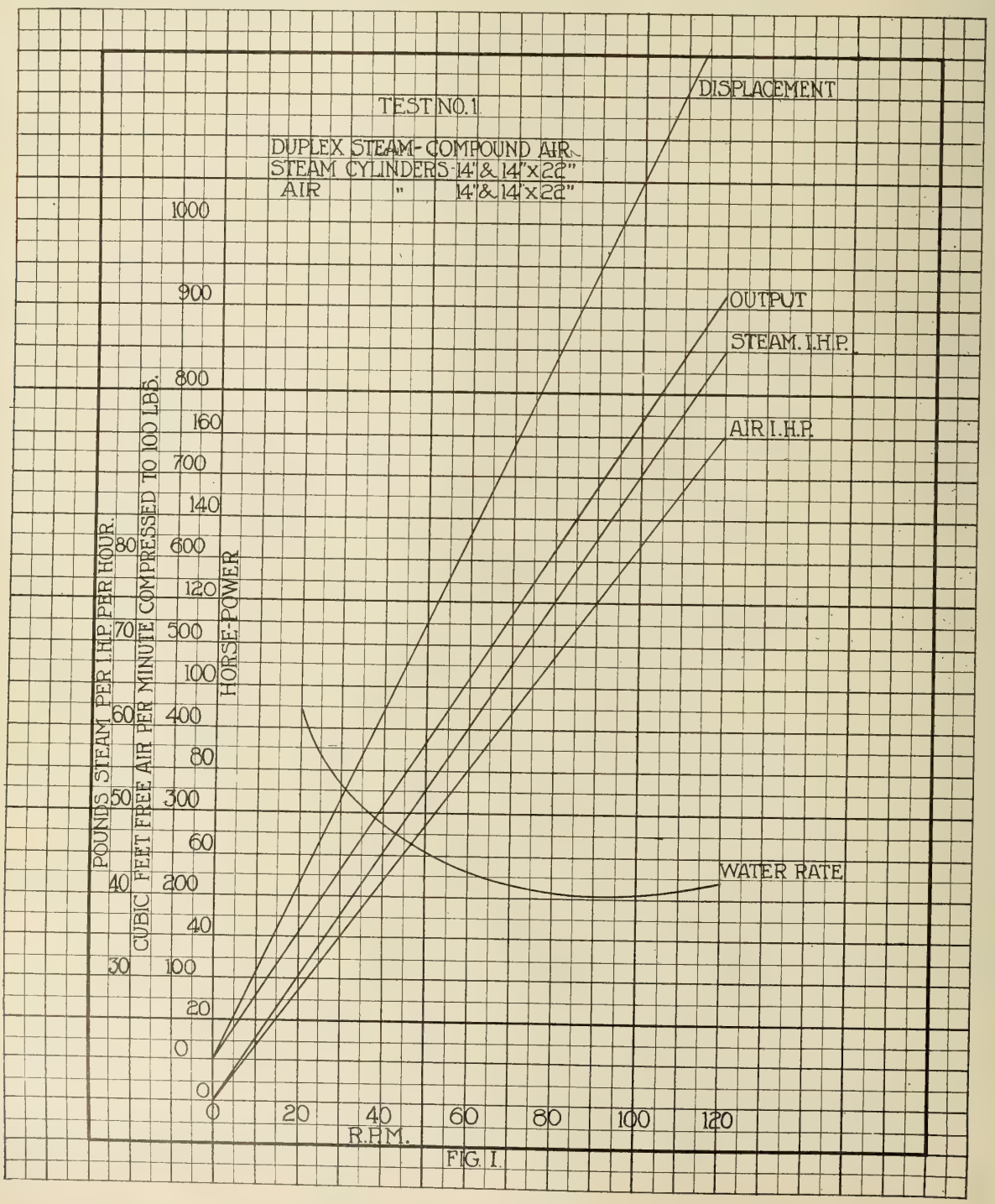
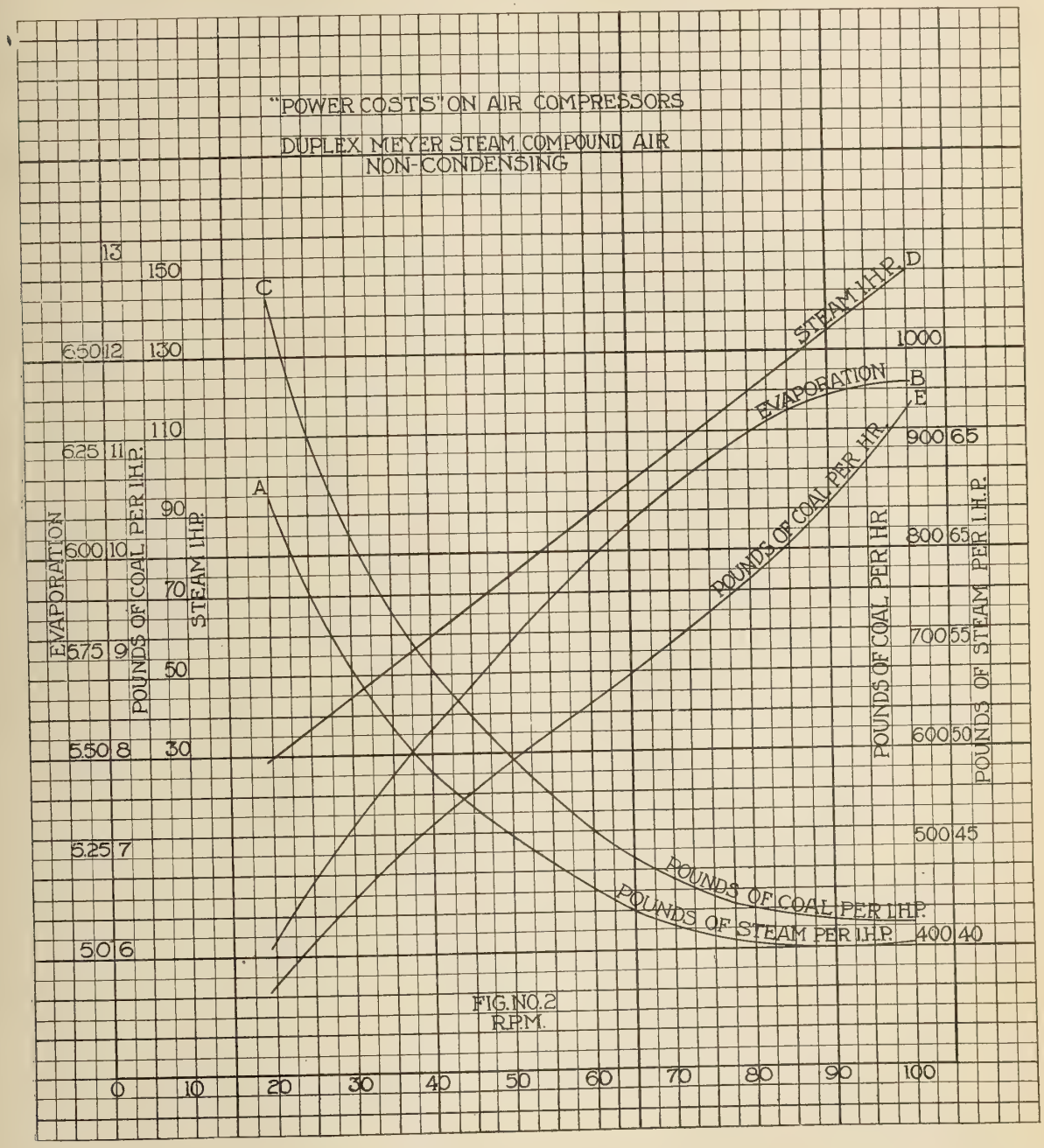


FIG. I.

mechanical efficiency without taking into consideration the other elements of loss besides friction. In fact, the manufacturer seldom mentions any other loss, leaving the impression that friction loss is the only loss to be considered. Such a test is far from answering the question as to whether the air compressor is commercially efficient, and gives no indication as to the actual effective horsepower of air compressors under ordinary working conditions.

The writer has just finished a series of exhaustive tests on a large number of air compressors. In making these tests he has had access to plants that have been in operation for a considerable length of time, and that are operating under ordinary working conditions. It is needless to state that the various companies operating these compressors employed the best technical and mechanical engineers available, and the actual results obtained may be safely taken, not only as a fair, but probably as a very high average of actual conditions existing elsewhere throughout the United States and Canada.



Canada.

The object of the following article is to point out the real efficiency of air compressors as found under ordinary working conditions. These are not shop tests.

The machines tested have been in operation for a year or more under competent supervision, and have been kept in excellent condition by competent machinists.

How the Tests Were Made.

In every case the following plan was employed in making the tests: A boiler test was run for not less than two weeks, the coal being weighed carefully, and the water pumped into the boiler being carefully measured. A meter was installed at the throttle of the compressor to measure the steam consumption. The compressor was operated over its entire range of speed at intervals of 10 R.P.M. up to its rated full speed. The average speed under which the compressor operated was determined by a revolution counter. A meter was installed on the discharge pipe of the compressor to measure the air actually delivered. The temperatures were taken at the suction, at the intercooler, and at the discharge. Cards were taken on all the cylinders. All readings were taken simultaneously. The compressor test showed by the steam rate the number of boiler horsepower required to develop a steam I.H.P. at this average speed. The compressor was then charged with the number of boiler horsepower as shown. Readings on the revolution counter of the air compressor were

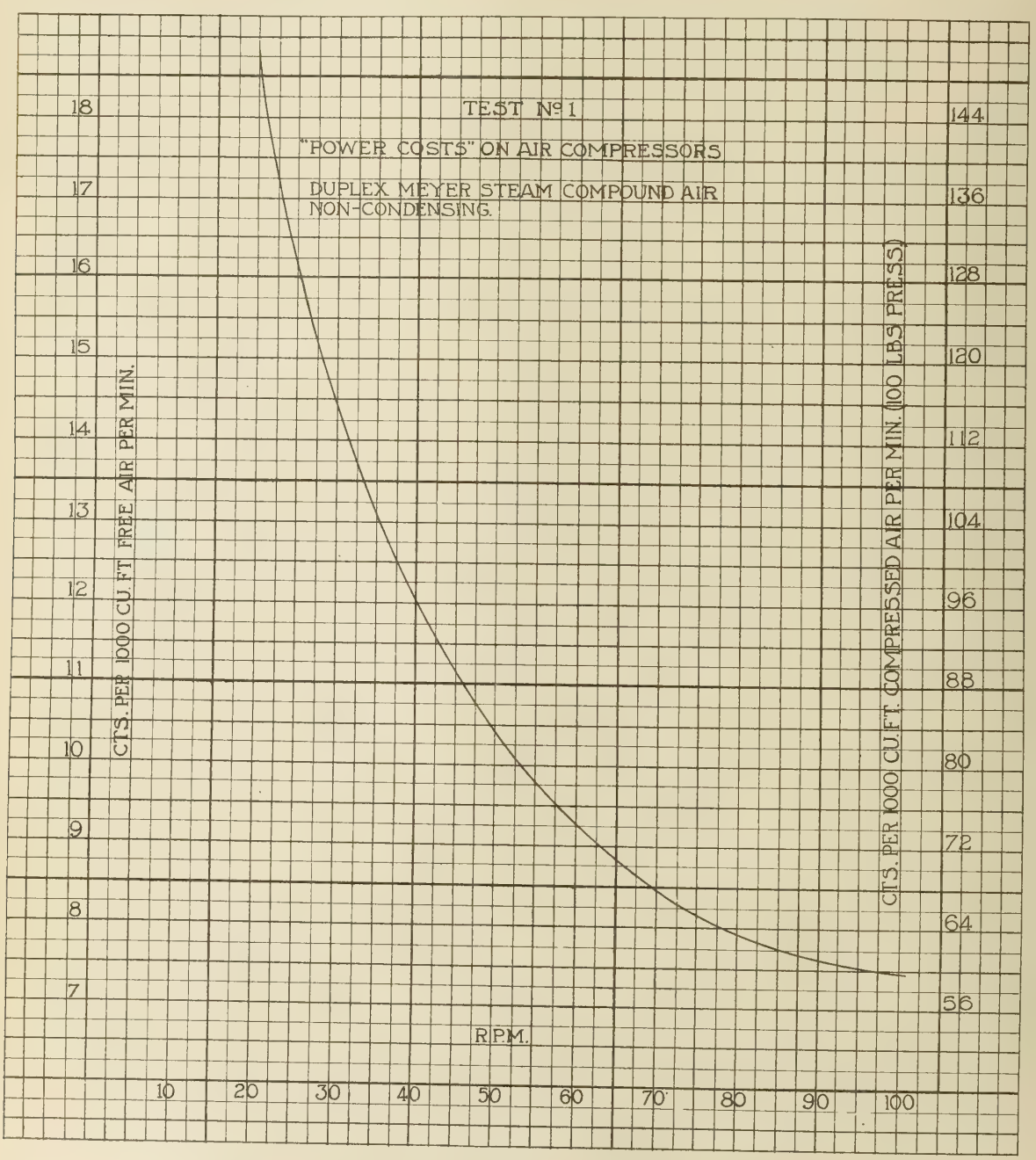


FIG. No. 2A.

taken hourly through a period of two weeks so that the average revolutions per minute were actually determined under working conditions and were not arbitrarily assumed.

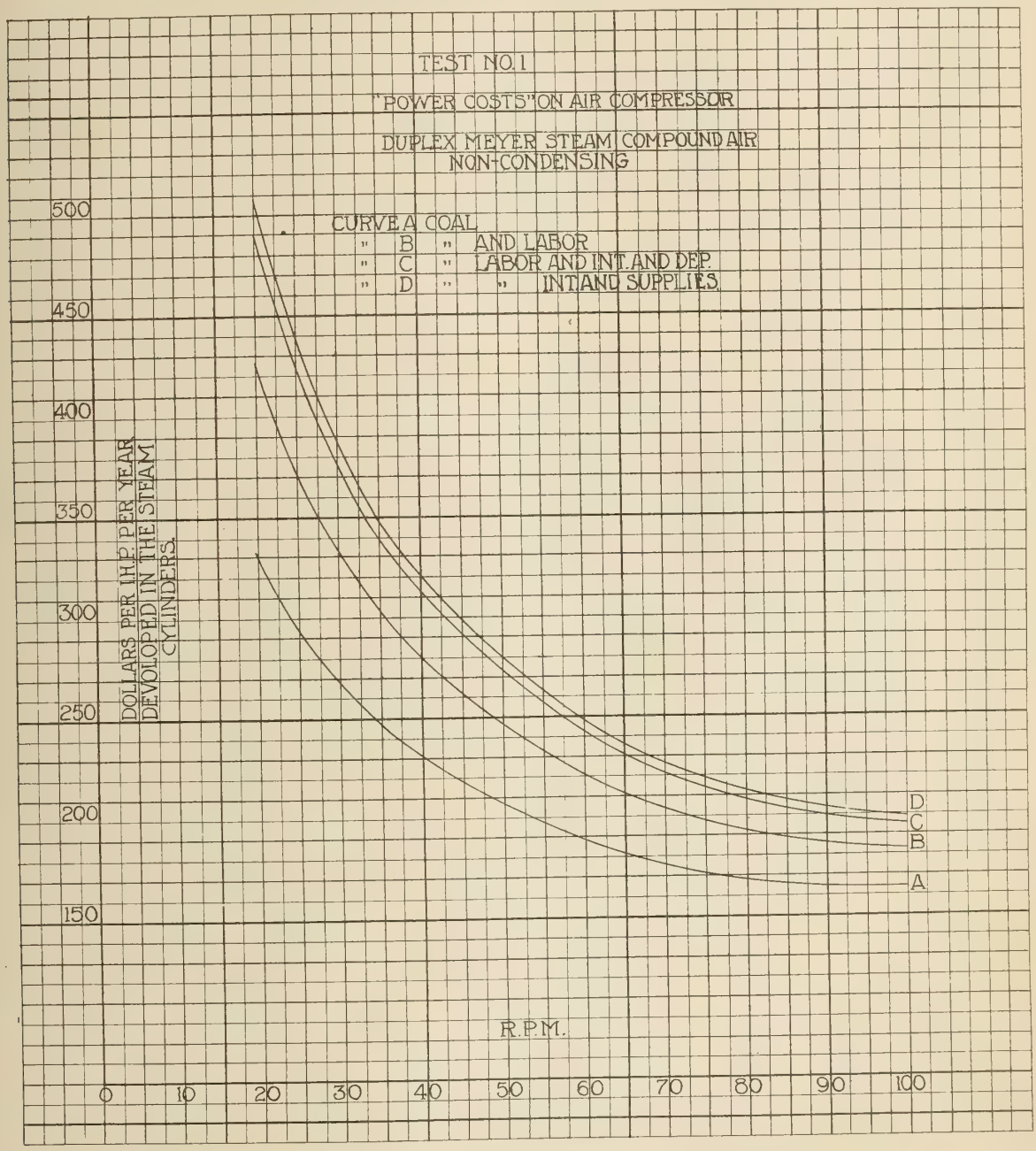
Instruments used in Testing.

The air and steam meters were of the Dodge type as developed by the General Electric Co., Schenectady, N.Y., and were operated by an expert sent by that company for that specific purpose. The indicators were of the American Thompson and Roberts-Thompson makes, which are well known and generally accepted as standard. The tachometer and thermometers were made by Messrs Schaeffer & Budenberg.

Results of the Test.

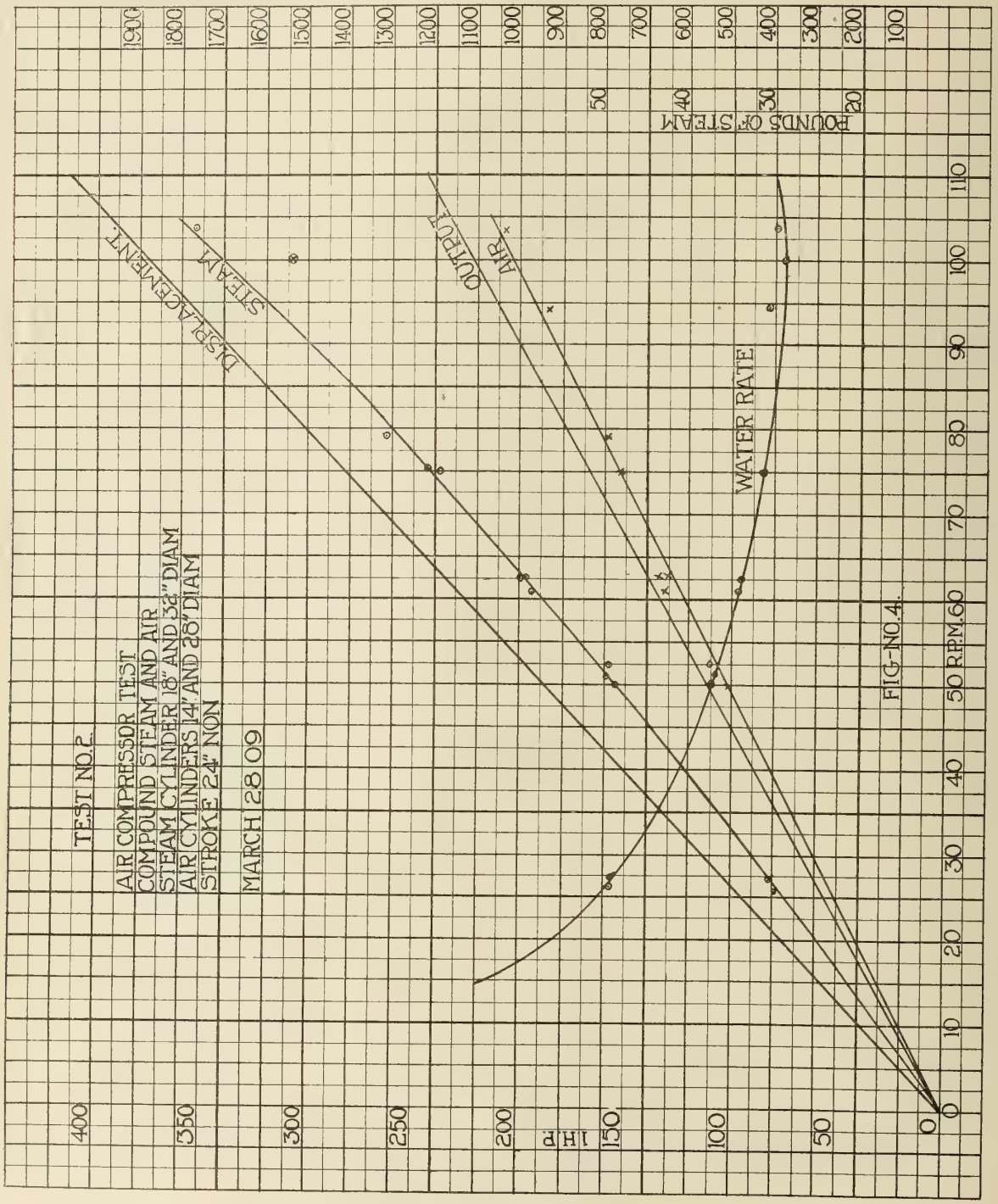
It quickly appeared that the friction loss was only a small item in the total, and that various other items of loss which have heretofore been entirely disregarded by the manufacturers and overlooked by engineers, played such a large part in cutting down the actual efficiency of the average air compressor under usual working conditions as to raise the question as to whether it is not one of the most wasteful machines ever employed.

As noted above, the manufacturers of air compressors rate their compressors by the volume of space in the cylinder. The efficiency of the machine, as they



state it, is only mechanical, and is obtained by dividing the total I.H.P. of the air cylinders by the total I.H.P. of the steam cylinders, the difference between these being the friction of the machine. For example, if the I.H.P. of the air cylinder is 100 horsepower and the total I.H.P. of the steam cylinder is 110, then the manufacturer rates the efficiency of his machine as 91 per cent. This rating absolutely disregards the losses due to the heating of the cylinder, adiabatic loss, the loss of the discharge, and the loss of delivery.

The friction loss will range generally from 10% to 25%, the first figure being the one most commonly mentioned by the manufacturers in their catalogues and prospectuses. On the other hand, losses from the various causes mentioned will run anywhere from 30% to 60%, thus cutting down the real efficiency of the average air compressor to such an extent as to make the figures of the manufacturer appear ridiculous.



Reports on Actual Tests.

The writer is not at liberty to disclose the identity

of the particular plants at which the tests were made, and for that reason the plants have been designated by numerals instead of by name.

Plant No. 1.

In plant No. 1 there were installed three 150-horse-power return tubular boilers, supplying steam for a Corliss engine, the air compressor, and the steam heating. The cost of the boiler horsepower was determined as above stated. The steam-meter was placed on the compressor during the test run, so that only that portion of steam actually used by the compressor was charged to it. The compressor was a duplex Meyer valve, simple steam, the air cylinders being two-stage, and was rated by manufacturer at 1,015 cubic feet of free air per minute at 105 R.P.M. The test at this plant lasted over a month. Hourly readings of the revolution-counter were taken, which showed the average speed of 36.05 R.P.M. The steam consumption at this speed was 51 lbs. per I.H.P. hour as measured at the throttle. The meter showed that at this speed the compressor delivered 275 cubic feet of free air per minute, an actual efficiency of 68.7.

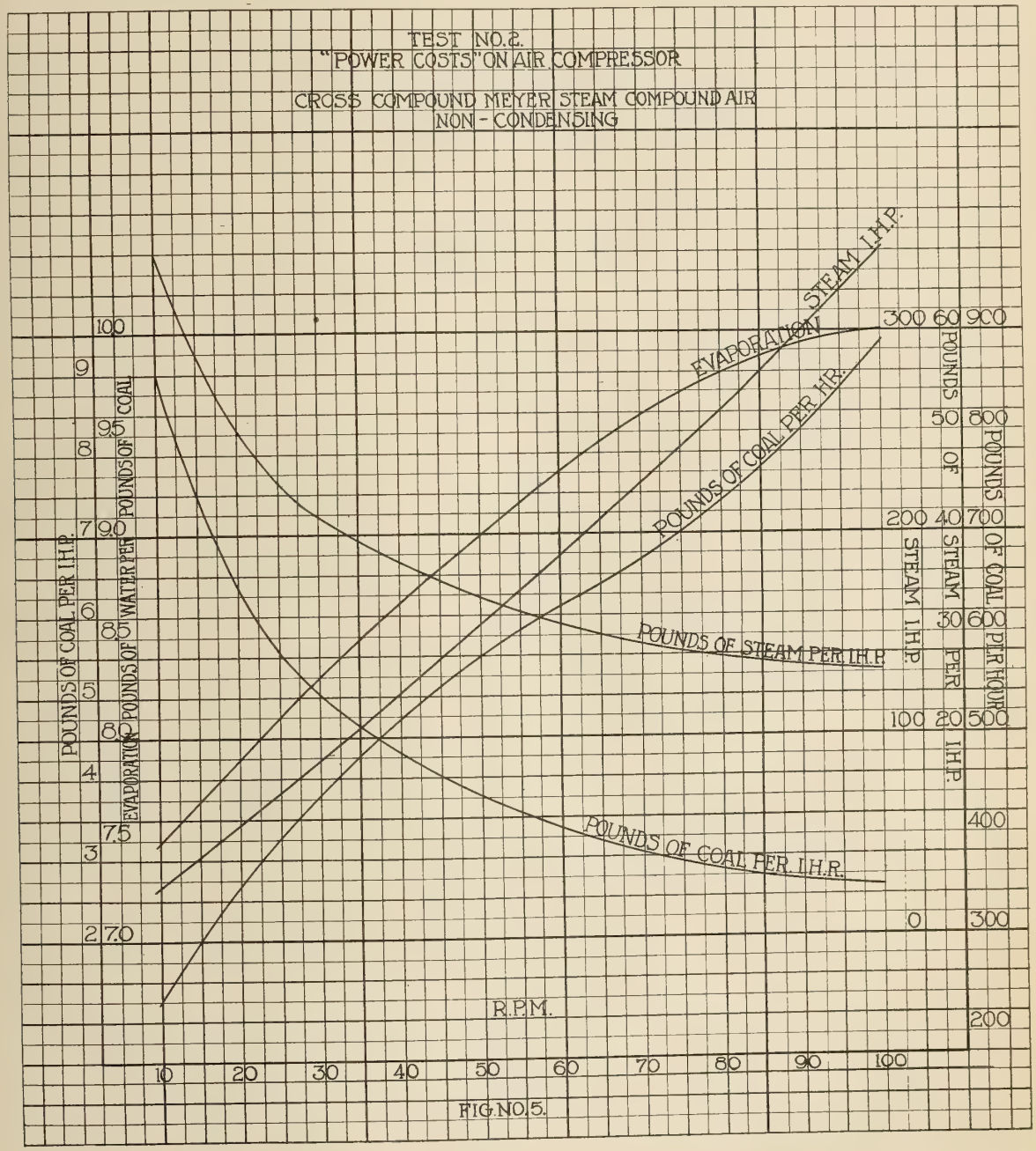


FIG. NO. 5.

Taking the ordinary method of computing the efficiency of this compressor, at 105 R.P.M. we should have 140 indicated air horsepower divided by 157 indicated steam horsepower, giving an efficiency of 89

per cent. as compared with the actual efficiency of 68 per cent.

The cost per indicated horsepower steam per year as shown by the books of the company amounted at the average speed to about $340. for coal at $6. per ton. The accompanying diagrams show just how the tests were worked out and the results obtained.—

Fig. No. 2—Shows how the total coal consumed per hour over the entire range of speed was determined, the curves being taken A.B.C.D and E.

The accompanying table takes the coal consumption, metered air output as already determined, and costs of operating as supplied from the owner's books and shows the cost of producing compressed air. From

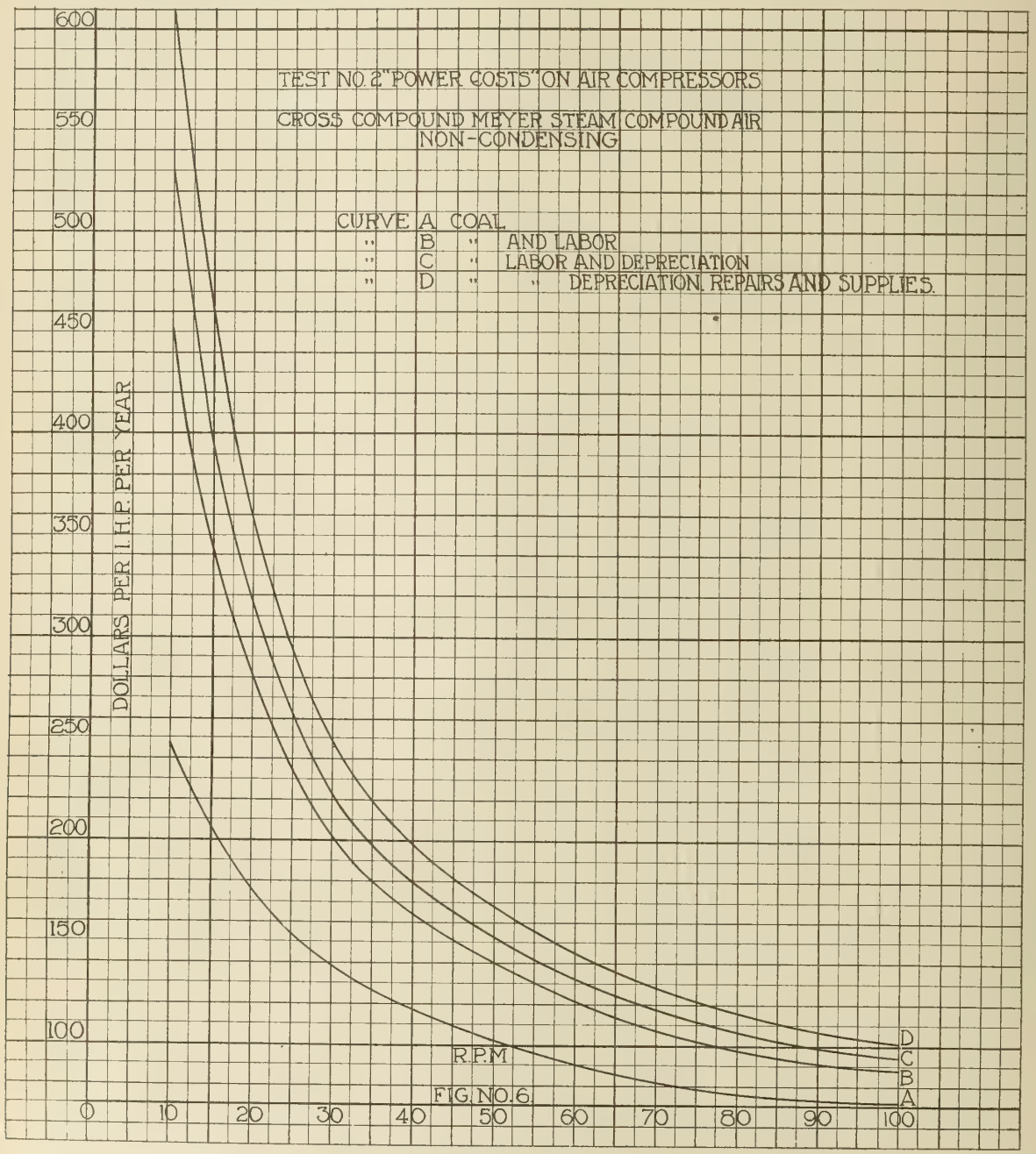


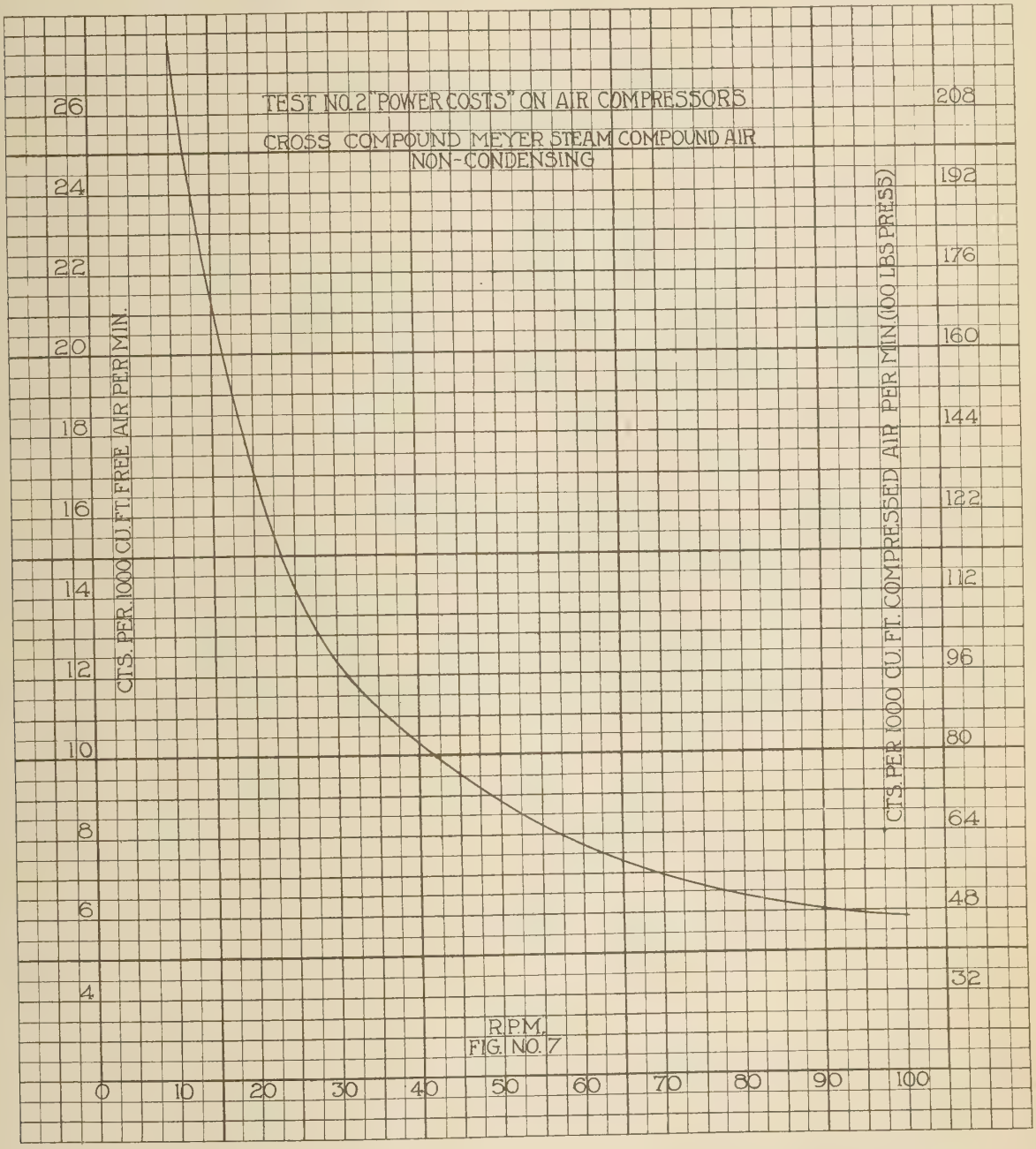
Fig. No. 1—Shows the indicated H.P. of the steam and air cylinders, the displacement of the piston, the metered air output after temperature correction and the pounds of steam consumed per indicated steam H.P. hour.

this table, the curves shown in Fig. 2 were plotted, showing the cost of producing a steam indicated horse power per year and Fig. 3 which shows the cost of delivering 1,000 cubic feet of compressed air to the receiver over the entire range of speed.

Plant No. 2.

This plant consisted of a cross compound Meyer valve steam and two stage air compressor supplied with steam from two 125 H.P. return tubular boilers. This machine was rated by the manufacturers at 1880 cubic feet free air per minute at 100 R.P.M. A two weeks' test was run on this plant in exactly the same manner as at Plant No. 1. The average speed of the compressor was 66 R.P.M., the steam I.H.P. at this speed 210, the air I.H.P. 128.5, which would show the mechanical efficiency to be 61.2%, or a friction loss of 38.8%. This is very high, and can be accounted for by the crank shaft being in bad condition. While the owner was aware of this, the machine could not be spared, having been operated in this condition for months. This is something that the manufacturer of the machine is in no way accountable for, but the writer is of the opinion that it is not exceptional, and many owners will not allow a plant to be shut down for repairs so long as it will turn over. The output of this compressor at its average speed was 734 cubic feet of free air per minute, which would show the over-all efficiency to be 46.2%.

The attached curves, Figs. 4, 5, 6, 7 and the accompanying table were worked out in the same manner as on the test of Plant No. 1 and may be followed.



Summary.

The writer has no desire to arouse a controversy on the merits or demerits of air compressors. The object of this paper is to show the absolute necessity for demanding from the manufacturer of air compressors a definite statement of the effective horsepower, or guaranteed output of compressed air, delivered by this compressor, at various rated speeds. Particularly is it desirable to require a guarantee of output delivered at speeds approximately those at which the compressor will be run in actual service. Manufacturers of electric motors give the efficiency at ¼, ½, ¾ and full and 1¼ loads. Manufacturers of air compressors, on the other hand, give only the volume swept through the cylinder by the piston and call it the output in free air, and even these data are given at only one stated speed, and that generally higher than the machine will stand for continuous operation. It should be remembered that an air compressor is generally a variable speed machine, its speed being usually regulated by a throttle governor connected to the pressure regulator, so that the machine is only called upon to run as fast as the demand for air requires it. Consequently, it is of the highest importance to require the manufacturer to give actual rating at the various speeds.

Furthermore, some definite data should be given by the manufacturer to enable the managers of plants to calculate the cost per horsepower delivered at the compressor. Up to this time, if the compressor is rated at 100 horsepower and the cost per annum $7,500, the manufacturer claims a cost of $75 per horsepower per year. Few plants, however, develop more than half

TEST NO. 2
POWER COSTS ON AIR COMPRESSORS

GROSS COMPOUND MEYER STEAM COMPOUND AIR
NON-CONDENSING

R.P.M.	EVAP.	WATER RATE	LBS. OF COAL PER I.H.P.	STEAM I.H.P.	LBS. OF COAL PER HOUR	COAL		COAL AND LABOR		COAL LABOR AND DEPRECIATION		COAL LABOR DEPRECIATION REPAIRS AND SUPPLIES	
						DOLLARS PER MONTH	DOLLARS PER I.H.P. PER YEAR	DOLLARS PER MONTH	DOLLARS PER I.H.P. PER YEAR	DOLLARS PER MONTH	DOLLARS PER I.H.P. PER YEAR	DOLLARS PER MONTH	DOLLARS PER I.H.P. PER YEAR
10	7.5	67.65	9.02	27.0	243.5	5.56	247.20	1015.13	451.17	1185.13	526.70	1358.56	604.00
25	8.1	45.1	5.57	72.3	403.0	9.20	152.70	1379.13	229.00	1549.13	257.30	1727.26	286.90
40	8.65	37.0	4.28	120.7	517.0	11.79	117.20	1638.13	162.85	1808.13	179.70	1991.16	198.10
60	9.3	31.02	3.34	188.5	630.0	14.36	91.50	1895.13	120.60	2065.13	131.50	2254.76	143.50
66	9.48	29.69	3.13	210.0	658.0	15.00	85.78	1959.13	111.90	2129.13	121.65	2320.66	132.60
80	9.8	27.41	2.8	261.0	731.0	16.00	76.60	2125.13	97.75	2295.13	105.50	2491.16	114.50
100	10.0	26.2	2.62	340.0	891.0	20.30	71.70	2489.13	87.90	2659.13	93.90	2861.96	101.10

R.P.M.	OUTPUT CU. FT. FREE AIR PER MIN.	COST (FREE AIR) CTS PER 1000 CU. FT. FREE AIR PER MIN	CTS PER CU. FT. FREE AIR PER MIN.	COST (COMPRESSED AIR) CTS PER 1000 CU. FT. COMP. AIR PER MIN 100 LBS PRESS	CTS PER CU. FT. COMP. AIR PER MIN 100 LBS PRESS	RELATIVE PER CENT OF TOTAL COST COAL	LABOR	INT. AND DEP	SUPPLIES
10	113	2.742	.02742	2.1936	.21936	40.92	33.80	12.52	12.76
25	280	1.4084	.014084	1.12672	.112672	53.25	26.59	9.84	10.32
40	445	1.0216	.010216	.81728	.081728	59.20	23.06	8.54	9.20
60	668	.7706	.007706	.61648	.061648	63.71	20.34	7.54	8.41
66	734	.722	.00722	.5776	.05776	64.63	19.79	7.33	8.25
80	889	.63977	.0063977	.511816	.051816	66.90	18.41	6.81	7.88
100	1110	.5886	.005886	.47088	.047088	71.00	16.01	5.91	7.08

TEST NO 1

"POWER COSTS" ON AIR COMPRESSORS

DUPLEX MEYER STEAM COMPOUND AIR
NON-CONDENSING

RPM	EVAP.	WATER RATE	LBS OF COAL PER I.H.P.	STEAM I.H.P.	LBS OF COAL PER HOUR	COAL DOLLARS PER MONTH	COAL DOLLARS PER I.H.P. PER YEAR	COAL AND LABOR DOLLARS PER MONTH	COAL AND LABOR DOLLARS PER I.H.P. PER YEAR	COAL LABOR AND INT AND DEP. DOLLARS PER MONTH	COAL LABOR AND INT AND DEP. DOLLARS PER I.H.P. PER YEAR	COAL LABOR INT AND DEP AND SUPPLIES DOLLARS PER MONTH	COAL LABOR INT AND DEP AND SUPPLIES DOLLARS PER I.H.P. PER YEAR
20	5.04	62.9	12.48	29.8	371.9	81.44	32.795	105.554	42.505	121.654	48.790	124.729	50.270
25	5.18	57.9	11.18	37.2	415.9	90.78	29.283	114.890	37.070	130.390	42.095	134.115	43.295
35	5.44	51.1	9.39	53.0	497.8	109.023	24.684	133.133	30.143	148.633	33.680	152.458	34.510
40	5.55	49.0	8.83	60.0	530.0	116.070	23.214	140.180	28.040	155.680	31.150	159.555	31.910
60	5.97	43.0	7.20	90.1	649.0	142.131	18.929	166.241	22.120	181.741	24.210	185.811	24.775
80	6.29	40.3	6.41	120.1	770.0	168.630	16.849	192.740	19.260	208.240	20.800	212.510	21.225
100	6.42	40.1	6.24	150.3	938.0	205.422	16.400	229.532	18.322	245.032	19.560	249.502	19.910

RPM	OUTPUT CU FT FREE AIR PER MIN.	COST FREE AIR CTS PER CU FT FREE AIR PER MIN	COST FREE AIR CTS PER 1000 CU FT FREE AIR PER MIN.	COST COMPRESSED AIR CTS PER CU FT COMPRESSED AIR PER MIN. 100 LBS PRESS	COST COMPRESSED AIR CTS PER 1000 CU FT COMPRESSED AIR PER MIN 100 LBS PRESS	RELATIVE PER CENT OF TOTAL COST COAL	LABOR	INT AND DEP.	SUPPLIES
20	152	.018.73	18.73	.14984	14984	65.25	19.34	12.46	2.95
25	190	.0161	16.1	.12888	12888	67.70	17.96	11.56	2.78
35	267	.013.03	13.03	.10424	10424	71.55	15.80	10.15	2.50
40	304	.011.98	11.98	.09584	9584	72.75	15.10	9.72	2.43
60	457	.009.28	9.28	.07424	7424	76.50	12.97	8.34	2.19
80	610	.007.954	7.954	.063632	63632	79.35	11.35	7.30	2.00
100	761	.007485	7.485	.05988	5988	82.35	9.67	6.22	1.76

TABLE I

their rated capacity on an average, so that instead of costing $75 the horsepower actually delivered costs from $150 per year upwards. A certain amount of variation is, of course, necessary to take care of the maximum load, but such discrepancies as in the example given above should not be allowed to continue.

OUR LONDON LETTER.

Mining shares of the London Exchange during 1909. Mines of most parts of the world in demand. Even "Jungles" looking up. Technical Mining enterprise in the University of Leeds. A fine training equipment. A cupola development. A new patent boring bar with many good qualities. Export of mining furnaces. J. P. Johnson on the ore deposits of South Africa.

Special Correspondence to the "Canadian Mining Journal."

London, January 18th, 1910.

The various mining share markets on the London Stock Exchange experienced pretty fair business all through last year. The early part of the year found West African mines in favour and later on South African or Kaffirs went ahead in fine style. The last six months of the year has also been signalised by activity in Diamonds and Rhodesian descriptions.

In view of the further improvement in the technical position of the Rand gold mining industry by the reduction effected in working costs, it was evident at the beginning of the period that a revival in the Kaffir market was only a matter of time. But for the Balkan affair and the unprecedented floods on the Rand which interfered with the working of a number of the mines, the first quarter of the year would probably have seen Kaffirs active and buoyant; as it happened, the revival was deferred until the second quarter. Then dealers had no cause to complain on the score of business, and

speculators for the rise had a nice run, prices moving up substantially.

A slump, the usual sequel to a boom, came in the second half of the year, the continued falling off in the native labour supply, which, of course, affected the returns of the mines, being a depressing influence, in addition to the liquidation of the unwieldy bull account that had been built up in the market. The market was gloomy for several weeks, but when the liquidation appeared to be at an end, the lower level of values attracted fresh buyers and during the closing weeks of the year and the opening ones of 1910, Kaffirs have displayed a cheerful tone, although they have not been particularly active. End-of-the-year prices are some way below the best of the period, but still show fairly good gains on balance.

Taking a few typical mining shares, substantial gains on the year can be shown. East Rands have risen from $32.50 per share to $37.50 per share, Rand mines from $40.00 per share to $47.00 per share. De Beers, Diamond Deferred shares are up on the twelve months from $56.00 a share to $98.00 per share, and even Chartered, the share in which perhaps more money has been lost in this country than any other share existing, have moved up from about $4.00 to $7.50. In the days of Cecil Rhodes and the great men these latter shares were often loaded on the public here at $40.00 each. Their face value is $5.00.

The discovery of a new banket field in the Abercorn district of Rhodesia materially helped that market as also did such other things as the progress of the railway from the south towards the Congo and the commencement of production upon several of the copper mines in that neighbourhood. The Rhodesian gold output for the year is the largest ever obtained.

"Jungle" mines, as West African descriptions are briefly called, have made substantial progress. This district had its boom in 1900-1901 when by every boat from the West African coast there came immaculately attired negroes with leather bags of concessions, many of them, after having been sold, being untraceable to any known district in the Gold Coast Colony or Ashanti. Last year, however, the great South African mining house, known as the Consolidated Gold Fields of South Africa took part in the reorganization of leading West African mining concerns and other big Rand houses such as Wernher, Beit and Goerz, have followed. It is due to this influential backing that the West African mining field is on a sounder basis than ever before. Prices of the dozen leading mines are, with one exception, up on the year.

West Australian mines have been weak and prices are down on the year with very few exceptions. This group makes the least satisfactory showing on the year. Broken Hills have been busy and are better for it, although Australian labour troubles have tended directly to restrict business in this group during the last few months. Tin shares have not showed much life and it seems impossible to revive public interest in either Indian or Russian mining descriptions.

The technical section of the University of Leeds is so remarkably well equipped and is such a new feature that a brief reference to its coal and metallurgical mining department there will be of interest. The accommodation of this department includes, in addition to the lecture room, which will seat fifty students, a drawing office, a general mining laboratory and a photographic and lamp room. There is a full equipment for underground and surface surveys and a shaft-plumbing outfit.

The general mining laboratory is arranged for the study of ore dressing and coal washing, using small samples. There are laboratory crushing and sampling machines, slime tables, small jigs, upward current classifiers, and settling-boxes, with gold-washing pans, and other apparatus. In order to test the products from washing, there is the necessary assaying equipment.

Larger-sized machinery for coal-washing and ore-dressing is placed in an annex to this laboratory. There is a stone-breaker 8 in. by 5 in., a three-head prospecting battery, a pair of Cornish rolls 15 in. by 9 in., a modified trough-washer for coal, a record vanner, a 9 ft. percussive vanning table, and a four-compartment Hartz jig.

The mining department has also a centrifugal pump, which is electrically-driven, and an experimental fan suitable for research and elementary work. A transmission dynamometer enables power measurements to be made. The galleries, which are used for explaining and demonstrating matters which affect the ventilation of coal-mines, are of great service in enabling the student to grasp the principles of this important detail of mining work. The mining department receives occasional students direct from the works, and university mining students are instructed in underground and surface surveying at the mines, as well as in general mining work. The mining and the gas departments seem to be closely affiliated, to the benefit of both. Especially advantageous is this arrangement for testing lamps in explosive conditions. There is obviously a close connection between the two great industries of coal-getting and coal-using. Whatever kind of gas is made, and from whatever materials—coal, coke, or oil—the gas engineer is dependent upon the miner for the supply of the raw material. There is a feeling of the fitness of things when we see both departments so closely allied with each other and with the engineering department.

The support given to the mining department by the West Yorkshire Coal-Owners' Association and the Drapers' Company of London should be mentioned for it is difficult to over-estimate the advantages, to the University and the practical men in the industries concerned, of this assistance. It may be mentioned that the well-equipped geological laboratories of the University are an essential adjunct of the mining department.

A well-known firm of foundry engineers of Keighley, Yorkshire, has introduced a small cupola for melting from one to ten hundredweights (English) of iron per hour. It is said that mining engineers will find this cupola of great convenience in the event of a breakdown in machinery, which needs immediate repair in order to avoid disturbance of work and consequent loss. A mine is often situated a long distance from a foundry, and to such a one this emergency cupola is of special value as it provides at small cost, cupolas of greater efficiency, the means wherewith to make a casting for repair work on the spot without delay. The Taquah Mining and Exploration Company of West Africa are amongst the users of this inexpensive little cupola for rapid melting.

There have been a good many objections to drilling machines of the hand-held hammer type, but they are gradually being cleared off. A new patent boring bar put on the market by a well-known house here, appears to go a long way towards getting rid of any remaining trouble. In very hard rocks where the rate of penetration is less than 4-6 inches per minute, and when the boring holes are above the level of the waist, the workman needs to rest occasionally, thus losing time and les-

sening the output of the machine; or it is not uncommon to find one man taking the dead weight of the machine, and another pushing it forward against the rock. The automatic feed and standard overcome this trouble to a certain extent, but have the disadvantage of taking up room in the heading, and in addition one of the greatest advantages of the hand-held hammer drill is lost, i.e. the possibility of continuing the boring whilst loading out is in progress.

The patent Simplex boring bar overcomes these drawbacks. It is a solid forging throughout in steel, and is provided with a tapered circular portion at one end through which a hole is bored to permit the drill steel to pass freely. In operation the machine is first used to bore a hole (slightly larger than the finished hole) to a depth of two or three inches. This work occupies barely a minute under any circumstances. This drill is withdrawn from the hole and the slide bar driven in. The machine is placed on the bar, and boring commenced in the usual way. The workman merely pushes the machine forward as fast as the hole deepens. It will be seen that the machine is fitted with a bracket fitting round the slide bar, and it has no tendency to loosen itself. When the boring is finished, a few taps with a hammer are sufficient to loosen the bar in readiness for the next hole. A large number of these machines have been supplied for metalliferous mines as well as collieries, and I am informed that they are being used for sinking and stoping in some of the hardest rocks known.

The Merton Furnace Company is doing good business with its furnaces. Thirteen have just been shipped out to Tasmania. Some of these are to be erected at the Mount Hercules Mine, which is adopting the Gillies process, others on the Rosebery mine, which is adopting the Metals Extraction bisulphide process, and one is going to Broken Hill.

A new mining book by one who knows is J. P. Johnson's "Ore Deposits of South Africa." The author is a mining geologist and engineer living in Johannesburg and his book is right up to date. It deals chiefly with the two great gold-fields of South Africa, where the mode of occurrence of the precious metal is remarkably similar in many important respects and is yet so distinct from that of the other big gold deposits of the world as to constitute a type demanding separate consideration.

The Witwatersrand goldfield is a bare ridge of hills about 30 miles in length and the ore deposit in regard to length of strike—its outcrop and sub-crop has been traced for a distance of 70 miles—and continuity of pay values is unique among and stands at the head of the great ore deposits of the world.

Some idea in the way of comparing this field with others may be gathered from the statement that the next in order of size is the Kearsarge amygdaloid of the Lake Superior copper field, which has seven producing mines, four developing mines and one idle mine ranged over a distance of nearly fifteen miles, and which is in turn approached only by the Baltic amygdaloid of the same field with its promise of a future ten mile line of mines.

The Theta-Beta horizon of the Pilgrimsrest goldfield will, however, eventually take second place. Three possible explanations are given as to the origin of the gold in the auriferous conglomerates of the Rand, but not one of these is generally accepted. The theories are:—firstly, that the gold, together with the quartz-pebbles, is derived from the denudation of gold bearing rocks; secondly, that it was chemically precipitated from the water at the time of the formation of the beds; and thirdly, the theory is that the gold, together with the minerals that form the bulk of the matrix, was subsequently introduced into the conglomerates by percolating solutions.

Explanation number two is not even nowadays given serious consideration. The others, namely that the gold is either a detrital accumulation or that it is an impregnation, have powerful followings. In the newer Pilgrimsrest goldfield the presence of the gold in the beds is clearly an impregnation.

Johnson's book is of great service to prospectors, students and others possessed of an elementary knowledge of geology and some mining experience.

MINING ENGINEERS AND MINING INSTITUTES.

Written for the Canadian Mining Journal, by A. B. Willmott.

With the objects aimed at in Mr. Kendall's paper I fully agree and thank him for having again presented the subject for discussion. Several objections to the scheme occur to me, and I believe the objects sought can be better obtained in other ways.

His scheme as I understand it entails:—

1. A serious restriction in the number of the members of the Institute.

2. The formation of a close corporation with powers similar to those now possessed by the doctors, dentists, et al. and which are being sought by the embalmers of Ontario.

My objections are as follows:—

1. The proposed restriction of membership I consider a mistake. We need a wide-open congress of some sort, where all interested in mining, whether technically qualified or not, can meet and discuss matters of common interest. This our institute is now doing well. Let us move slowly in the matter of change. We want the broker and investor to attend our meetings, and learn the views of our leaders on the ethics of mine finance, and on the duties of directors to their shareholders. To shut out these men and also the younger men of the profession who might not be able to qualify, is to shut out from the Institute the very men who profit most.

Again to get sufficient numbers in the small local centres to make a live branch, the basis of membership must be wide. These members are by constitution members of the main Institute.

Still further we require all the funds we can raise to carry on our work. To restrict the membership to purely technical men would sorely cramp the Institute financially.

2. My second objection is the great difficulty of securing the legislative power to compel all engineers to pass the necessary examinations and enroll in the Institute. This matter is controlled by the provinces, and it would mean a separate campaign in each for a number of years. Then, in all probability it would be found that the conditions prescribed by the different provinces would not be alike. The doctors and the dentists who are far in advance of us in organization, have not yet succeeded in getting a common standard for all the provinces. If worth while I would not balk at this difficulty, but I think there is a better way.

3. My third objection is that even after the membership has been restricted in the way Mr. Kendall proposes there will still be "engineers and engineers" as he himself states. A man may be an excellent chemist, and so fully qualified for membership in the Institute, and be quite incompetent to report on the best

methods of developing a mine. Another man may be thoroughly versed in mine machinery and so an acceptable member, and yet not be qualified to value a placer deposit. The truth is, the mining engineering profession is a very wide one and no man can be thoroughly qualified in all its many branches. Yet. under Mr. Kendall's proposals we would virtually say to the public "the membership of this Institute has been carefully selected by law and you can safely employ any member for any mining service."

My solution of the problem, is the voluntary incorporation by some of our leading engineers of a Mining Engineers Guild. The qualifications for membership would require a high standard in technical education, experience and probity. There should be an initiation fee of fifty or a hundred dollars, and an annual fee of ten dollars over and above membership in the Institute. This money should be spent in educating the public to the necessity of employing only competent engineers. Advertisements would state the qualifications for membership in the Guild, and urge the public to demand reports by fully qualified men. Lists of all members with their special qualifications would be kept by the secretary. Advertisements would state that these lists would be furnished on application. This advertising would be of great assistance to the individual, and he could well afford the fees charged for membership. Nor would it interfere with his own advertising.

Such a guild would urge the employment of competent engineers as no individual could think of doing. It could criticise fraudulent promotions as no private engineer dare do. It would protect its members against the unfair use often made of their reports. It could control the whole subject of professional conduct by its own by-laws.

Some of the qualifications for membership in such a guild would be:

An age limit, say thirty years.
Graduation from some recognized college.
Practical experience of—— years.
Ethical qualifications.
Canadian residence.

It is recognized that many of our most qualified men might not join such a guild, having at present positions where they are not looking for public employment. There would be no compulsion that they should join. Many who might like to join might be debarred for a time, until age or experience gave them the necessary qualifications. As soon as they qualified they would be received. All Guild members should be members of the Institute in good standing.

In proposing this alternative scheme I am quite aware that objections can, and will be raised just as I have raised them to Mr. Kendall's proposals. I offer the suggestions, with the hope that out of the joint opinions of the members a scheme can be evolved which will involve the mining fakir in oblivion.

LEGAL COLUMN.

[Editor's Note.—Before this appears in print the Senate will probably have dealt with the proposed addition to the Criminal Code. The points brought out by our correspondent, however, are of signal importance.]

A debate arose in the Senate last week on a proposed addition to the Criminal Code, making it an offence for a person to have ore in his possession for which he couldn't account.

Legislation of this kind has regularly followed the founding of mining camps. It probably started in Australia, where there is still a most stringent statute in force, under which it is an offence to be the occupier of premises where gold suspected of being stolen is found, or to walk along a vehicle containing such gold. The discovery of diamonds in South Africa resulted in the development into an established industry of illicit diamond buying. Such great ingenuity was shown by the workmen in concealing diamonds that emetics and purgatives were used to supplement the law. Consequently the law was made as stringent as possible. It is a compliment to our enforcement of the laws we have that the demand for more easily enforced legislation has been so long delayed.

The following is the proposed addition to the Criminal Code: "424A. Everyone is guilty of an indictable offence and liable to two years' imprisonment who, having in his possession or on his premises with his knowledge any rock, ore, mineral, stone, quartz or other substance containing gold or silver, or any unsmelted, or untreated, or unmanufactured, or partly smelted, partly treated or partly manufactured gold or silver, is unable to account satisfactorily for or prove his right to the possession of the same."

This section was passed by the House last year with the words, "prove that he came lawfully by the same," in the last line instead of the words, "account satisfactorily for," etc., but it was rejected by the Senate. The objection raised in the Senate appears to be that the proposed section is a departure from well-recognised rules as to the onus of proof, and may work a hardship on persons having ore in their possession, but being unable to prove technically where such ore came from. It was to meet this objection that the clause was amended in the House this year.

In its amended form this objection does not really appear to be very serious practically, and it is largely on the question of principle that it has been opposed in the Senate. The principle, however, has suffered other breaches in the Code. One wonders if the attention of the Senate has been called to the strange provisions of Section 395: Where anyone has in his possession "any live or dead fence, or any post, pale, wire, rail, stile, or gate, or any part thereof, of the value of 25c at the least," and cannot satisfy the justice of the peace that he came lawfully by the same, he is guilty of an offence and liable to a penalty not exceeding $10 plus the value of the article so found."

After that there cannot be any serious departure in principle in the passage of the new amendment proposed. In fact, the Code already provides (Section 988) that the possession contrary to the provisions of any law on that behalf of any smelted gold or silver or any quartz-bearing gold or any unsmelted gold or silver by any operator, workman, or labourer, shall be prima facie evidence that the same has been stolen by him. This provision was passed, we believe, to stop high-grading in Nova Scotia. (One of the objections raised to the proposed section is that it was for the benefit of Ontario alone.)

The present law regarding stolen ore is embraced in two sections of the Code: 378 and 424 as amended in 1909. Section 378 makes it an offence punishable by two years' imprisonment to steal ore of any metal or any quartz, etc. With this paragraph should be read Section 637, which provides that a justice of the peace may issue a search warrant as in the case of stolen goods upon a written complaint to search for gold or quartz, silver or silver ore, and that such justice may restore it to the lawful owner as he considers right (subject to an appeal to the County Court judge).

At the same time, Section 893 provides that an error in the indictment under Section 328 or 424 as to the name of the owner may be amended at the trial, and that if no owner is proved, the indictment may be amended by alleging the Crown to be the owner.

Section 424, Sub-section 3, prior to the amendment of 1909, made it an offence punishable by two years' imprisonment for any person not the owner of a working claim, or the agent, or not authorized in writing by the proper officer named by any Provincial Act, to sell or purchase any quartz containing gold or any smelted gold or silver within three miles of any gold district.

Sub-section C provided any person who purchases any gold in quartz or any unsmelted or smelted gold or silver of the value of one dollar or upwards, except from such owner or authorized person, should execute a written instrument, setting out the particulars, and file the same with such proper officer within twenty days.

This section is obviously very defective. It would work hardship in the Yukon, where gold dust is used as a medium of exchange, and it was useless in Ontario, where no officer was provided to issue licenses to deal in gold, and consequently there was no place where the instrument required to be filed could be filed.

The section was amended in 1909 to include "any rock, ore, mineral, stone, quartz or any substance containing gold or silver or any unsmelted, untreated or unmanufactured or partly smelted, partly treated or partly manufactured gold or silver." The three-mile limit was abolished, the instrument was required to be filed within ten days with the officer with whom bills of sale and chattel mortgages are filed, and the Yukon Territory was excepted from the section.

The original section was evidently borrowed unreflectingly from the Transvaal ordinances. Even as amended, it is much more limited than the Transvaal ordinances, which prohibit trading by or with any person without a license. Under that statute it has been held that it is not necessary to prove that the accused was seen to handle the gold, it is sufficient if the gold was found in his possession; it has also been held that it is no defence that the accused acts as agent for another; and that the mere fact of agreeing to buy without an actual sale taking place is a breach of the ordinance. None of these cases would be covered by our present statute.

INDUSTRIAL SECTION.

A LARGE ELECTRIC MINE PUMPING INSTALLATION FOR HANDLING HOT WATER.

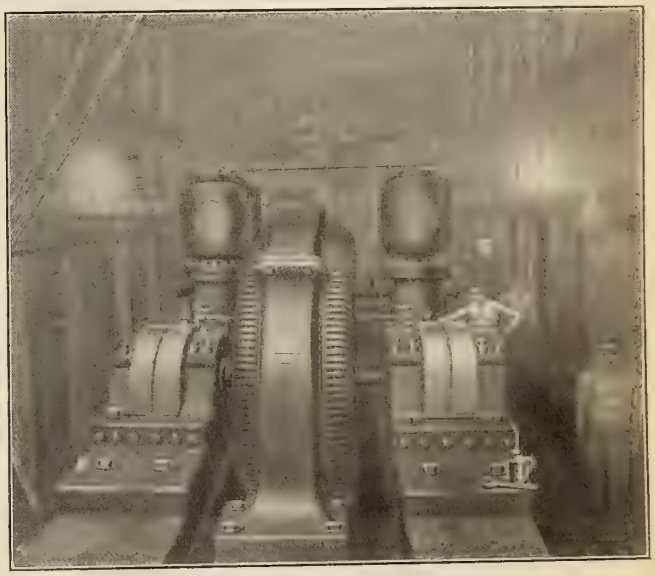
In reopening the Ward shaft, at Virginia City, Nev., a considerable flow of hot water was encountered, which for a time baffled the efforts of the workmen. The great depth of this shaft, 3,480 feet, and the high temperature of the water, 175 degrees, made the work of pumping out the impounded quantity very difficult, but a temporary electric pumping outfit was finally successfully put into commission, and has since been supplanted by a permanent installation, which easily handles the present continuous hot flow.

For the emptying of the mines, in the first place, a temporary motor-driven pump equipment was installed, by which compressed air driven sinker pumps at the bottom of the shaft lifted the water to a centrifugal pump on the 2,330 ft. level. This in turn delivered to a vertical triplex pump on the 2,100 foot level. The sinker pumps were supplied with compressed air from two 100 horsepower Ingersoll-Sergeant compound air compressors driven by 100 h.p. Westinghouse motors, located on the surface. The three stage Byron Jackson centrifugal pump on the intermediate level was belted to a 50 h.p. Westinghouse induction motor, while a 100 h.p. type "C" Westinghouse induction motor drove the 6¾ x 8 inch Knowles vertical triplex pump at the uppermost pumping level.

This apparatus has since been replaced by the installation of the permanent pumping plant located in a pumping station 80 ft. long, 24 ft. wide and 20 ft. high, connected with the shaft 3,100 ft. below the surface. The permanent pumping equipment consists of a special slow speed, 800 horsepower Westinghouse type "H F" induction motor direct connected to a Knowles express type, duplex, double-acting pump, operated at 195 revolutions per minute.

The valves are of the automatic Poppett type arranged in nests of 13 each, presenting a valve area of 104 square inches, which makes necessary very slight movement of the valves, and is conducive to a high speed and a minimum of wear. The valves and other visible parts are of bronze, and the pump has a capacity of delivering 1,600 gallons per minute against a total head of 1,550 feet.

The plant is equipped with a three stage electrically driven air compressor for charging the air receivers, besides a vacuum pump and an automatic oiling system.



For convenience of erection and repair, the pump station will be fitted with a 15 ton travelling crane; in fact, it is intended to include in this plant everything that will insure reliability and ease of operation.

The over-all dimensions of each pump are 27 feet 3¾ ins. in length, 17 feet in width, and 14 feet 2 ins. in height. The motor is 13 feet in diameter, and the steel crank shaft, forged from one piece, is 13¾ inches

in diameter and 14 feet 4½ inches long. The total cost complete for operation was about $125,000. These pumps are supplied by either one of the two centrifugals located in the pump at the bottom of the shaft, and operated by special 75 h.p. Westinghouse motors on a vertical shaft.

The water is discharged through a 16 inch steel column with welded steel flanges. The thickness of this pipe varies from ¼ inch at the tunnel level to 9-16 inch at the bottom. The column is supported by means of heavy weight iron clamps 6 inches in length, which in turn rest upon the wall and end plates. To resist the pressure of 675 pounds to the square inch, male and female flanges are used and each fitted with a lead-filled copper gasket.

The electric current is taken down the shaft at 2,240 volts over a three-conductor, lead-covered, steel-armored cable of 400,000 circular miles capacity. The electrical equipment, from the automatic oil circuit breakers on the surface to the motors themselves, is the best that money can buy; and in operation, with the splendid Westinghouse plants of the Truckee River Electric Company behind it, results have been obtained never before approached for this class of work.

The accompanying illustration of the present permanent pump house, 3,100 feet underground, was retouched from an actual flashlight photograph, obtained during a recent visit to the mine. The normal temperature of this pump room, 110 degrees Fahrenheit, is attested by the costume of the men, who work their daily shifts of twelve hours under these conditions.

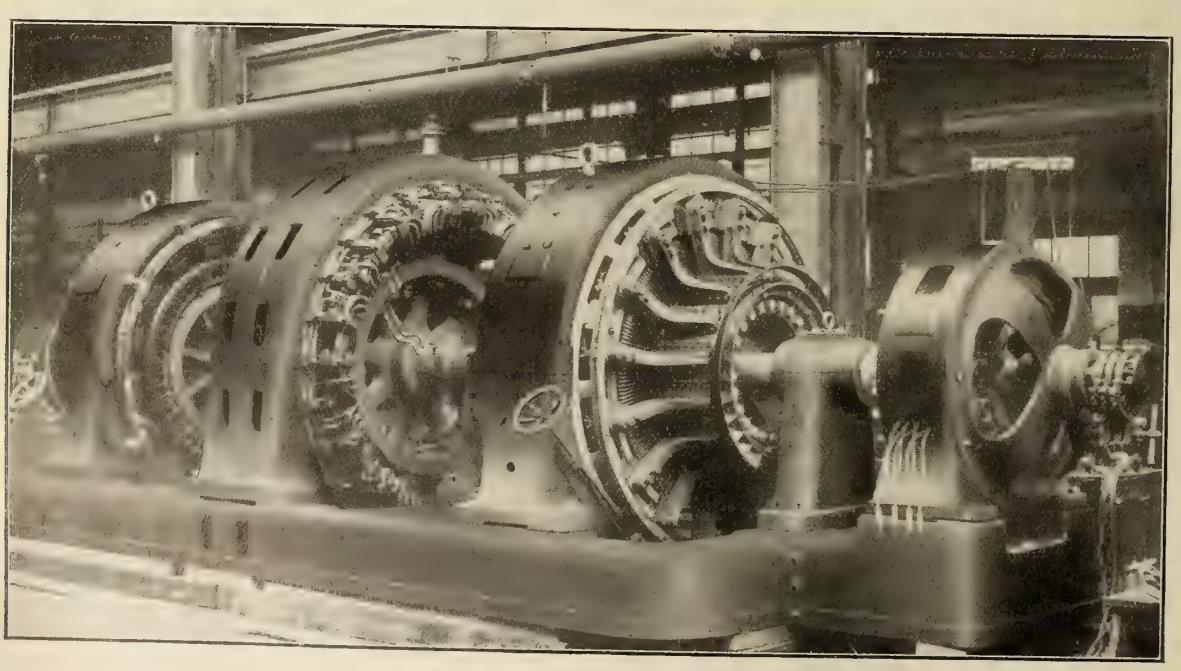
BRUCE, PEEBLES & CO.

Announcement is made on another page of this issue of the establishment in this country of the business of Bruce, Peebles & Co., Limited, Edinburgh, Scotland, manufacturers of electrical apparatus, through their Canadian representatives, Messrs. Vandeleur & Nichols, Dineen Building, Toronto. The firm of Bruce, Peebles & Co., Limited, was established in 1866, but it was not until 1897 that the electrical department was added. The business, however, in their electrical specialties has grown so rapidly as to almost eclipse other departments, and the works were gradually increased until they now occupy a site covering ten acres, the location being near Granton, just outside of Edinburgh.

It is interesting to note that the works are entirely self-contained, water is pumped from their own wells and the sewage treated in a septic tank in the grounds. Steam boiler house and gas producer plant provides the motive power for large generators, while a storage battery will operate all the lights and any department when the main plant is closed down. The main works building is 600 feet long by 150 feet wide, and is divided into five bays. Additional structures provide accommodation for office staff, drafting, designing and estimating departments.

Messrs. Bruce-Peebles were not long in the field before it was recognized that their product stood for all that was desirable in quality of workmanship and material. The passing of time proved the reliability of their machines under periods of stress and overloads, and their desirability under all conditions of service. The British Government repeatedly places large contracts in their hands, of which mention might be made of H. M. Dockyard, Chatham; H. M. War Office, Watham Abbey Powder Factory; Enfield Small Arms Factory; H. M. India Office, equipment for state railways, and the Crown Agent for Natal Government, turbo-generators and motor converter sets. Other large contracts have been awarded, such as the furnishing of complete street railway systems for Shanghai, China; Delhi, India; Athens, Greece; Llandudno and district, Wales, and Sunderland and district, England. These systems have included the entire equipment from the powerhouse to the conductors' uniforms, and were turned over to the purchasers in actual full operating order. In addition to these contracts, numerous other large installations for industrial purposes could be mentioned.

Messrs. Vandeleur & Nichols form the last connecting link in a chain of branch houses and agencies which encircles the entire globe.



One of Two 1,500 H. P. Motors supplied to the Newcastle on Tyne Electric Supply Co.

THE LARGEST ROCK CRUSHER IN THE WORLD.

The largest rock crusher in the world will be one of the features of interest at the rock crushing plant, which Messrs. Laurin and Leitch will have in operation at Outremont, Quebec, within a few months. They have contracted with the Montreal Water and Power Company to build a reservoir about 800 feet long and 400 feet wide on the side of the mountain and, as the contract must be completed within four years, one of the problems involved was the economic disposal of the rock which is to be excavated. In view of the large and increasing demand for crushed stone for concrete and other purposes, they decided to erect a plant of sufficient capacity to take care of all the rock which might accumulate during the process of the work. Having visited the largest and most modern crushing plants in the United States, especially in New York and Michigan, Messrs. Laurin and Leitch selected the Gates gyratory breakers as those best suited to their requirements, and gave to Allis-Chalmers-Bullock, Limited the contract for the complete equipment. It will involve an expenditure of upwards of $200,000.

Another serious problem was to arrange a plant of such proportions on the land available in that locality. Messrs. Laurin and Leitch purchased a site about 1,000 feet away from the reservoir and have arranged for direct connections with both the Electric Railway and the C. P. R. while the quarry cars will be hauled along two incline railways from the reservoir to the edge of the crushing plant property. There will be a powerful hoisting engine, capable of lowering four cars, each carrying 20,000 pounds in one train over the incline of 1,000 feet at the rate of 250 feet a minute. The incline will be operated with two barneys, so that if desired an additional train of rock may be elevated to the crusher plant without letting the empties down as the barneys carry the rope back. By this method no coupling or uncoupling of trains will be necessary. Two additional hoists will operate separately, each taking one of these loaded cars at a time, elevating it to the crusher, and, after it is dumped, lowering it to the bottom of the incline again. Steam shovels will be used for loading the quarry cars.

The principal rock crusher known as a No. 21, weighs 240 tons, and has a capacity of 10,000 tons in ten hours, or about 500 railway car loads daily. This machine receives the largest pieces which it is practicable to take from a quarry and crushes them without the need of any preliminary breaking by sledge hammer, or secondary blasting. There are two discharge openings through which the crushed product leaves the machine instead of only one which is usual with smaller breakers. It is thus possible to build the machine lower and make it more stable. The broken rock from each spout will fall into large steel frame elevators, which in turn will deliver it into heavy steel frame screens, each 6 feet wide and 22 feet long with 2¾ inch perforations. The rock which escapes this mesh will be conveyed to several of the No. 6 Gates breakers, equipped similarly, though on a smaller scale, with elevators and screens. To care for such an enormous amount of stone daily, there will be a carefully planned system of storage piles and bins while the tracks will be arranged in such a way that crushed stone can be loaded by steam shovels into either railway cars or horse carts.

Having purchased the largest rock breaker in the world, Messrs. Laurin and Leitch determined that the rest of the equipment should be of the most modern character. The entire plant will be driven by a 700 h.p. triple expansion engine, and a cooling tower will be erected so that the engine may run condensing. Electric power will be used whenever it is advantageous, and the firm will have its own electric plant consisting of a 175 k.w. alternating current generator, belted to the main shaft, switchboard, transformers and other apparatus. The smaller breakers, elevators and conveyors will be run by induction motors. Even the rock drills will be operated by electric power. When completed the plant will be the largest of the kind in Canada. Allis-Chalmers-Bullock, Limited, will act as consulting engineers in connection with the erection and operation of the plant.

CORRESPONDENCE.

The following is a copy of a letter sent by the Toronto solicitors for the Mond Nickel Company, Limited, to the chairman of the Select Standing Committee of the House of Commons on Mines and Minerals. The letter is self-explanatory:—

Feb. 4th, 1910.

The Chairman, Committee on Mines, etc.,
House of Commons, Ottawa, Ont.

Dear Sir,—We have communicated a synopsis of the allegations before your committee by cable to our clients, the Mond Nickel Company.

We are instructed to protest most emphatically against the statement that the International Nickel Company of New York controls all the supplies of Canadian nickel.

The Mond Nickel Company own their own mines in Canada, and do in this country most of the work required in producing nickel. The purchase money went into the pockets of Canadians, and the Canadian public has benefitted; for instance, one of their properties was purchased by them from the late Aeneas McCharles, who, with part of the proceeds, founded an endowment for research to be administered by the University of Toronto. Out of this fund an award was made the other day to a distinguished citizen of Ottawa.

Our clients have expended large sums in exploration for further ore bodies, but in addition to those which they acquired some time ago they have not been able to find new ore bodies which can be worked in competition with the rich nickel deposits of New Caledonia. At the present time our clients are producing nickel from their mines in Canada, and are supplying the British Government and the Indian Government with nickel mined, smelted, bessemerized and refined within the jurisdiction of His Majesty. About ninety per cent. of the entire wages are expended in this country. The completion of the refining is done in Great Britain, the nickel produced by them from Canadian ores being completely manufactured within the British Empire.

All well-informed persons know that the Sudbury District has no monopoly so far as the supply of nickel is concerned.

And, moreover, the use of nickel is very limited. Large amounts have been spent by nickel refiners in the effort to increase the use of nickel and to educate manufacturers as to the advantages of nickel steel, and notwithstanding these efforts, it seems impossible to enlarge the scope of the industry.

A large proportion of the nickel used at the present time comes from New Caledonia, and within the last few years new works have been started in Europe for refining New Caledonian ores. Besides these, Norway has also commenced to produce nickel again, and deposits of rich nickel ores have recently been discovered in Russia and other parts of the world.

Under these circumstances, to impose an export duty on nickel ore or matte would be to strike a severe blow against Canadian and British industry, and to favour the products of convict labour in the penal colony of New Caledonia.

The only Canadian director of the Mond Nickel Company was the late Sir George A. Drummond, whose loss will be regretted not only by this company, but throughout Canada and Great Britain.

We have asked the secretary of the committee for a copy of the evidence submitted, which we shall send to our clients in London so that they may have an opportunity of sending you a formal statement.

Yours truly,
CLARK, McPHERSON, CAMPBELL & JARVIS,
Solicitors for the Mond Nickel Co., Ltd.

Quebec, Jan. 25th, 1910.

Editor Canadian Mining Journal,
Sir:—

In the number of the Canadian Mining Journal of the 15th instant, I notice in Mr. Harpell's article on the Asbestos industry a statement, rather sweeping and unjust towards the Department of Mines, of the province of Quebec.

The article ends with the following sentence:

"The present Quebec Government cannot be held responsible for the condition of land holdings that exists around Thetford Mines and Black Lake, but they will be responsible for these conditions in new districts, such as Chibougamau **where they are creating a state of affairs no better than that created by their predecessors in the Asbestos district of the Eastern townships.**"

That large land holdings exist in the Chibougamau district, is inaccurate as regards both mining rights and surface rights, and allow me to correct the impression that the sentence conveys.

The Chibougamau district, by order in council passed in January 1907, was withdrawn from sale for colonization purposes. This means that no mining concessions, nor surface rights may be sold or disposed of without a new order in council being passed, throwing the district open.

Up to the present, only Mining Concessions applied for before the withdrawal from sale have been granted, and the area of these is altogether about 2,500 acres. The balance of the district, which comprises about 1,200 square miles is, at present, held by the government both as regards the mineral rights and the surface rights.

There are therefore in the Chibougamau district no large tracts of the "best agricultural lands held by one or two individuals" as the statement published in the journal seems to imply.

Let me state, Mr. Editor, that we always receive in the best spirit all well meant criticisms, and that we carefully note such for future guidance, but before making such condemnatory statements as the ones referred to above, it might be well to inquire as to the actual facts.

The Department of Mines of the province of Quebec is entirely at the disposal of any inquirer for information, and had Mr. Harpell realized the condition of the land holdings in the Chibougamau district, I am sure, he would have refrained from writing the last sentence of his article.

Yours truly,
Theo. Denis
Superintendent of Mines.

IN THE HIGH COURT OF JUSTICE.

Between Peterson Lake Silver Cobalt Mining Company, Limited, Plaintiffs, and Edward Steindler, D. M. Steindler and J. A. Jacobs, Defendants—Consent Minutes of Judgment.

It is hereby agreed by and between all parties to this action that judgment be entered by consent in the following terms:—

1. The defendants shall forthwith pay to the plaintiff company in full settlement of all claims the sum of $50,000, and shall also forthwith pay to the plaintiff company the further sum of $3,000 on account of its costs.

2. The defendants shall forthwith surrender to the plaintiff company 160,000 paid-up shares of the plaintiff company's stock by delivering up to the plaintiff company certificates representing the said 160,000 shares of stock accordingly.

3. The plaintiff company admits a liability to the defendants David M. Steindler and Jacob A. Jacobs of $28,291.10, and shall forthwith deliver to the said defendants in payment thereof two promissory notes for $14,145.55 each, bearing date the 19th day of January, 1910, payable in one and two years respectively from the date thereof, with interest at 5 per cent. from the said date.

4. The said defendants J. A. Jacobs and D. M. Steindler shall forthwith procure the dismissal of an action pending in this court against the plaintiff company, in respect of the said sum of $28,291.10, and the discontinuance of a like action and attachment proceedings in connection therewith, pending in the State of New York or New Jersey, in respect of the same matter, the said action to be dismissed or discontinued without costs, and the defendants will give such consents and do all such other things as may be necessary to release the moneys attached in said proceedings so that the same may be payable to the plaintiffs without costs or charges.

5. The defendants shall forthwith procure the dismissal without costs of an action pending in this court between Warren, Gzowski & Co., and the plaintiff company in respect of the transfer on the books of the plaintiff company of certain shares of stock of the defendants in the plaintiff company.

6. The plaintiff company shall rescind all resolutions barring or restricting the transfer of the stock of the defendants or any of them, and shall forthwith remove all restrictions in connection with the transfer of any such stock, other than such as are contained in the general by-laws of the plaintiffs applicable to all the stock of the plaintiff company generally.

7. The plaintiff company shall forthwith procure the dismissal without costs of an action pending in this court against the defendant Jacobs for an account and for other relief.

8. The judgment herein shall be without costs, except as hereinafter stated, and shall declare and adjudge that the above-mentioned payments and surrender of stock by the defendants shall be and be deemed to be a full and complete payment, satisfaction, settlement and discharge of all amounts payable by the defendants, or any of them, in respect of any and all of the capital stock of the plaintiff company heretofore at any time issued to the defendants or their nominees, or any part of them, and as entitling the defendants to receive all of the said stock at any time issued to or received by them or any of them or their nominees as

fully paid-up, non-assessable stock, and shall also be and be deemed to be full and complete payment, settlement, satisfaction and discharge of all claims against the defendants, or any of them, for misfeasance or otherwise in respect of the issue of any of the said stock or of any subsequent transfer or distribution or other disposal thereof, or in respect of the issue of any stock of the plaintiff company to any other person or persons whatsoever or in respect of any act or acts whatsoever of the said defendants, or any of them, as directors, promoters, agents or servants, or as director, promoter, agent or servant of the said company; and in full settlement, satisfaction, payment and discharge of all claims of the plaintiff company against the defendants, or any of them, for moneys, had, received or retained by the defendants, or any of them, and generally in settlement, payment, satisfaction and discharge of all claims and demands at law or in equity of every kind whatsoever by or on behalf of the plaintiff company against the said defendants or any of them.

Dated this 19th day of January, 1910.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—During the first half of January the output of the Dominion Coal Company's mines, was roughly 95,000 tons, which compares with an output of 85,000 in the first fortnight of January of last year. There was a slight falling off from the figures of December, due to the prolonged holidays taken by many of the men at Christmas. The daily output ranges round 9,000 tons, but it will not be until the end of January that the maximum will be obtained.

The announcement that Mr. M. J. Butler, C.M.G., had been appointed General Manager of both companies, was made at a meeting of the Coal Board on the 12th January, and on the 17th, Mr. Plummer, together with Mr. Butler and Mr. D. H. McDougall, the new Superintendent of Mines, paid a visit to the mines. Mr. Plummer had a conference with the three Divisional Superintendents of Mines and the Mine Managers, after which a statement was issued to the local newspapers by Mr. Plummer, which in part was as follows: "Mr. Plummer stated that he had not met the representatives of the United Mine Workers, and that he does not consider it necessary that he should meet them. The position of the Coal Company, as regards its employees has already been plainly stated in his telegram to the Sydney and Glace Bay papers, and a meeting with these representatives, even to discuss the terms on which the men, now out of employment may return to work, might be misconstrued, and regarded as a recognition of the United Mine Workers, which is against the policy of the company." This whole-hearted endorsement of the policy, hitherto pursued by the Coal Company towards the U.M.W.A, invaders has greatly pleased those whose duty it has been throughout the past six months to fight the various influences which have been brought to bear, to gain recognition for the United States organization.

At the time of writing, the Annual Convention of the U.M.W. is meeting in Indianapolis, and it may be that Mr. Lewis will have hard work to justify his actions and those of his representatives in Nova Scotia during 1909. Some of the Canadian newspapers which have supported Mr. Lewis in his campaign to gain control of all Eastern Canadian coal mines have recently hinted very plainly that the strike is lost, and further fighting on the part of the U.M.W. is futile.

One of the most significant facts that has transpired during the strike was given to the Halifax Morning Chronicle by Mr. John Moffatt, the Grand Secretary of the P.W.A., of Nova Scotia. On a recent visit to Pittsburg, Mr. Moffat discovered that at certain mines in Pennsylvania the miners are working under a reduced scale of rates, known as the "eastern rate," which it is explained, is necessary to enable the U. S. operators to capture the Eastern, or in other words, the Canadian market. Mr. Moffatt was shown affidavits in which it was stated that these special rates were paid under a "tacit understanding and private agreement" between the President of the Pittsburg Coal Co. and Mr. Tom Lewis, the President of the U.M.W.

The coal operators of Nova Scotia may well be pardoned if they consider the present condition of affairs a peculiar one, In 1909 the output of Nova Scotia was reduced one million tons, by the actions of the U.M.W. President in calling the several strikes. The importation of American coal was greatly increased by the same action, taken, it must be remembered, by the same labour leader who has the "tacit understanding and private agreement" with the head of a great U. S. coal company, that wishes to extend its coal sales in Canada. At the same time, action is taken in the Canadian Courts, charging the coal operators of Nova Scotia with enhancing the price, and with "unduly limiting the facilities for mining coal" in Canada. The costs of the prosecution are paid out of the treasury of the U.M.W. by the gentleman with the "tacit understanding and private agreement" with a U. S. coal company. The inference is too obvious to need elaboration. All this is being done by the irresponsible leader of an unincorporated foreign body, not amenable to Canadian Laws, for it is well known that there never would have been any strike in Nova Scotia, had it not been deliberately planned and brought about by the Executive of the U.M.W.A.

Glace Bay.—One result of the unfortunate strike brought about by the U. M. W. A. in Nova Scotia has been to compel many of the local miners to seek employment in other parts of North America, but these men do not seem to have found better conditions or more attractive remuneration in all their wanderings. Letters are daily received at the offices of the Coal Company from such widely separated addresses as Taber, Alberta; Nanaimo, Vancouver; from Illinois and Pennsylvania, and they all tell the same tale. The miner at Glace Bay has generally been certain of steady work and certain payment, but this does not appear to be an unvarying rule in the coal mines of other provinces and states. The more exact acquaintance with the workings of the U. M. W. A. which these men have gained by working in mines controlled by this union has cooled their enthusiasm as nothing else could have done. Many of these men are stranded and without the means to return to Glace Bay. There were numerous cases of good workmen who left Glace Bay when the strike was called, not because they sympathized therewith, but simply because they were men of peace, who hated a fuss, and dreaded the treatment to which those who attended their work were subjected. This class of miner was composed almost entirely of European nationalities, who felt little interest in the faction fight of two unions, accompanied by complications they did not understand, and they preferred to leave the town rather than be mixed up in the anticipated troubles.

Another class was made up of native miners, who, bitten with the western fever, thought the strike presented a favourable opportunity to see the country and work in those favoured provinces where the beneficent rule of Tom Lewis held sway. But all classes unite in a consensus of opinion, that Glace Bay and the Dominion Coal Company are hard to beat—and it is a

thousand pities that it should have proved necessary to travel so far afield and to lose so much to learn this lesson. If half the statements that these expatriated strikers made are true, the U.M.W. of America have little excuse for spending $600,000.00 in a forlorn and useless struggle in Nova Scotia, such time as conditions in the mines of their own country are the shame of a civilized community.

Whatever faults the town of Glace Bay may possess, a lack of variety is not one of them, and the recent municipal elections have furnished some amusing reading. The following excerpt will serve to show the extremely candid brand of criticism in which the local journals indulge. The Glace Bay Standard, which is the organ of the United Mine Workers of America, recently remarked as follows: "The officials of the Coal Company have never yet shown any ability in running the company's own business in any but an experimental and blundering manner; it has become the laughingstock of those who have an idea how such a concern ought to be administered. . . . Let the Coal Company's officials stick to their business, and perhaps, under the new teaching such as they are now getting, they may after a while learn something of their own business." This is a fair and average sample of the "journalese" with which the newspaper readers of Glace Bay have been regaled since the beginning of the United Mine Workers' strike.

The output of the Dominion Coal Company's mines for January was, approximately, 212,000 tons, which compares with 200,000 tons in the month of January, 1909. A comparison of the figures by collieries is as follows:—

Colliery No.	1909.	1910.
1	36,473	45,000
2	36,178	45,000
3	15,417	18,000
4	20,664	26,000
5	25,036	28,000
6	3,838	.....
7	9,255	6,000
8	12,882	10,000
9	22,605	17,000
10	13,634	11,000
12	4,194	4,000
14	.....	2,000
Total	200,176	212,000

The outputs during the first half of the month were much disorganized by the Christmas holidays, but they recovered towards the end of the month, and during the last week the output maintained an average of 9,330 tons per day.

It is apparent and has been apparent for a long time that the so-called "strike of the United Mine Workers" has failed, and it is difficult to know what justification this organization has for its expenditure to maintain the pretence of a strike in face of the foregoing figures.

Mr. Duggan's departure from Glace Bay and his retirement from the active management of the Dominion Coal Company gave occasion for a gathering of a significant character. Mr. Duggan was waited upon by a committee, which included representatives from all the lodges of the Provincial Workmen's Association at the mines of the Dominion Coal Company, who presented him with a very tangible token of their esteem, and expressed their regret that Mr. Duggan was leaving Glace Bay. This committee represented some 3,500 workmen of the Coal Company, and the address which was read referred to Mr. Duggan's good faith in every negotiation he had had with the workmen under his charge, and was, in fact, a tribute such as is rarely given to an official of a large corporation by workmen. The number of men who have followed the mistaken lead of the United Mine Workers' organizers does not, at the outside, exceed 1,700 men. To the unbiased observer, matters in Glace Bay must seem a little topsy-turvy when a disgruntled minority of workmen, aided by the funds of a labour organization with headquarters in the United States, is allowed to intimidate the great majority of the workmen who desire nothing better than to attend to their work and manage their own business in the way that seems best to themselves. It may not be realized that this small body of strikers has for seven months held a carnival of coercion and intimidation throughout the colliery districts, which is costing the peace authorities and the Coal Company a large expenditure of money, and blocking the wheels of industrial progress in a manner unprecedented in Nova Scotia. It is one of the basic principles of British politics that a minority has rights, but by no stretch of the imagination can a minority of workmen have the right to act in the manner in which the United Mine Workers of America have acted since the 6th of July, 1909.

ONTARIO.

Cobalt.—It is understood that a 51 per cent. interest in the Provincial mine has been sold. The mine has been incorporated in a company known as the Cobalt Provincial Mining Company. This property was bought at the last sale from the Provincial Government.

The new road into the South Lorrain camp is practically completed. It leaves the Kerr Lake road at the Lumsden mine, near the Rochester, and goes through the Pan Silver, John Black, Ophir, Highlands, and Ontario Development Company's properties. Stages are now running over the road, and the trip into the Keeley mine can be made in three hours. This road will be of great benefit to Cobalt, as formerly the only way to get into the district was by way of Haileybury. The Mines Power is making preparations to deliver cheap power to the district, and is building a substation on Beaver Lake, and when it can deliver power, mining costs will be much reduced. The present year should see several mines added to the list of shippers. The Keeley and Wettlaufer are certain, while the chances are excellent for the Little Keeley, Beaver Lake, the Newman, and Maiden Companies. The Beaver Lake Company has discovered silver in its big smaltite vein at a depth of 135 feet. The vein was very wide on the surface and in the shaft, but the silver values were low. In drifting on the vein, however, on the 135-foot level leaf silver was encountered. The Keeley is the oldest property in the camp where values were found. The company has so far been labouring under a serious disadvantage, as the gas producer plant that it installed has given it a great deal of trouble. Another gas producer plant has been ordered to run a ten drill compressor. The company has on hand about half a car of high-grade ore that will run high in silver. The shaft has been sunk to the 140-foot level, and drifts are being run on the vein. At the 65-foot level a cross-cut has been started to cut No. 2 vein. There is also a shaft down 75 feet on No. 3 vein, but no work has been done on this for some time. The Beaver Lake has, however, found silver in this same vein at greater depth, so the possibilities for the Keeley finding it are also good. Up to date this property has shipped a little over forty-four tons of ore. For some time past it has been known that Adolph Lewisohn, who controls the Kerr Lake mine, has been negotiating for control of the Wettlaufer. This he was unable to get, but he has acquired a large interest. The Lewisohns are not, however, in the habit of being contented with minority interests, so that it is fairly safe to assume that this is only a preliminary to acquiring control. The Wettlaufer Company is capitalized at $1,500,000, and when the stock was first put on the market it was sold for 45 cents, and less than a year ago 150,000 shares of treasury stock were sold at that price. When it was known that the Lewisohns had invested heavily in the property the stock sold as high as $1.42 per share. This mine has had high-grade ore from the surface, and the first carload that was taken out from development work more than paid all the initial expenditures on the property. The shaft has now been sunk about 140 feet, and there is high-grade ore in

the bottom. There are two levels, and over 500 feet of drifting has been done. Up to date two cars of high-grade and two cars of medium grade ore have been shipped.

The Cobalt Lake mine is coming to the front on account of the shipments of high-grade ore that have lately been made, and on account of the better physical condition of the property. The new vein, known as the Pellatt, is showing good values, and has now about five inches of high-grade ore. It has been decided to continue the winze from the 190-foot level to a depth of 250 feet. From this depth a cross-cut will be run to cut the Pellatt vein.

It has been denied that the Bartlett has reverted to the original owners, McLaughlin and McIntyre, but it is understood that when work is again started these men will be directly interested in it. The Bartlett will now have a chance to make good when operated under conservative management. The property is one of the best located in the Gowganda District, and the surface showings were exceptionally good. However, under the previous management no trenching or surface prospecting was done. The company is unfortunately cursed with a high capitalization.

Active development work is now being carried on at the Drummond mine, and they are cross-cutting on the 200-foot level under Kerr Lake in an effort to reach the conglomerate. The Hargraves opened up a good vein some time ago in the vicinity of the Drummond boundary, and it is probable that the latter company will recommence prospecting in that vicinity. About two years ago they sank a shaft on a small vein close to this point, and when the values pinched out the working was abandoned. This company still continues to make large shipments from the dump to the Trout Mills concentrator, and it is understood that the rock is assaying higher than was anticipated.

The big Peterson Lake and Steindler and Jacobs suit has been settled by arbitration. All through the action Justice Teetzel advocated a settlement, and gave it as his opinion that the suit was so complicated that he doubted his ability to render a satisfactory judgment. After a good deal of discussion the interested parties decided to leave the matter in the hands of the judge. Steindler and Jacobs are to pay $50,000 in cash and surrender 16,000 shares of stock, besides contributing $3,000 to the costs of the action, while the Peterson Lake Mining Company will pay Steindler and Jacobs the sum of $28,000 in two years. The independent suit against Mr. Jacobs has been withdrawn, also the claims for stock alleged to have been improperly issued. The question of the location of the lease has yet to be settled by the courts.

Another ore shoot has been discovered on the 200-foot level of the Crown Reserve about 350 feet west of the No. 1 cross-cut. It has been drifted on for over 15 feet, and shows high-grade ore. This company is in an excellent condition financially, and after paying all dividends has a surplus of approximately half a million dollars.

Already this year four companies, the T. & H. B., Crown Reserve, Nipissing and La Rose, have paid a total of $888,457.50 in dividends.

The new Trethewey shaft being sunk at the northern extremity of the property is about completed, and will soon be in shape for timbering. This shaft is being sunk to work the veins developed by the Hudson Bay. The latter company also put up a raise to meet the shaft, thus much reducing the time necessary to carry out the work. The new shaft is being connected with the mill by an incline tramway, and the cars will be run with a small hoist. Good progress is being made with the mill, which will probably be finished before the power is ready. The stamp batteries are in place, and a large part of the other machinery is on the ground, and is being rapidly installed.

The position of the King Edward has much improved since the mill started running. It is probable that in the future the shipments will average nearly a car of mixed high-grade ore and concentrates a month.

It is reported that a rush of some proportions has started to Fort Matachewan, which is about forty miles north of Elk Lake. Some good specimens of gold-bearing quartz have been brought down.

The road from Latchford to Maple Mountain has been opened up, and supplies have already started in over it.

With their 2 per cent. dividend cheques the La Rose sent out a brief financial statement. It reads as follows:—

Cash in bank, ore in transit and at smelters	$335,828.97
Ore sacked at mine ready for shipment	46,810.00
	$382,638.97

Up to date the La Rose has disbursed to shareholders dividends to the amount of $1,379,279.00. It is interesting to compare the above statement with that of the Nipissing, as these two properties are the principal ones in the district. During 1909 the increase in tonnage over 1908 was 3,005 tons, and the cash surplus was $402,510.34 more, while the increase in dividends paid amounts to $660,000. In addition to this it is stated that the ore reserves are greater than at any time in the previous history of the mine. The statement of January 1st, 1910, is as follows:—

Cash in bank	$819,223.86
Ore in transit and at smelters	413,033.64
Ore sacked at mine ready for shipments	90,728.00
	$1,322,985.50

The 1909 dividends, including the one payable January 20th, 1910, amounted to $1,500,000.

In 1909 the company shipped 6,510 tons of ore, valued at, net	$2,210,364.00
In 1908 the company shipped 3,505 tons of ore, valued at, net	1,263,783.00
Increase, 3,005 tons, net increase	$946,581.00

The Nipissing has been steadily improving its position, and it is expected that vein 122 will take the place of the Kendall as the principal producer. Some exceedingly fine ore is also being taken out of No. 64, which is a continuation of one of the Hudson Bay veins.

A notice sent to the shareholders of the Beaver advises them that the second carload of ore shipped gave a net return from the smelter of $47,948.81.

A consignment of silver bullion amounting to 29,000 ounces was shipped recently direct from the O'Brien Mine to Mocatto & Goldsmid, bullion brokers for the Bank of England.

The third carload of silver to be shipped from Gowganda was sent out recently from the Reeves-Dobie mine. The other shipments were made from the Blackburn and the Reeves-Dobie. The ore was sent out from the mine to the end of steel on the Canadian Northern, and the trip only occupied a little more than a day. It is understood that the Mann and the Boyd-Gordon will also shortly ship a car, while more may be expected from the Reeves-Dobie.

The Right of Way has cut a new high-grade vein from their No. 3 workings between the Silver Queen and the McKinley-Darragh. The vein was discovered on the 120-foot level, and shows about four inches of ore that will run in the neighbourhood of $2,000 of silver.

Mr. E. T. Corkill, Inspector of Mines for Ontario, has laid information before the magistrate against the Goodwin Mines, alleging negligence and non-compliance with the Mines Act in connection with the death of one of the workmen a short time ago. The case comes up February 4th, and will be the first of its kind for over a year. The penalty is between $100 and $1,000.

The report that the O'Brien option on the Gillies and Miller claims in the Porcupine had been abandoned came as a great surprise. It was known that Mr. O'Brien was endeavouring to get an extension of the option, and it was understood that he

had been successful, but a few days afterwards all work was stopped. Particular interest was felt in this option, as it was on these claims that the diamond drill was working in an effort to cut the vein at some depth. When the drill was first started and was down a short distance it was figured that it would take a 600-foot hole to cut the vein, so that hole was stopped and another one started at a lower angle. Before this was down very far, however, the option was abandoned and the drill stopped. It is understood that the owners had several good offers for the property, and were not content to extend the option without a large part of the initial payment of $50,000 being made. Encouraging results are being obtained from the Hollinger properties, which are under option to the Timmins. The main vein can be traced for over 1,000 feet, and the shafts that are being sunk show that the values are going down as far as the shafts have been sunk. When a depth of 50 feet is reached cross-cuts will be run to cross the veins and prove their values. On the claims owned by McArthur & Co., of Glasgow, Scotland, the main energies of the management have so far been directed toward the erection of camp buildings, and as soon as these are completed several shafts will be sunk. It is reported that McCormick Bros., of New York, have purchased the Wilson claims. This property, which consists of eleven claims, is generally conceded to be the best in the district. Some time ago Mr. A. A. Cole, engineer for the Temiskaming & Northern Ontario Railway, made a report on the district.

It is not expected that the phenomenal values found in some places will hold, but it is hoped that the values in the veins will average up to make a good low-grade proposition. Engineers are confidently looking for the appearance of sulphides with greater depth.

The annual report of the Hargraves was very encouraging to the shareholders, as it showed a cash balance of over $30,000, and ore on hand to the value of $10,000. The property is looking better than at any previous time in its history.

The Nancy Helen mine has been closed down for an indefinite time. The power plant has been leased to the Cobalt Light Company until the 1st of March.

The Otisse-Currie and the Gavin-Hamilton properties in Elk Lake have assigned. It is understood that there is a likelihood of a settlement being effected and of work being resumed.

Following the starting up of the Colonial mill, that property has shipped a car of ore for the first time in over a year.

BRITISH COLUMBIA.

Rossland.—The local mining situation remains steady and unchanged, with the exception of the recent leasing of the Mayflower mine in the South belt. A good ledge of pay ore has been uncovered in No. 3 tunnel on this property, and Mr. N. Hansen, the lessee, expects to begin shipping on a small scale in a short while. A crew of five men is now at work on the property, and an ore chute from the tunnel to bins near the railway track is being built.

The Le Roi 2, Ltd., is quite active, and is preparing for operations on a larger scale than at present. This concern is asking figures on an electrical hoisting apparatus to replace the present 150 h.p. hoist at the Josie headworks. Preparations are also being made to explore that area of ground north of the No. 1 shaft. Some of the finest copper ore ever produced in this camp has been mined in the No. 1 workings, which are about 650 feet deep. This part of Le Roi 2 property has not been worked for some years. The cross-cut on the 1,300-foot level of the Josie has been driven 100 feet toward the ore zone, and work on this level will be energetically continued.

The Le Roi continues to ship a moderate tonnage each week. Nothing new is heard from the ore discoveries made in the lower levels with diamond drill, but it is understood some indications of good ore have been located. The Consolidated Centre Star-War Eagle group is shipping nearly four thousand tons per week, and development in the lower levels is yielding a big tonnage of ore.

Resolutions affecting the mining industry, that will be placed before the Associated Boards of Trade, in convention at Nelson, January 25th, will include one from the Rossland Board, that the Government of the Dominion of Canada be requested to coin silver dollars at the Mint in Ottawa. Men interested here would like to see this adopted for two reasons. It would mean an increased use of the .999 fine silver produced at the Trail refinery, and it would probably retire some of the filthy, germ-laden bills now in circulation. A quasi-radical resolution will be considered suggesting the abolition of the present personal tax on merchandise, machinery, stock, etc., carried for the conduct of business. It seems that some of the men connected with the Government have hinted that this tax might be abolished when the finances of the province were in a flourishing condition, and there were good days ahead. As things look now, it is thought that the time is about ripe for a consideration of this measure.

The following change in the Mineral Act will become law on April 1st: "The owner or agent of owner of a mineral claim for which the mining recorder's certificate, under Form 1 of the schedule of this Act, has been granted, shall within three months from the date of such certificate, make application to the Gold Commissioner for a certificate of improvement, and in default of such application being made in such time, such mining recorder's certificate shall lapse and become absolutely void." It seems that there has been much delay in applying for the certificate of improvement in the past, and this measure will overcome that by constraining the owners of mineral claims to prompt action within the specified three months.

The Boundary.—The action of the Granby Consolidated, to sell 13,500 shares of its treasury stock, is looked upon with favour here for several reasons: The amount derived from the sale of this stock ($1,147,500) even at the preferred figure to present shareholder of $85 will be more than sufficient to pay off the indebtedness of the company incurred in the purchase of stock in the Crow's Nest Pass Coal Company. Then it is stated by the Granby officials themselves that as there will be no improvements of such magnitude as undertaken last year, a more substantial dividend may be paid than was the case in 1909 (2 per cent.), provided, of course, things remain normally favourable and no disastrous labour or fuel trouble crops up, which possibility is most remote at this writing. The Granby is maintaining a good average in ore shipments, and for the first three weeks of this year has sent 78,532 tons to its Grand Forks smelter, where seven furnaces are working now, one of the battery undergoing some minor repairs. This average maintained for the last week of the month will mean a production of 2,303,500 lbs. copper for the first four weeks of the year, as Granby ore will average nearly 22 lbs. copper per ton and under $1 in gold and silver. It is thought the Granby will pay from 5 per cent. to 8 per cent. in dividends this year, under favourable operating conditions.

There is not much fear of work being suspended at the mines and smelter of the B. C. Copper Co. over the threatened labour difficulty now that a board of arbitration has been called for under the Lemieux Act. Some phases of the demand of the miners' union for "closed shop" are ridiculous to fair-minded men, and they are not receiving the support they would get were their grievance founded on more substantial ground. The net profits of the B. C. Copper Co. during December last were about $22,700, and the cost of making the red metal per pound was 10c, as compared with 7.35c in November. This was partly caused by the several holidays and inclement weather interfering with surface mining. Shutting down a big mining and smelting concern easily runs up costs and is quite expensive, though it be but for a day or two. For the first three weeks of the year the B. C. Copper Co. has shipped 29,745 tons of ore from its Mother Lode and Oro Denoro mines.

The Golden Eagle, on the west fork of Kettle River, shipped 120 tons of ore to Granby smelter during the past week. The mine has closed down temporarily. The Riverside property has been purchased by a local syndicate, and work will be started along development lines shortly.

Nelson.—A substantial tonnage of high-grade ore is being sent to the smelter from the Slocan, Nelson and East Kootenay mines, and several new properties have joined the shipping list already this year. The outlook for the coming season is cheerful. There is a good tonnage of ore blocked out in the Ottawa, at Slocan which is under lease. A 14-foot vein of ore is being worked in the Standard, Silverton, and shipments are being made. A force of over 100 men is now employed at the Van Roi, where about 150 tons of ore per day is being milled. The Silverton Mines, Ltd., is working the Hewitt and Lorna Doone property. The Molly Hughes shipped 59 tons of ore last week, carrying a quantity of native silver.

An ore body has been opened up in the lower tunnel of the Lucky Jim, carrying from 52 to 53 per cent. zinc, which is considered a rich find. The property is temporarily shut down at this time.

A party of French capitalists, who are interested in the Blue Bell mine, being operated by the Canadian Metal Co., visited the property last week. As a result of this visit it is hoped that the production at the mine will be doubled. With this end in view, steps are to be taken toward the improvement of the reduction plant at Riondel. The zinc reduction problem in this district is a profound problem, but now that the attention of the mining public is centering on it, there is no doubt that steps will be taken toward its solution.

It is reported that the face of the 360-foot tunnel on the old North Star mine is in ore carrying 60 oz. silver and 40 per cent. lead. Development is now being undertaken to prove the value of the strike.

Vancouver.—It looks as though something definite is to be done at last with the British Columbia iron deposits. Recently J. A. Moore, president of the Irondale Smelting Co., invested $60,000 in coal lands on Graham Island, and states that it is intended to erect a steel plant on the coast that will cost from a half to a million of dollars. This plant will very likely be on Vancouver Island, where extensive iron deposits have been found. The same concern has invested $75,000 in the magnesite beds of Atlin. This mineral ($MgCO_3$) is not common, and this deposit is probably the only one of the same character on the continent. One of the uses of magnesite is as a refractory material for linings for the converters used in the basic Bessemer process for making steel. The deposit behind Atlin was bought as an investment.

The Red Cliff Mining Co. now has its boiler and compressor plant at the mine, and will shortly begin the installation. Extensive work is planned for the coming season at Portland Canal. The O. H. fraction near the Portland Canal group has been bonded for $75,000, and will be worked immediately. There are several rich veins on the property. The owners of the Britannia are spending about $30,000 per month in development and equipment, and the property is rapidly coming to the front.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—The coal boring operations in Prince Edward Island which have been in progress for nearly two years, have been concluded. The work has not brought the results which all have so earnestly hoped for. The last borings made were at Miminigash, where a drill had been sent down to a depth of seventeen hundred feet. Work here was brought to a sudden termination a few days ago by the fact that there was a cave in of about one hundred feet of the upper earth, which buried the apparatus and knocked on the head all possibility of continuing the work at that place.

Sydney, Jan. 28.— The present winter up to the present has been one of the mildest experienced here in many years, and shipping men look for an early opening of navigation.

Not since 1902 has there been so much activity in Dominion Coal Co. shipments as there is this winter. The coal carrying capacity of the fleet now in operation is 34,300 tons, as against 16,000 tons last winter.

The above figures represent dead weight capacity. As almost the whole of the coal shipped goes to Halifax, St. John, Portland, or Boston, the steamers of the Coal Company's fleet are able practically to make weekly trips. Fully half the amount shipped for this winter has been from the Sydney piers.

The company looks forward to a very busy season in coal shipment during the coming summer, and is making preparations at the collieries accordingly.

QUEBEC.

Montreal. Feb. 9.—The last hope of the U. M. W. of America was shattered to-day when President Plummer of the Dominion Coal Company refused to meet a delegation of high officials from that order to discuss the Glace Bay strike.

Mr. Plummer absolutely declined seeing the delegates, sending Hector McInnes, K.C., the company's solicitor, to tell them that such a conference would be useless, and would give rise to misconception and misunderstanding; and also for the reason that his policy had already been announced, and that there was no possibility of a change.

Thetford Mines, Que., Feb. 3.—The very mild winter has been a great boon to both Thetford Mines and Black Lake, in as much as it has permitted the Amalgamated Asbestos Corporation to carry forward very extensive plans for improvements and extensions, and the progress already made on the larger contracts indicates that the company will be able to increase its output materially in the near future.

ONTARIO.

Cobalt, Feb. 2.—Sandy Christie and Jas. Hope, two miners, were blown to pieces on Monday afternoon in the shaft of the Silver Leaf mine.

The two men went down the shaft about three o'clock to load some holes. The dynamite had been packed in and the fuses set. Hope lit one fuse and before he noticed anything wrong he started a second.

Some loose powder had evidently been left near the hole for the flame from the end of the fuse leaped to the powder and an explosion followed immediately.

After the second hole had gone off other men ventured down and found the two bodies terribly mutilated.

BRITISH COLUMBIA.

Greenwood, January 26.—Once more work on the great tunnel to Phoenix is in full swing. The newly installed drill compressor started at 9 o'clock on Wednesday morning last. Two hundred and twenty-six feet was driven by hand, and now the rate of progress with the drills will be very much accelerated. There are 22 men employed, superintendent, 8 miners, 9 muckers, 2 compressor men and 2 blacksmiths. The complete equipment is now ready for continuous work and the management expects to make from 12 to 18 feet per day.

Queen Charlotte, B.C., January 27.—News is just to hand from the camp between Massett and the Yakoun that the diamond drill at work there has struck a large body of coal.

Three seams of excellent coking and steam coal are reported, the largest seam being 9 feet 6 inches at 600 feet below the surface.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

It was finally agreed at a meeting of owners and miners in Newcastle-on-Tyne, on January 15th, that further meetings should be held between the men's representatives and the managers at the individual collieries, with a view to endeavouring to arrive at a settlement on the lines of the conversation that had taken place that day between the representatives of the two associations.

The South Wales and Monmouthshire Coal Trade Conciliation Board continued negotiations at Cardiff, January 26th for the drawing up of a new agreement between the coal owners and the miners. Both sides were chiefly engaged in holding separate conferences for the purpose of deciding upon their future course of action, and so much time was occupied in this manner that it was decided to adjourn the discussion on the most important questions until today, when the chief topic will relate to the minimum and maximum wage difficulty. It is expected that both parties will put forward modified proposals.

GERMANY.

Notwithstanding economic depression prevailing during the greater portion of 1908, the production of coal in Germany in that year reached record figures. It amounted to 148,966,000 tons, as compared with 148,621,000 tons in the preceding year, or an increase of 345,000 tons, and the output of lignite, or brown coal, totalled 68,355,000 tons, as against 66,450,000 tons, being an increase of 1, 905,000 tons. The imports of coal in 1909 amounted to 12,198,000 tons, as contrasted with 11,661,000 tons in the previous year, or an increase of 537,000 tons. On the other hand, the exports of coal were 23,350,000 tons, as against 21,190,000 tons in 1908, being an advance of 2,160,000 tons. The total consumption of coal in Germany amounted to 137,814,000 tons, as compared with 139,091,000 tons in 1908, thus showing a falling off of 1,277,000 tons.

Berlin, January 15th.—The "Tageblatt" points out that, in consequence of the introduction of the miners' eight hours' day in England, the British steel and iron manufacturers have been obliged to raise their prices, thereby enabling their German competitors to raise their prices, which had sunk to a very low level. Since then there has been a genuine revival in the home markets, so that the German iron and steel industry is able to count on an active trade and higher prices. As a result of the coal strike, a number of iron works in the north of England are closing down, and if the strike is protracted great advantages will certainly accrue to the German coal and iron industries. The "Tageblatt" points out that as a consequence of the cessation of the importation of British coal the German consumer will be compelled to pay higher prices for German coal, and concludes, therefore, that in the general interest it cannot wish for a protracted strike in England.

AUSTRALIA.

Sydney, January 15th.—The ballot among the Southern miners has resulted in favour of the acceptance of the award of the Wages Board.

Sydney, January 25th.—The position of the Northern and Southern miners remains unchanged. The judge on the Northern Compulsory Board has determined to proceed to compel the attendance of witnesses. The s.s. "Quito," the first government coal ship, is expected to arrive to-night from Calcutta. Free labourers have been engaged to unload her. The Crown is prosecuting nine miners at Maitland for obstructing workers in the local colliery.

NEW ZEALAND.

New Zealand is likely to become an important oil producer at no distant date, and extensive prospecting operations are in progress. An area some 300,000 acres in extent, near Gisborne, in the North Island, has recently been taken up, and will no doubt shortly be the subject of a prospectus. From other parts of the world comes news of active operations, and among pending flotations are the Timor Oil Fields, which is being formed to acquire property in the Dutch East Indies, while a concern having interests in Madagascar is also expected to make its appearance shortly. In California a great demand for oil lands is reported, but the supply has now become very limited. Favourable reports are to hand from Angola and the Portuguese territories of West Africa.

RHODESIA.

Rhodesia, like the Rand, managed to create a fresh record in its gold output for the past year, but, also like the Rand, it did not make so much progress as in 1908. The total production of £2,624,000 in 1909 was an increase on the previous best in 1908 of nearly £100,000; but, on the other hand, 1908 gained as compared with 1907 nearly £350,000.

CHINA.

The directors of the Pekin Syndicate announce that the output and sales of coal for the month of December were:—Output, 23,350 tons; sales, 30,000 tons; boiler consumption, 1,850 tons.

UNITED STATES.

Primero, Colorado, February 1.—Of the 150 miners employed in the Primero colliery of the Colorado Fuel and Iron Company, fully one-half are victims of a gas explosion that took place this morning at 4:30 o'clock. Both fans were shattered by the explosion. It took three hours to repair them. 24 bodies have been already taken out by rescue parties equipped with breathing helmets. One miner was rescued alive. Numbers of miners volunteered to aid in the search. The work of superintendent J. F. Thompson was notably heroic. He was twice overcome by gas.

Ely, Nev.—The work of retimbering the new shaft of the Giroux company is progressing at the rate of 15 feet a day, which insures the completion of the shaft not later than the middle of March. Sinking has been commenced from the bottom of the shaft and will be continued, it is said, until the 2,000-foot level has been reached.

The Giroux shaft is 18 x 10 feet, inside dimensions. There are five compartments, one 10 x 6 for a bouble-decked cage which is to handle men and timber. Thirty-five men can be taken at a single trip and a car of 9 x 6 timber can be run onto the cage, lowered to the point desired, and then run off on the level, without any shifting. There are two skip roads each 4½ x 5 feet and the rest of the shaft is taken up with ladder and pipe-ways cut up to the best of advantage. A platform running on guides will be provided for pumpmen and pipemen, so that inspection of these lines may be made readily and properly and new lines added as may be needed.

Cherry, Ill., February 1.—Work was resumed in the St. Paul mine to-night by scores of men, following the removal late to-day of the hermetic seal that had kept the mine closed for two months. Efforts will be made to clear the mine of noxious vapors, wall-in any smoldering fires and recover the 160 odd dead bodies of miners who have lain entombed since the fire of November 13th.

Mine experts in oxygen helmets descended 350 feet to the bottom of the shaft and reported that an unprotected man could not live a minute there. Accordingly, efforts are now being directed to clearing the mine of poisonous gases. No one will venture to estimate when the bodies can be removed.

COMPANY NOTES.

It is announced that the quarterly dividend of 3 per cent. due February 1 has been passed by the directors of the Coniagas Mines Company.

Last quarter the dividends were recommenced, the previous quarterly payment having been passed to admit of a concentrator being built.

B. C. Copper Company's Earnings.

The British Columbia Copper Company, in its fiscal year ended November 30th last, earned 10 per cent. on its capital stock, which prior to increase amounted to $2,515,000.

Coal and Coke Company Meeting.

The annual general meeting of the Western Coal and Coke Company will be held February 14, in Montreal. Books will be closed from January 31 until after the meeting.

Coal Pfd. Dividend.

The Dominion Coal Company has declared the regular half-yearly dividend on the preferred stock of 3½ per cent., payable February 1, to stockholders of record January 21.

CROWN RESERVE MINING COMPANY, LIMITED—REPORT OF THE GENERAL MANAGER.

Cobalt, Ont., 25th January, 1910.

To the Directors:

Herewith follows report of the operations of the company for the year ending December 31st, 1909.

Mine Development.

The No. 1 cross-cut was driven across the lake to the north boundary, and cut vein No. 14, besides several small stringers. About 365 feet north of the shaft the diabase was encountered; no veins were cut beyond this point. This cross-cut proved, however, that the diabase was farther north than expected, due to the northeasterly dip of the conglomerate, giving the property a greater area of the vein-bearing conglomerates with depth than was expected. The No. 2 cross-cut was driven 536 feet and then stopped, as it was considered dangerous to go farther on this level because of water. This cross-cut exposed veins Nos. 15, 17, 24, and others. A solid concrete wall was put in the face of this cross-cut, and at present the development of this cross-cut is being done by means of a flat diamond drill hole, which is now in 315 feet. Silver assays were obtained between 191 feet and 195 feet, although we were unable to get the cores at these points. (Since January 1st another vein has been struck at 420 feet.) The practice of installing heavy doors in concrete frames was continued, so that any portion of the mine can be isolated, practically eliminating any chance of danger to the mine from water.

In all, 24 veins were exposed by cross-cuts Nos. 1 and 2, although some of them may prove to be stringers of the same veins. The most important veins, besides the Carson vein, are Nos. 2, 14, 17 and 24.

Carson Vein.—On the Carson vein the east and west winzes were sunk to the 200-foot level, and then connected by a drift. This vein did not have any particular change until the 165-foot point in the west winze and 175-foot point in the east winze were reached, when the Keewatin was encountered and the vein became smaller and more shattered, and the values decreased somewhat; the vein, however, still shows good values at the 200-foot level, and in one place it is about 9 inches in width and assays 4,700 ounces. Besides this there is good milling ore for about 4 feet adjoining the rich ore. However, it cannot be said that the vein at this level is as phenomenal as it was in the conglomerates above, although it is better than the average high-grade vein in the Cobalt District. The east winze at the present time is being sunk from the 200-foot level to the 300-foot level, and shows the vein strong at the bottom at a depth of 225 feet. In the development work on this vein about 800,000 ounces were obtained, and stoping on this vein during the year produced 2,750,000 ounces.

No. 2 Vein.—The No. 2 vein runs about east and west, and is about 25 feet north of the Carson vein. It averages about 3 inches in width of heavy smaltite ore assaying about 3,000 ounces. This vein has been stoped for a length of 115 feet and a height of 15 feet at the 100-foot level, the stope producing approximately 70,000 ounces.

No. 14 Vein.—The No. 14 vein when cut was about 3 inches in width, and assayed about 6,000 ounces, but the shoot of this ore was only about 20 feet in length and then ran into smaltite ore assaying about 200 ounces. This vein has been drifted on for 300 feet, but only stoped for a length of 90 feet and a height of 10 feet, the ore in the stope being quite spotty. About 30,000 ounces has been taken from this stope.

No. 17 Vein.—The No. 17 vein when cut was about 4 inches in width, and assayed about 4,000 ounces. The vein was drifted on in a northwesterly direction for 80 feet, showing continuous rich ore, which then split up into two stringers running parallel to each other, one being 2 inches and the other 1 inch in width, and each assaying about 3,000 ounces. A winze was sunk to the 200-foot level, and shows continuous ore for the whole depth, averaging 4 inches in width, and assaying 4,000 ounces. At the 200-foot level this vein was drifted on for 150 feet, and shows rich ore from 1 to 6 inches in width. With the exception of the Carson vein, this is the most important vein at present discovered. In the development work alone it has produced 250,000 ounces, and no stoping has been done at the 200-foot level. There is ore blocked out on three sides 100 feet high and 150 feet long. The most significant fact that the development work on this vein has proved is that the ore and values at the 200-foot level are better on this vein at least than on the 100-foot level.

No. 24 Vein.—Vein 24 is 60 feet east of vein No. 17, and runs almost parallel to it. The ore is from 2 to 4 inches in width, and averages over 4,000 ounces. A drift was run at the 100-foot level for 130 feet in continuous rich ore and a stope about 5 feet high was taken out above it. At present a winze is being sunk from the 100-foot level to the 200-foot level, and it is now down 15 feet, and shows about 4 inches of rich ore at the bottom. This vein has produced about 150,000 ounces, practically all taken from the 130 foot drift and the small stope.

Besides these veins, there are others that are still undeveloped and that will more than pay for the cost of developing them, and some will undoubtedly show very substantial profits.

The mine plans accompanying this report show all underground work in detail.

Total Mine Development.

	1909. Feet.	Total. Feet.
Sinking and raising	465	705
Drifting	1,539	1,825
Cross-cutting	2,042	2,402
	4,046	4,932
Stoping in cubic feet		105,050
Stoping in square feet of vein area		12,470

Plant and Equipment.

During this year we added quite materially to our plant and equipment, as we found our plant of last year inadequate. The new buildings include a bunkhouse 56x36 feet, for the accommodation of 125 men, and an addition 24x26 feet to the dining-room, so that this will now accommodate 200 men at one sitting; storehouse 35x25 feet; carpenter shop 45x30 feet, equipped with a band-saw and buzz-planer; and an addition to the office,

24x18 feet. The powerhouse was made larger, and another 100 h.p. boiler installed, also a twenty-drill compressor in place of the six drill machine. We replaced the hoist with a larger one capable of lifting a load of 7,000 lbs. at 300 feet per minute, and added a 20 kilowatt dynamo, besides fire pumps, condensers, etc., so that our equipment is of the highest efficiency necessary for the development of this property. We also erected six double and five single houses on the property of the Imperial Crown Mines, Limited, who granted us a lease for this purpose. These houses are occupied by our married employees, and will pay for themselves in rental in five years.

Ore Production.

The total production for the year 1909 was 4,034,325 ounces of a gross value of $2,080,156.08 produced from 3,092 tons of ore, as compared to the production of the year 1908 of 1,798,954 ounces of a gross value of $910,350.62 produced from 650 tons.

The total production in detail follows:—

	Weight.
High grade	1,513,895 lbs.
Low grade	4,664,578 lbs.
Bullion	76,152 ozs.
Total	3,093 tons

Ounces Silver.	Gross Value.	Freight and Treatment.	Net Value.
3,622,029	$1,867,509.22	$126,609.83	$1,740,899.39
346,085	176,820.64	56,190.26	121,630.38
66,211	35,826.22	2,871.07	32,955.15
4,034,325 ozs.	$2,080,156.08	$184,671.16	$1,895,484.92

Average Value of Ore.

	Ounces per ton.	Value per ton.
High grade	4,784.7	$2,466.96
Low grade	184.4	75.81
Total	1,304.6	$672.66

Bullion, 869 thousand fine. Average price received for silver was 51.56c.

Cost of Ore, 1909.

Smelter charges and deductions	$184,671.16
Ore handling and marketing	39,984.31
Mining and development	97,717.74
Power and light	29,826.67
Maintenance building, plant and equipment	13,664.10
Mine, general expense	19,389.31
Superintendence and travelling	12,332.00
Head Office expenses	4,225.46
Depreciation at 20 per cent. on B. F. & E.	14,330.15
Total	$416,140.90
New buildings, plant and equipment	$65,403.26
Total cost of silver per ounce	1031c

This shows a net profit of 41.25c per ounce, or a total net profit of $1,664,015.81 for the year. This is equivalent to 83.20 per cent. of the capital of the company and 93.07 per cent. of the dividend-paying stock.

Conclusion and Recommendations.

Owing to the irregularity of size and values of the veins in the Cobalt District and the great element of error in the sampling of very high grade ore, it is almost impossible to estimate absolutely ore blocked out, especially in the Crown Reserve, with the lake overlying the property; such an estimate would be little more than a guess. I might say this, however; the mine up to date produced roughly 5,800,000 ounces, of which the Carson vein has produced in development below the 100-foot level 800,000 ounces, and the other veins a total of 500,000 ounces, so that the stope above the 100-foot level on the Carson vein has produced about 4,500,000 ounces, or a little over $2,250,000.00. There is still as much ore left at this level on the Carson vein alone as has been extracted, and the whole stope between the 100 and 200 foot levels is practically intact. Besides this, veins Nos. 2, 14, 17 and 24 have rich ore shoots blocked out, and some of the other veins will be good producers.

For the coming year, I recommend that stoping be done on veins Nos. 2, 14, 17 and 24, so that they may produce a good percentage of the ore shipped, and that the other smaller veins be developed at the 100-foot level; that the Carson and No. 17 veins be exploited to the 300-foot level, and that at the 200-foot level the No. 2 cross-cut, with other cross-cuts running north from it at 500-foot intervals, be run for the entire length of the property. This, our diamond drilling and development work on the Kerr Lake, has shown the presence of veins on our property farther east, which these cross-cuts will undoubtedly cut.

Although the Crown Reserve mine produced practically one-sixth of the entire output of Cobalt during the past year, it is in much better physical condition, and has a great deal more ore blocked out than it had a year ago at this time, and I can see no reason, if the above recommendations be carried out, why the coming year should not be at least as successful as the past.

Very faithfully yours,

(Signed) S. W. COHEN,
General Manager.

CROWN RESERVE MINING COMPANY, LIMITED.

Statement of Assets and Liabilities, 31st Dec., 1909.

Assets.

Mining lands, minerals, mining rights, buildings, plant and equipment, etc.	$2,085,014.59	
New buildings, plant and equip. (1909)	65,403.26	
Stores and supplies on hand	9,287.12	
Ore on hand	50,000.00	
Due from smelter	395,982.95	
Cash on hand and in bank	313,400.77	
Accounts receivable	1,715.33	
		$2,920,804.02

Liabilities.

Capital stock	$1,999,957.00	
Royalty accrued and accruing to Gov't.	87,548.28	
Accounts payable, current	18,701.22	
Dividend No. 7, due Jan. 15, 1910	265,322.10	
Surplus	549,275.42	
		$2,920,804.02

LE ROI MINING COMPANY, LIMITED.

The tenth ordinary general meeting of shareholders of Le Roi Mining Company, Limited, was held on January 18th, at Salisbury House, London-wall, E.C., Mr. T. D. Grimke-Drayton, J.P., presiding.

The Secretary (Mr. Harold A. Wesson), having read the notice convening the meeting and the auditors' report,

The chairman spoke in part as follows: Gentlemen,—From the report and accounts you will see that, after deducting the sum of £34,026 8s 9d on account of exploration and development work, depreciation at mine and smelter, and other items, details of which are set out in the report and accounts in your possession, the operations for the year resulted in a net loss of £9,701 14s 1d. This is, of course, very disappointing, but I have no hesitation in saying that it is unavoidable. The absence of profits is to be attributed entirely to the lack of any considerable bodies of payable ore. At our meeting last year I told you we had discovered some rich ore in the 1,650 ft. level—the bottom level of the mine. For three or four months work done on this ore body indicated that it was likely to develop into a large and a very valuable asset. Unfortunately the rich ore found on this level, which was of considerable size, was not found on the winze level below, nor on the level above. In carrying on our work we came across large quantities of ore too low in value to handle.

Under the circumstances it soon became evident that a great deal more work must be done to ascertain if the extension of the

rich ore found on the 1,650 ft. level could be discovered on other levels; or if, by means of diamond drilling, payable ore could be found at greater depth in the mine. To carry out an exploration and development scheme of such magnitude necessarily involved very careful consideration. Mr. Carlyle, our consulting engineer went out to Rossland last winter and spent some weeks there looking thoroughly into everything on the spot, both above and below ground. Mr. Carlyle recommended that work should be suspended at the mine and smelter for a time until a large scheme of exploration work could be decided upon and the necessary arrangements made to carry out the same. Mr. McMillan was also at the mine, and after these gentlemen had thoroughly looked into the matter, along with the other officials at Rossland, they agreed in recommending the comprehensive scheme of exploration and development which is at the present moment being carried out. This work involves not only a large amount of diamond drilling on the lowest levels of the mine, but also arranges for thoroughly testing the property by means of the diamond drill for a depth of about 1,000 feet below the 1,650 foot level. In addition to this, a good deal of work has been and is being done by means of diamond drilling and by drifts and cross-cuts in other parts of the property. You will remember that a short time since you were notified that two finds of ore had been made by means of the diamond drill and that work was under way by means of cross-cuts to reach the places indicated. What the final outcome of this development work may be we cannot state, but you may depend upon it that, if any considerable bodies of payable ore exist in the mine, we are pretty sure to find them by means of the work we are now carrying out. The future depends upon the discovery and opening up of important bodies of pay ore. If we find these there will be no difficulty in making profits. No one has a greater interest than your directors in achieving satisfactory results, and you may depend upon it that everything that can be done is being done in your interest. I am pleased to say that the work we have been doing is approved by the shareholders at large, as shown by the fact that we are to-day supported by proxies representing nearly one-half of the capital of the company.

Mr. A. J. McMillan (managing director) said: There is but little to add to the speech made by the chairman, and to the reports already in your hands. You will notice that during the year we have spent liberally on exploration and development, and that the whole amount spent has been written off. Owing to the fact that so much of the exploration work done during the last year or two in the older parts of the mine failed to locate large bodies of ore of commercial value, and seeing that the high grade ore discovered on the 1,650 foot, or lowest, level of the mine last year, and to which reference was made at the last annual meeting, did not apparently continue any considerable distance below that level, it became necessary to deal with the question of exploratory work in a bold and comprehensive manner, and lay out our plans upon a large scale. After the most careful consideration, the work now under way was decided upon—work involving a great deal in the way of cross-cuts and drifts, and about 30,000 to 40,000 feet of diamond drilling in many different parts of the property, including portions hitherto unworked; and giving special attention to the lowest levels in the mine and the testing of the vein by means of boreholes for 1,000 feet below this. There is a large amount of low grade ore in the mine and on the dumps, amounting to some hundreds of thousands of tons—ore which, though too low to be of commercial value to-day, may some day be valuable owing to the progress in the direction of new and improved methods of treatment and reduction in treatment costs. As you have already been told, in carrying on our diamond drill work we ran into some ore of good value, but a considerable distance had to be driven and a good deal of work done to ascertain the value of these discoveries, the outcome of which is not yet determined. If the values are not in the ore we cannot, of course, put them there, but if large bodies of payable ore exist in the mine I have no doubt we shall discover them, and there will then be no difficulty in making money. Everything possible is being done in order to achieve results satisfactory to the directors and the shareholders alike.

Replying to questions, the Chairman stated that the superintendent of the mine had been looking round for some time for another property, but up to the present he had not found anything good enough to recommend. With regard to the development work now in progress, Mr. Carlyle, the consulting engineer, informed him that they ought to know definitely the result within the next few months.

Mr. McMillan proposed the re-election of Mr. Grimke-Drayton as a director, which was seconded by Mr. G. W. Wilson, and unanimously agreed to. The auditors were also re-elected.

STATISTICS AND RETURNS

The January output of the Nova Scotia Steel and Coal Co. is as follows:

Coal, 58,236 tons.
Ingots, 6,684 tons.
Pig iron, 5,740 tons.

GOWGANDA SHIPMENTS.

Jan. 1st, 1910.—Blackburn to Copper Cliff	30 tons
Jan. 14th, 1910.—Reeves-Dobie to Thorold	29 tons
Jan. 22nd., 1910.—Reeves-Dobie to Thorold	32 tons

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Jan. 28, and those from Jan. 1, 1910, to date:

	Jan. 28 Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo		112,144
City of Cobalt		64,000
Cobalt Central	41,299	81,299
Cobalt Lake		132,000
Colonial	63,660	63,660
Coniagas		119,542
Crown Reserve	123,071	368,856
Drummond		664,200
Kerr Lake		302,605
King Edward		49,952
La Rose	123,500	700,531
McKinley-Dar	46,027	144,397
Nipissing	306,852	672,092
O'Brien		64,056
Right of Way		127,963
Temiskaming		60,000
Trethewey	65,000	65,000

Ore shipments for week ending Jan. 28 were 769,409 pounds, or 384 tons. Total shipments from Jan. 1 to Jan. 28 were 3,792,297 pounds, or 1,896 tons.

Following are the shipments from the Cobalt camp for the week ending Feb. 4, and those from Jan. 1, 1910, to date:

	Feb. 4, Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	61,250	173,394
City of Cobalt	65,970	129,970
Cobalt Central		81,299
Cobalt Lake		132,000
Colonial		63,660

Coniagas	61,200	180,742
Crown Reserve	61,444	430,300
Drummond	.....	664,200
Kerr Lake	.....	302,605
King Edward	.....	49,952
La Rose	195,248	895,779
McKinley-Dar.	.....	144,397
Nipissing	300,300	972,392
O'Brien	69,050	133,106
Peterson Lake	49,600	49,600
Right of Way	.....	127,963
Temiskaming	60,000	120,000
Trethewey	.....	65,000

Ore shipments for week ending Feb. 4, were 924,062 pounds, or 462 tons. Total shipments from Jan. 1 to Feb. 4 were 4,716,359 pounds, or 2,358 tons.

B. C. ORE SHIPMENTS.

Nelson, B.C., January 29,—The feature of the ore shipments for the past week was the large number of shippers to the Consolidated Company's smelter at Trail, 33 properties sending in over 12,600 tons of ore. The first shipment to Trail has been made from the Sullivan in East Kootenay, and the Fern, close to Nelson, two properties long idle, but now being extensively developed. Appended are the details:

ORE SHIPMENTS.

Boundary.

Granby	23,927	104,459
Mother Lode	9,408	38,233
Snowshoe	5,191	14,561
Other mines		1,040
Total	40,526	158,343

Rossland.

	Week.	Year.
Centre Star	3,643	13,135
Le Roi	581	1,347
Le Roi No. 2	41	145
Velvet		13
Total	4,821	16,654

Slocan-Kootenay.

	Week.	Year.
St. Eugene	618	1,523
Richmond-Eureka	134	388
North Star	126	282
Blue Bell	198	274
Whitewater	42	203
Queen	23	74
Rambler-Cariboo	45	68
Emerald	96	222
Highland-Buckeye	31	98
Silver Cup	13	143
Yankee Girl	262	543
Granite-Poorman	30	63
Eastmount	31	63
Sullivan	76	76
Maestro	35	35
Silver King	549	549
Duncan	6	6
Fern	7	7
Standard	23	91
Lucky Boy	3	3
Peco	7	7
Ferguson	33	33
Mother Lode	90	90
Rambler	4	4
Summit	5	5
Ruth	28	28
Utica	14	14
Other mines		411
Total	2,329	5,405
Grand Total	47,886	180,407

Smelter Receipts.

	Week.	Year.
Granby	25,927	104,579
Consolidated	12,619	36,973
B. C. Copper	9,408	39,203
Total	47,954	180,753

TORONTO MARKETS.

Metals.

Feb. 8.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 6 cents per lb.
Lead, 3.75 cents per lb.
Antimony, 8 to 9 cents per lb.
Tin, 34¾ cents per lb.
Copper, casting 14¼ cents per lb.
Electrolytic, 14¼ cents per lb.
Ingot brass, 9 to 12 cents per lb.

Feb. 8.—Pig Iron—(Quotations from Drummond McCall Co.)
Summerlee, No. 1, $23.50 to $24.00, (f.o.b. Toronto).
Summerlee, No. 2, $23.00, (f.o.b. Toronto).
Midland, No. 1, (off the market).
Coal Anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Feb. 4.—Connellsville coke, (f.o.b. ovens).
Furnace coke, prompt, $2.50 to $2.60 per ton.
Foundry coke, prompt, $3.00 to $3.15 per ton.

Feb. 4.—Tin (straits), 32.50 cents.
Copper, prime Lake, 13.75 to 13.87½ cents.
Lead, 4.72½ cents.
Electrolytic copper, 13.50 to 13.60 cents.
Copper wire, 15.25 cents.
Spelter, 6.10 cents.
Sheet zinc, 8.50 cents.
Antimony, Cookson's, 8.50 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, (ordinary) $29.00 per oz.
Platinum, (hard) $34.50 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $51.00 per 75-lb. flask.

SILVER PRICES.

		New York. cents.	London. pence.
January	22	52⅜	24 3-16
"	24	52⅜	24 3-16
"	25	52¼	24⅛
"	26	52¼	24⅛
"	27	52¼	24⅛
"	28	52¼	24⅛
"	29	52¼	24⅛
"	31	52	24
February	1	51½	23¾
"	2	51¾	23⅞
"	3	51½	23¾
"	4	51¼	23⅝
"	6	51½	23¾

SAFETY = SPEED = SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" OF THE ATLANTIC

FASTEST and FINEST
in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records
between Liverpool and Canadian Ports

---

900 Miles on Enclosed and Sheltered Waters

LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent,
Board of Trade, - MONTREAL.

ANNOUNCEMENT

IN PRESS—WILL BE ON SALE EARLY IN FEBRUARY.

THE HANDBOOK OF THE COBALT DISTRICT

Including a Manual of Incorporated Companies.

By H. P. DAVIS.

¶ The first section of this volume is a treatise on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 paper Cover. - - $2.00 Stiff Cover.

BOOK DEPARTMENT

CANADIAN MINING JOURNAL

TORONTO

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Bateman & Brown
Campbell & Deyell
DeMorest, Stull & Low
Evans, J. W.
Gwillim, J. C.
Hassan, A. A.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Scott, O. N.
Tyrrell, J. B.
Willmott, A. B.
McGee, Boyd

Astley, J. W.

Quebec

Hardman, J. E.
Hersey, Milton L.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B.
M.A., B.Sc.
Consulting Mining Geologist
Sault Ste. Marie, Canada
Consulting Geologist
Lake Superior Corporation

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N.Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 James St. Montreal

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA, ELK LAKE, TORONTO
Bartram, Wadsworth & Sherry
J. B. Bartram, W. R. Wadsworth, C. J. Sherry.
Continental Life Building, Toronto, Ontario
Solicitors for { Imperial Bank of Canada, Elk Lake / Royal Bank of Canada, Gow Ganda
Cable Address, "Barwad." Western Union Code

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98
Porcupine Claims—Write Matheson Post Office

Coal Mine for Sale

A coal mine in Alberta, city of 25,000, must be sold before the first of May.

This mine was opened last April and is thoroughly equipped.

Present capacity of over 200 tons daily and coal enough to last 20 years.

Good market for output and steady trade.

The present owner is obliged to sell and no reasonable cash offer will be refused.

For full particulars, write or wire

"Alberta" care Canadian Mining Journal

THE SCHOOL OF MINING, Kingston, Can.

ASSISTANT PROFESSOR IN GEOLOGY.

Applications for the position of Assistant Professor of Geology will be received until March 15th, 1910. Special knowledge of Palaeontology desirable. Session seven months. Salary $1500.

GEO. Y. CHOWN, B.A.

DOBBS & YOUNG

PROPERTIES LISTED and
INVESTMENTS DIRECTED

MINING BROKERS and CLAIMS AGENTS

Wire or write us for particulars to

Box 541, COBALT, ONT.

WATCH THIS SPACE

A CROWN MINERAL PROPERTY

Suppose the Government should say to you there is a property worth $10,000. We will sell it to you for $10,000, payable in 20 annual instalments and won't charge interest on deferred payments. In event of your death at any time during the 20 years, we guarantee to cancel the balance due and execute a warranty deed to your wife, or if she prefers, we will pay her $10,000 in cash. If you live to complete all payments, we will pay you $10,000 cash, plus interest earned on your annual deposits. Chances are you would jump at it. We are making just such an offer backed by assets of over $45,000,000. Better investigate it.

ROYAL INSURANCE COMPANY Limited OF LIVERPOOL, ENGLAND Founded 1845

Full particulars on application to

A. R. HOWELL, Superintendent
Royal Insurance Building, Montreal, Que.

OR

W. H. LEACOCK, Inspector
Royal Insurance Building, Toronto, Ont.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.

1025. Waverley Sheet.

1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.

1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.

1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.

1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.

1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.

1075. Gowganda Mining Division, 1908. W. H. Collins.

1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.

1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite,
etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES.
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD — **Associate Editors Courtenay DeKalb, H. Foster Bain**

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.
SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

---

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10 00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

When answering Advertisements please mention THE CANADIAN MINING JOURNAL

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.



An Accurate Ore Test on any metal in 10 minutes For Five Cents.

Thats what the Mining Man or Prospector can have, provided he has a Way's Pocket Smelter Outfit. Anybody can make his own tests right in his office or in the field on **any ore.** Think of what this means to a prospector "miles away from nowhere" or to the mining man who must make dozens of tests a day.

Write for folder giving full information about **Way's Process** and describing both field and laboratory outfits.

WAY'S POCKET SMELTER CO.
Box 954, South Pasadena, Cal.

NOW READY

Mining Law of Canada

BY

ALFRED B. MORINE, K. C.
(Of the Bar of Ontario, Nova Scotia and Newfoundland)

The following table of contents conveys a fair idea of the scope of the work :

CHAPTER I
Mining Terms and Phrases.

CHAPTER II
PART 1—Laws in force.
PART 2—Dominion Legislation.
PART 3—Provincial Legislation.
(*a*) Manitoba, Alberta, Quebec, Nova Scotia and New Brunswick.
(*b*) Ontario.
(*c*) British Columbia.

CHAPTER III
PART 1—Crown Lands.
(*b*) Indian Lands.
(*c*) Railway Belt.
PART 2—Railways and Highways.

CHAPTER IV
Capacity to Work, Sell, Lease or License.
PART 1—Extent of Rights.
PART 2—Capacity to Lease
PART 3—Partnerships and Companies.

CHAPTER V.
CONTRACTS
PART 1—Making.
(*a*) Statute of Frauds.
(*b*) Part Performance.
PART 2—Enforcing.
(*a*) Statute of Limitations.
(*b*) Specific Performance.
PART 3—Terminating.
(*a*) Rescission.

CHAPTER VI.
Mining Licenses and Mining Leases.
PART 1—(*a*) Bare Licenses.
(*b*) Profits à Prendre.
(*c*) Leases.
PART 2—(*a*) Parcels.
(*b*) Term.
(*c*) Covenants.
(*d*) Forfeiture and Re-entry.
(*e*) Reservations and Exceptions.

CHAPTER VII
PART 1—Easements.
PART 2—Fixtures.

CHAPTER VIII
PART 1—Employer's Liability.

CHAPTER IX.
Wrongful Abstraction.
Criminal Offences.

CHAPTER X
PART 1—Assessment.
PART 2—Registration.

GLOSSARY
APPENDIX I.—Statutes and Regulations of the Dominion, and Statutes of Ontario British Columbia and Quebec.
APPENDIX II.—Working Forms.

HALF CALF - $7.50

Book Dept. Canadian Mining Journal - - Toronto

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ainsworth, Wm., & Sons xiv
Ackroyd & Best, Ltd xiii
Allan, Whyte & Co. v
Astley, J. W. xx

B

Beatty, M., & Sons, Ltd. ix
Baszanger, Jacques & Co.....xi
Belliss & Morcom, Ltd viii
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry. & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons xv
B. C. Assay and Chemical Supply xxvii
Bartram, Wadsworth & Sherry xx
Behrend Concentrators Ltd.....xi
Brown A. H.....xx

C

Canada Metal Co..... xv
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute xiv
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Canadian Northern Ontario Ry..xxi
Curtis & Harvey, Ltd.....xxvii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xiii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks.... viii
C. L. Constant Co., outside back cover

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus xii
Drummond, McCall & Co.....xii
Dominion Coal Co., Ltd. xiv
Dietzgen, Eugene, Co., Ltd.... xvi
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables.....iv
Davis, John & Son..... xvi
Dessau's, S. Sons.....vii

E

Evans, J. W.....xix

F

Fleck, Alex., Ltd. viii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gillespie, Geo. H. xix
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v
Grand Trunk Ry xxix

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iii
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C xx
Laurie & Lamb viii
Lymans Ltd..... xiii
Link Belt Co. xii
Leckie, J. Edwards xx
Ledoux & Co xx
The Lancashire Dynamo and Motor Co., Ltd.....x

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Metal Shingle & Siding Co.....xiii
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxi
Nova Scotia, Province of.....xxvi

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros. .....vi & vii
Patterson Mfg. Co. xii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx
Royal Insurance Co. xxi

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co.....viii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Sydney Cement Co., Ltd..... xiv
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,. Ltd xi

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Seperating Co. x

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905. Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

WHY IS IT

THAT SALES OF

MORTON'S

"BC"

Drill Steel

ARE INCREASING EVERY DAY?
MUST BE IT IS BETTER MATERIAL,

Gives Best Satisfaction

AND THE DRILL

Lasts Longer.

COULD ANYONE EXPECT MORE?

IN STOCK WITH

E. G. PRIOR, Victoria, B.C.
CANADIAN RAND CO., Cobalt.
BAINES & PECKOVER, Toronto.
ANGEL ENGINEERING & SUPPLY Co. St. John, Nfd.

Canadian Representative

D. W. CLARK, P.O., Box 521, **Toronto.**

GRAND TRUNK RAILWAY SYSTEM

The Longest Continuous Double Track Railway in the World Under One Management.

The Great Double Track Route Through Canada.

Fast passenger service from the Atlantic Ocean to the head of the Great Lakes. The line taps all the principal commercial centres in Canada and reaches the important points in the States of Maine, New Hampshire and Vermont, the principal towns and cities in the Provinces of Quebec and Ontario, and many important places in the States of Michigan, Indiana and Illinois.

The "International Limited" (Canada's Railway Greyhound)

The Finest and Fastest Train in the Dominion

Runs every day in the year leaving Montreal at 9.00 o'clock in the morning for Toronto, Hamilton, Niagara Falls, Buffalo, Detroit, Chicago and intermediate points.

Write for copy of "Trains 3 and 4" descriptive of the route from Chicago to the sea, to J. Quinlan, Bonaventure Station, Montreal, or to J. D. McDonald, Union Station, Toronto.

W. E. DAVIS,
Passenger Traffic Manager,
MONTREAL.

G. T. BELL,
Assistant Passenger Traffic Manager,
MONTREAL.

GEO. W. VAUX,
General Passenger Agent,
MONTREAL.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If anything you want is not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
N. J. Holden Co.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
A. M, Ellicott Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
A. M. Ellicott Co,
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.
Drummond, McCall & Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.

Crossings (Diamond —
Montreal Steel Works, Limited

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cement—
Sydney Cement Co., Ltd.
Link Belt Co.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.
Peacock Bros.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Drummond, McCall & Co.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Peacock Bros.
A. M. Ellicott Co.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
O. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Eugene Dietzen Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Drummond, McCall & Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.

Girders, Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
A. M. Ellicott Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Peacock Bros.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Metal Shingles—
Metal Shingle and Siding Co.
Pedlar People.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
The Hardy Patent Pick Co.
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.

Pipe (Cast, Wrought, Spiral, Riveted)—
Drummond, McCall & Co.

Roofing, Steel—
Metal Shingle & Siding Co.
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Peacock Bros.
Canadian Cleveland Drill Co.
N. J. Holden Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Durmmond, McCall & Co.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
The Hardy Patent Pick Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.
Drummond, McCall & Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Eugene Dietzgen Co.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Drummond, McCall & Co.
Morton & Co.
Thos. & Wm. Smith
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Smith, Thos. & Wm., Ltd.
Drummond, McCall & Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

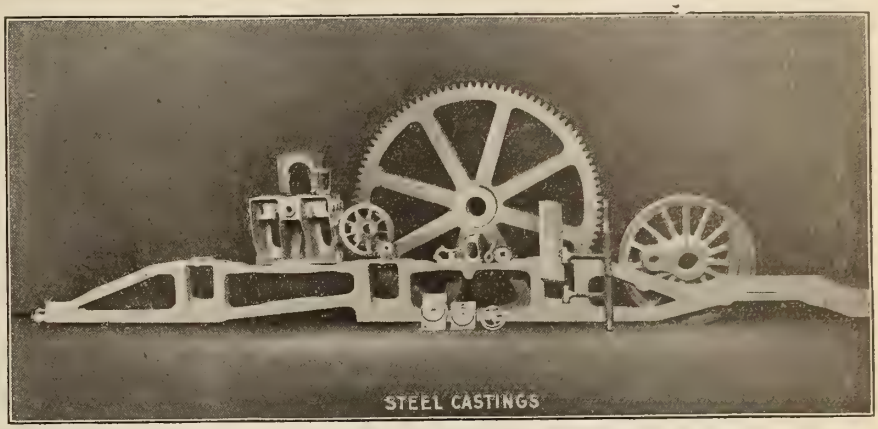
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"

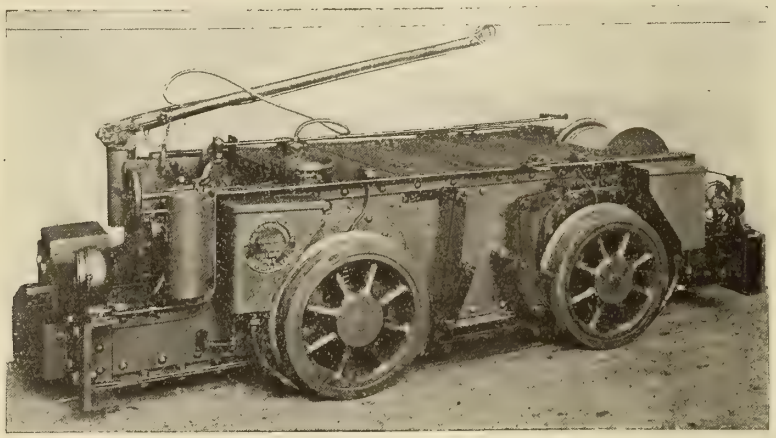


A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Baldwin-Westinghouse
ELECTRIC MINE LOCOMOTIVES



Baldwin-Westinghouse Steel-Frame Gathering Locomotive

B-W Mine Locomotives represent the combined experience of the Baldwin Co., as builders of locomotives, and the Westinghouse Co., as builders of electrical apparatus.

Built in all Types and all Capacities

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
252 St. James Street, MONTREAL.
158 Granville Street, HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.



THE SIMPSON SHOE FOR MEN

MANY a man judges a pair of boots by the price he is obliged to pay for them. If they lose their shape or split at the toe in a short time he makes excuses for them. It was some fault of his feet that did it, or something wrong in his treatment. The boots were alright—they cost $6 a pair. They must be good.

But there's a better way of judging boots than by the price, to those who understand leather, to those who understand shoemaker's workmanship.

VICTOR SHOES

sell at $4.00, 4.50 and 5.00 per pair.

Try a pair. You'll find they give you the wear and the appearance you want despite their low price.

It's our own shoe, made expressly for us and there are consequently no middle profits or expenses.

THE ROBERT **SIMPSON** COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

Mining and Metallurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

THE CANADIAN MINING JOURNAL

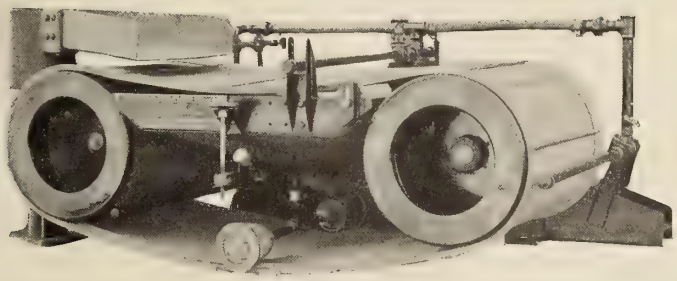
Vol. 31 TORONTO No. 5

We have been appointed Sole Canadian Agents for the well-known



Callow Tank—The quickest tank for settling and pulp thickening.

Callow Tanks and Screens



Callow Screen.

WRITE FOR FULL PARTICULARS

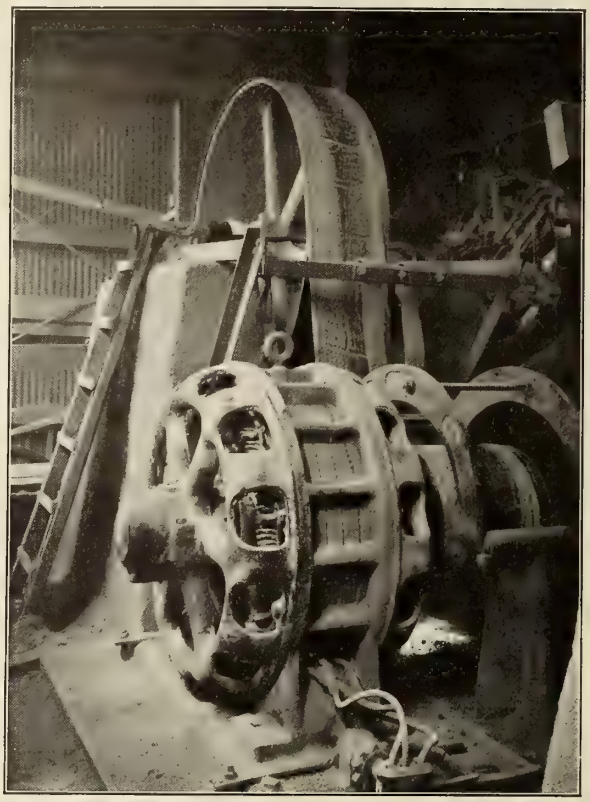
MUSSENS LIMITED

Head Office: MONTREAL

Branches { TORONTO, 73 Victoria Street
COBALT, opposite Right of Way Mine
WINNIPEG, 259-261 Stanley Street
VANCOUVER, Mercantile Bldg.

INDUCTION MOTORS
IN
CRUSHING & CEMENT PLANTS

Polyphase Induction Motors have many advantages in the operation of rock crushers, ball mills, tube mills, rotary kilns, hoists, conveyors, pumps and other machinery. In addition to flexibility and economy, demonstrated in many other lines of service, electric drive eliminates long lines of counter-shafting, a specially desirable feature where gritty dust makes the maintenance of both belts and bearings very expensive.



In the dusty atmosphere of a cement mill the simple squirrel cage rotor of an induction motor is much less liable to give trouble than the wound armature of a direct current machine. The illustration shows one of our 100 H.P. type "AN" induction motors belted to a tube mill at the Belleville Plant of the Canada Cement Company Limited. The equipment of that plant includes over 1,000 H.P. of our motors.

See Bulletin 301 (revised)

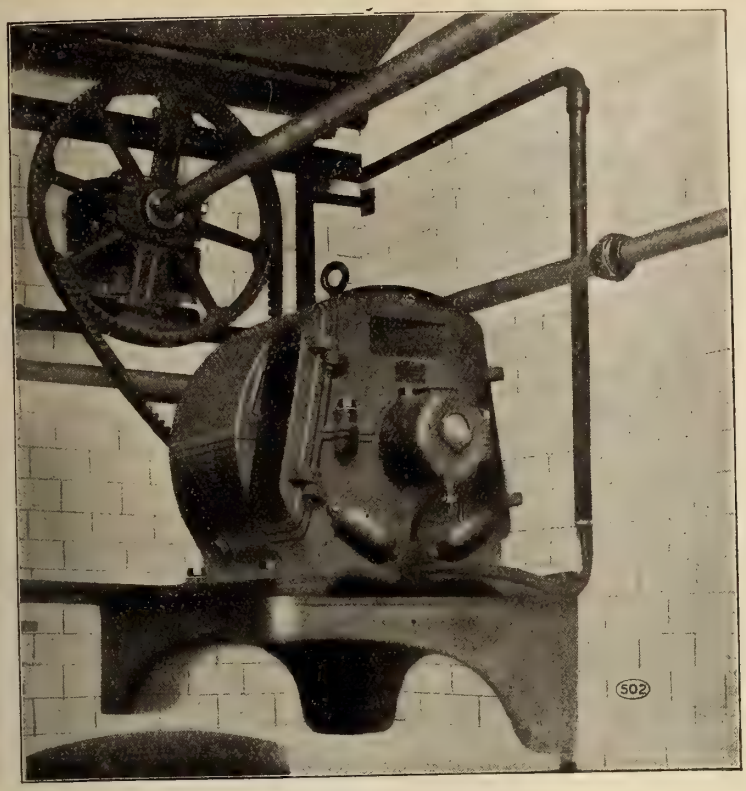
ALLIS-CHALMERS-BULLOCK
LIMITED

WORKS - - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY



QUIET, FRICTIONLESS, AND COMPACT.

RENOLD PATENT SILENT

MANCHESTER, Eng.

CHAIN

overcomes

TRANSMISSION TROUBLES

The only Drive suitable to Short Centres.

All the advantages of direct connection at half the cost.

WRITE FOR ILLUSTRATED CATALOGUE

JONES & GLASSCO., Canadian Agents MONTREAL, Que.

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.

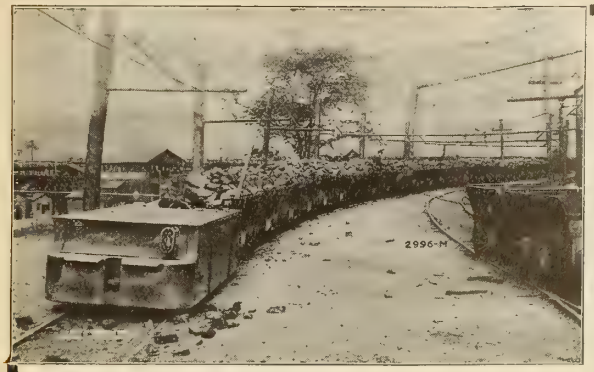


Write us for Bulletin 40-A

CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 522, Cobalt, Ontario



JEFFREY
Electric Locomotives
Coal Cutters and Rotary Drills

constitute an essential feature in every Coal Mine where modern, serviceable and economical machinery is required.

WRITE FOR BULLETINS.

LOCOMOTIVES 17, DRILLS 16, COAL CUTTERS 18.

Jeffrey Wire Cable Car Hauls

combine qualities which make them the most successful medium used for the continuous haulage of mine cars. Descriptive Bulletin 21.

WE BUILD

Complete Coal Mine and Tipple Equipments

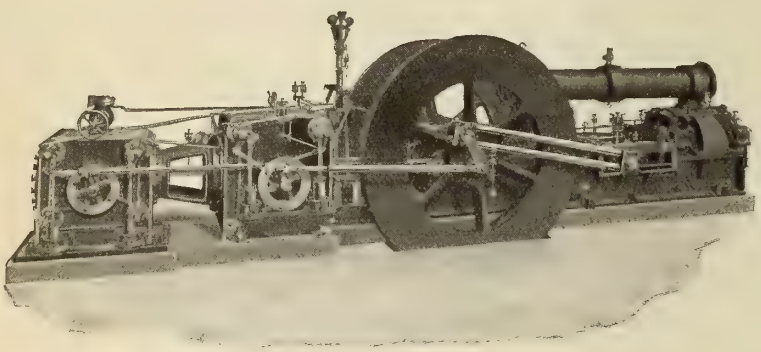


THE JEFFREY MFG. COMPANY

COLUMBUS, OHIO, U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Sts., Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance St.

Sullivan Tandem Corliss Compressors



unite low fuel consumption, attained by Corliss valve gear on both high and low pressure steam cylinders, with first class air efficiency, provided by two stage compression, and the economy in floor space, foundations and freight which results from tandem construction.

An automatic co-ordinating speed and pressure regulator, original in these machines, together with massive fly wheels, enable Sullivan tandem compressors to run with perfect smoothness under any proportion of the load.

Capacities, 900, 1400, 1800 and 2500 ft.

CATALOGUE 6581.

Rock Drills, Diamond Drills, Coal Mining Machines

Sullivan Machinery Co.

CHICAGO, U. S. A., CLAREMONT, N. H.

Birmingham, Pittsburgh — Butte, Rossland — Cobalt, Ont., Salt Lake — Denver, San Francisco — El Paso, Seattle — Joplin, Spokane — Knoxville, St. Louis — New York — Paris, France, Sydney, N.S.W.

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Successfully used at the following

EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English,
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE

Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

We carry in stock a complete line of Mining Machinery and supplies in our

Cobalt Warehouse

Our representatives cover the whole Northern mining district and are in a position to quote good delivery on our mining equipment.

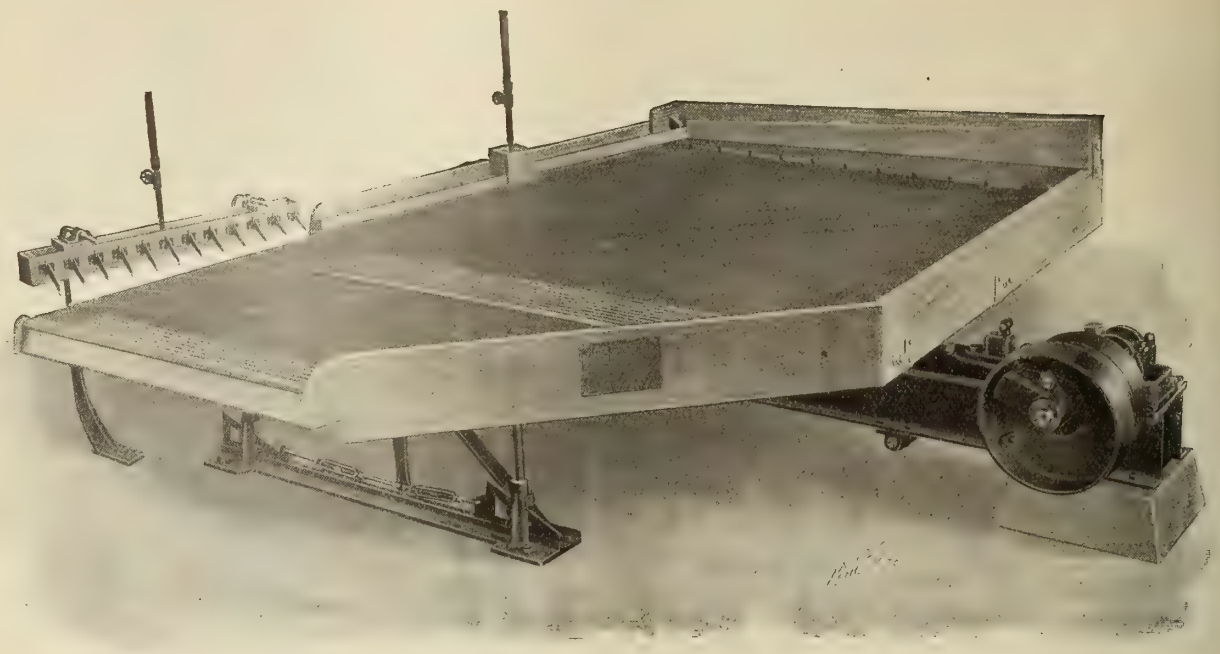
AIR COMPRESSORS ROCK DRILLS BOILERS
HOISTS ORE CARS ORE BUCKETS
WIRE ROPE STEAM AND AIR HOSE
OCTAGON AND CRUCIFORM DRILL STEEL

ALL SMALL SUPPLIES

CANADIAN RAND CO., LIMITED

Montreal, Canada

ELK LAKE COBALT ROSSLAND VANCOUVER WINNIPEG TORONTO HALIFAX



24 Additional Improved No. 3 Deister tables are being installed in the new addition to the Goldfield Consolidated Mines Company's mill as the result of efficiency in operation and small cost of maintenance of a previous installation of 70 tables.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

THE CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Philippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faros Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

The Canadian Laboratories

Chemical and Physical tests of all Materials.

Mining properties examined and reported upon.

Write for prices for Ore analysis.

37 Melinda St. Toronto

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL COVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

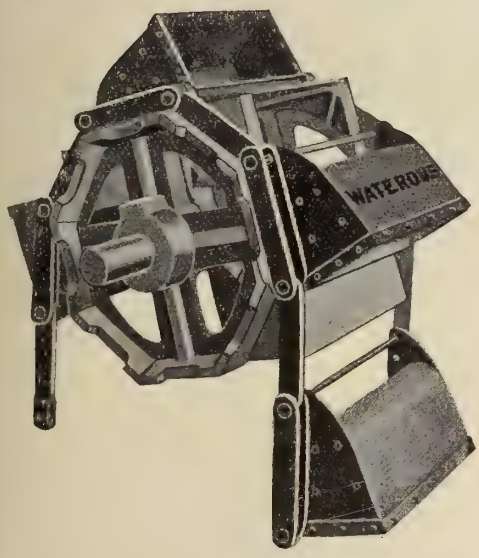
For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

ORE ELEVATORS



Our Chain Ore Elevators are made with or without geared heads and with either single or double strands of chains as requirements demand. Chains of special type or standard designs are furnished as desired.

Steel Buckets

Standard and special designs—All sizes,

adapted for handling ores, coal, stone, clinker or other bulky material.

Our steel shop has the tool equipment and the men for turning out the highest grade of plate work of the most difficult kind.

We have the experience to back us up.

THE WATEROUS ENGINE WORKS CO., LIMITED

BRANTFORD, CANADA

Agency, H. B. GILMOUR, Vancouver, B.C. - - **Branch, Winnipeg, Manitoba**

Walker Brothers (Wigan) Limited

Wigan, England



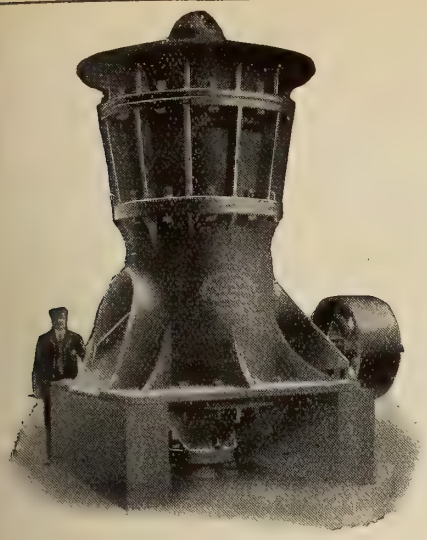
Largest Air Compressors in Canada

are of WALKER BROTHERS (Wigan) LIMITED manufacture.

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

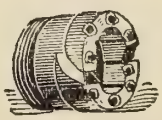
THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL P.Q.

We personally break all our carbons

Goods sent on approval for selection

CARBONS
Black Diamonds)
and BORTZ for
DIAMOND DRILLS



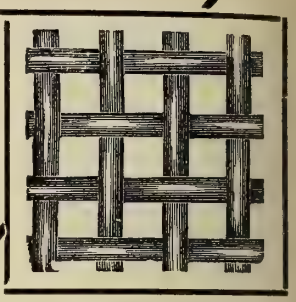
S. DESSAU'S SONS
Importers
180 B. Broadway,
N. Y.

Carbon for all mechanical purposes

Bortz for all mechanical purposes

THE DOUBE C RIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalog 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

ANNOUNCEMENT

BRUCE PEEBLES

& COMPANY, LIMITED

EDINBURGH - - SCOTLAND

are now represented in

CANADA

by

VANDELEUR AND NICHOLS

DINEEN BLDG., - - - TORONTO

SPECIALTIES:

DIRECT and ALTERNATING CURRENT.
DYNAMOS and MOTORS for all Conditions of Service.
PEEBLES-LACOUR MOTOR CONVERTERS.
STEAM TURBO ALTERNATORS. TRACTION MOTORS.

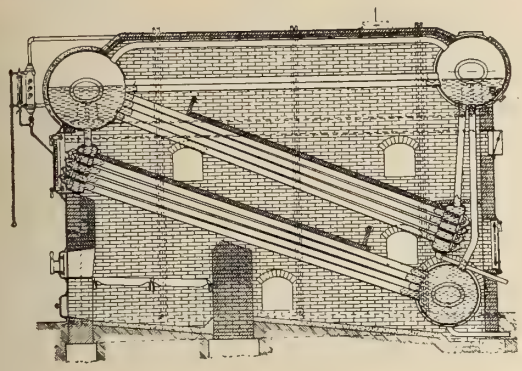
ORE DRESSING

By R. H. Richards. 4 Vols. $20.00.

Index to four volumes now ready.

Book Department, CANADIAN MINING JOURNAL

Robb Water Tube Boiler



Straight tubes. Perfect water circulation.
Dry or superheated steam.
Half the usual number of handholes.

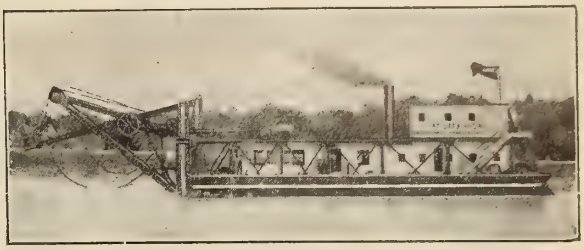
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

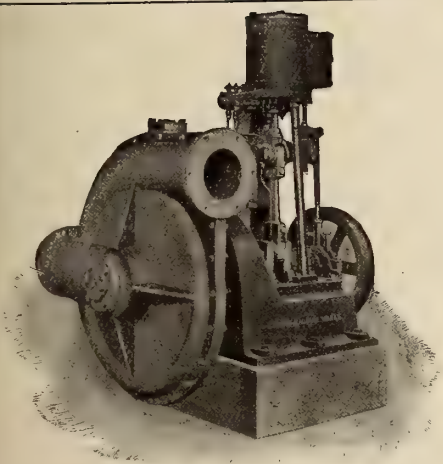
Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



Morris Machine Works
BALDWINSVILLE, N.Y.

Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

New York Office—39-41 Cortland Street

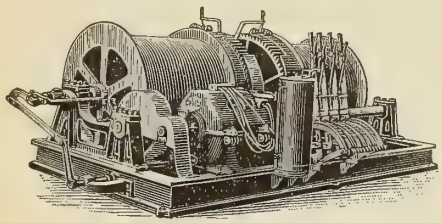
AGENCIES
Henion & Hubbell, 223-231 North Jefferson St., Chicago, Ill.
Harron, Rickard & McCone, San Francisco, Cal.
Zimmerman-Wells-Brown Co., Portland, Ore.
H. W. Petrie, Toronto, Ont.

Flory Hoisting Engines

STEAM AND ELECTRIC

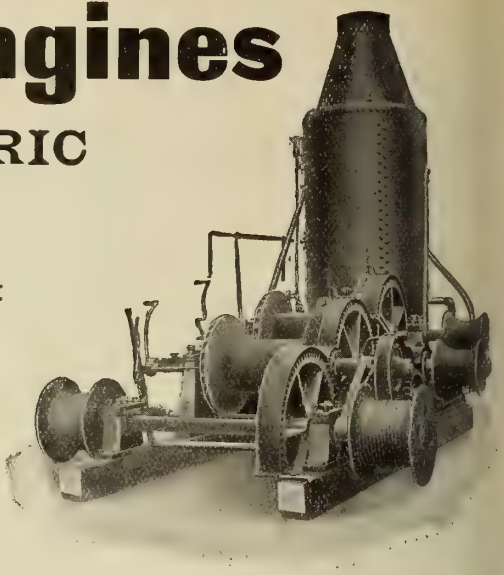
Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 and 4, Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office honrs: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

CANADIAN PACIFIC RAILWAY

THE SHORTEST, CHEAPEST AND BEST ROUTE
TO
GOWGANDA
IS
Leave Toronto 10.10 p.m. daily, Ar. Gowganda 9.00 p.m. next day.

THROUGH FARE $15.80

Through sleeper to Sudbury; dining car on C. N. O. train to Gogwanda Junction. Stops made at Phoenix for lunch and Elkhorn for dinner by stage line.

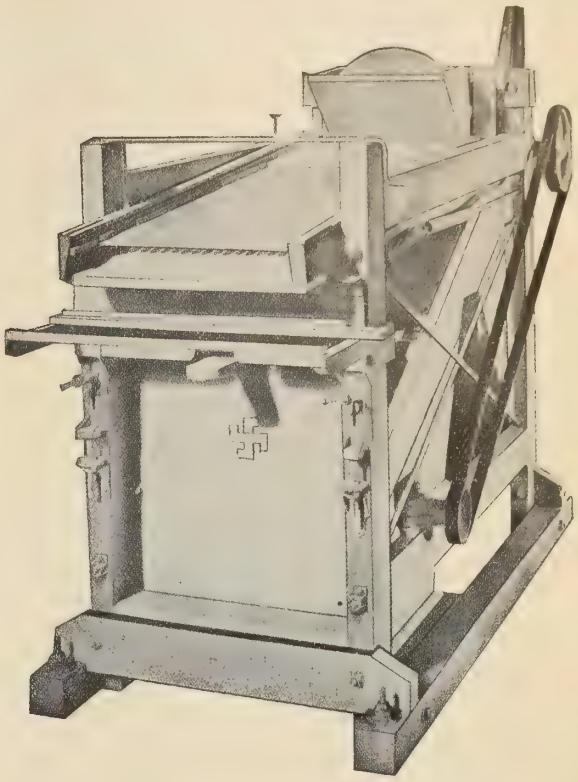
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

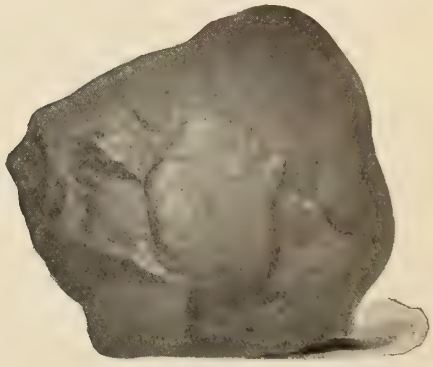
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scrantan, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

The Davis Handbook

OF THE

Cobalt Silver District

By H. P DAVIS.

ILLUSTRATED WITH PHOTOGRAPHS

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 PAPER COVER $2.00 STIFF COVER

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

"Link-Belt"

CONVEYORS

For Coal Mines

Our manufactures include

Conveyors, Car-Hauls, Screening Plants, Complete Washery Equipments, Box-Car Loaders, Weigh-Boxes, Etc.: Original "Ewart" Link-Belt, "Dodge," "Monobar," "Ley" and other Chains: ➤FLINT-RIM➤ Sprocket Wheels, Small Rollers and Truck Wheels for Conveyors, Carriers and Cars.



Retarding Conveyor at Gentry, W. Va., Mine of N. R. & P. C. C. & C. Co., Capacity. 500 tons per hour.

In every section of the country may be found Conveying Machinery of our manufacture—evidence of broad utility in an extensive and exacting field.

PARTICULARS GIVEN ON REQUEST TO

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK, 299 Broadway
PITTSBURGH, 1501-2 Park Building
ST. LOUIS, Missouri Trust Building
SEATTLE, 439-440 Ney York Block
DENVER, Lindrooth, Shubart & Co.
NEW ORLEANS, Wilmot Machinery Co.

ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F) Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

LYMANS, LIMITED
MONTREAL

ASSAY SUPPLIES

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

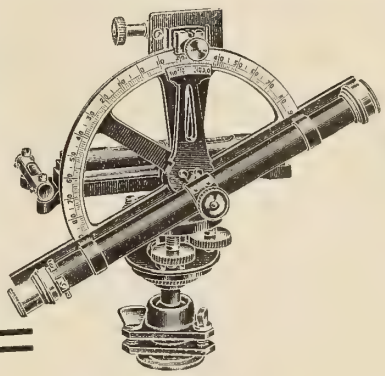
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Hayes' Mining Level

Specially designed for accurate levelling and for taking angles of inclination in mines Equipped with a ball and socket motion for rapid levelling—can be levelled anywhere in 15 seconds. A great time-saver and invariably accurate. With telescope attachment or sights.

A well-built and minutely accurate instrument with advantages too numerous to explain herein.

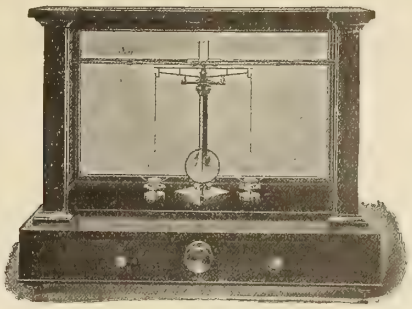
Catalogue F sent free.

Joseph Casartelli & Son

Scientific Instrument Makers

43 MARKET STREET

MANCHESTER, ENG.



TYPE D. PRECISION BALANCE

4 INCH BEAM SENSIBILITY $\frac{1}{10}$ MILLIGRAM

This balance is used extensively by Assayers in Smelters, Mines Cyanide and Chlorination Mills having a large volume of very accurate weighing to make.

It is representative of the output of

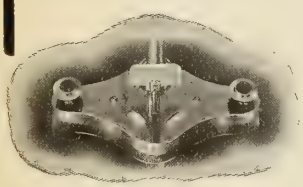
THE PRECISION FACTORY

Among its many excellent features we show below

THE UNIT BASE

which carries the level vials, center lift rod and pan rest bearings thereby maintaining their perfect alignment, regardless of the warping of the case, and by the removal of three screws the entire mechanism may be removed for cleaning.

CATALOG A-16 DESCRIBES OUR LINE



WM. AINSWORTH & SONS

Denver. Colo., U.S A.

CANADIAN AGENTS

Lyman Sons & Company,
380 St. Paul St., Montreal.

B. C. Assay & Chemical Supply Company,
Vancouver, B. C.

Dominion Coal Company

Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

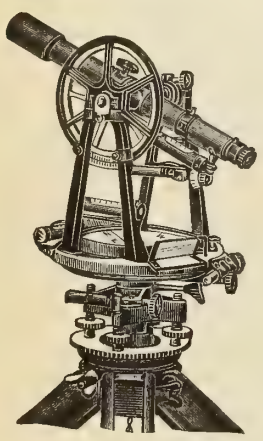
Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

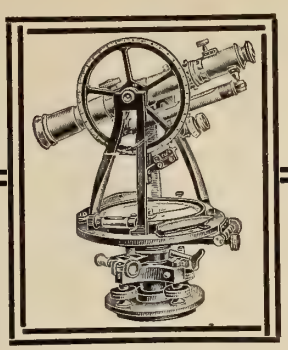
80 St. Francois Xavier Street, Montreal

Address P.O. Box 196

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines



K & E
Engineering Instruments

The superior design, high quality of material, workmanship and finish which characterize our Surveying Instruments, account for their use on nearly every important engineering enterprise.

When in the market for a new surveying outfit, we will be pleased to quote on your requirements, as we can furnish every requisite of the engineer for field or office.

Send for our Solar Ephemeris for 1910.
Our complete Catalogue sent free on request.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

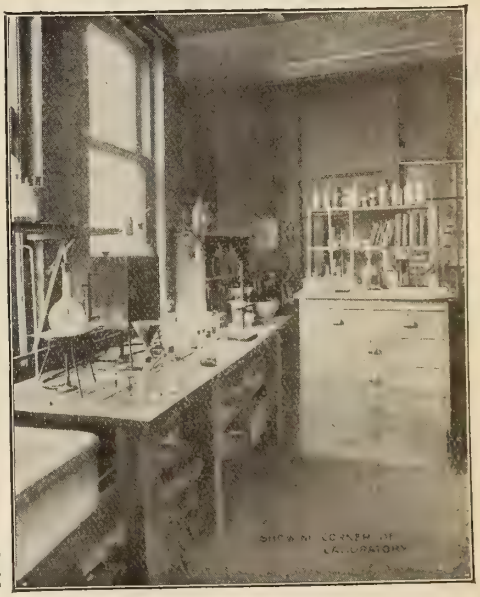
THE
Bennett Fuse
Crown  Brand

MANUFACTURED BY
William Bennett, Sons & Co.
CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:
The Giant Powder Company, Con.
VICTORIA, B.C.
AND AGENCIES THROUGHOUT THE DOMINION.

WE DON'T GUESS

This is our Chemical Laboratory. We know our Metal from the raw material to the cases it is packed in.



Chemical Room.

Harris Heavy Pressure Bearing Metal

Will keep your Bearings Cool, save you money in Oil and Fuel.

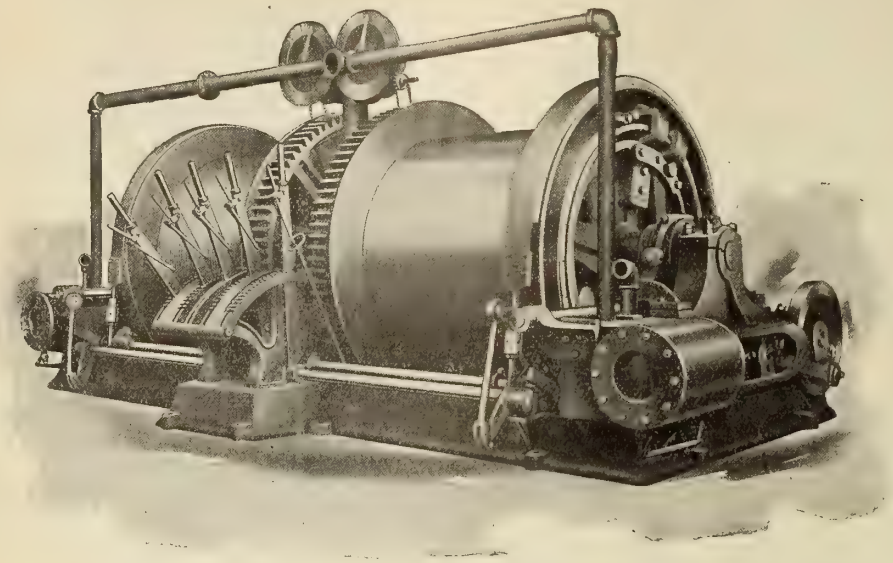


This Factory behind the Metal.

These are Facts

Wo ld you like a sample shipment

THE **CANADA METAL CO., LTD.**
TORONTO



Why Is It?

Our hoists are specified in nearly every case throughout the Mining Districts of Canada.

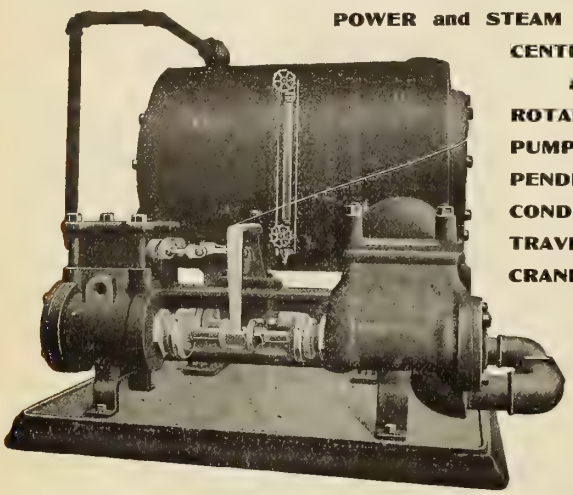
Must be their past reputation.

WE STOCK THE SMALL SIZES.

ARE YOU INTERESTED

The Jenckes Machine Co., Limited

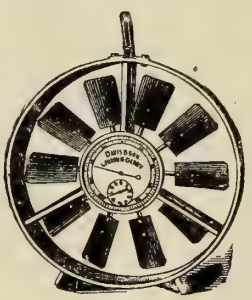
Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.



POWER and STEAM PUMPS, CENTRIFUGAL and ROTARY PUMPS, INDEPENDENT JET CONDENSERS, TRAVELLING CRANES, ETC.

THE SMART-TURNER MACHINE CO., LIMITED, HAMILTON, CANADA.

DAVIS



ANEMOMETERS
WATER GAUGES
HYGROMETERS

(STOCK AT MONTREAL)

SEND FOR CATALOGUES

PEACOCK BROTHERS
68 BEAVER HALL HILL
MONTREAL

WANTED

Copy of Canadian Mining Review, January, 1907

STATE PRICE

CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING
TORONTO

LUDWIG NAUEN
HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, March 1, 1910 No. 5

The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials—	Page
Editorials	129
(1) The Canadian Mining Institute's Twelfth Annual Meeting	129
(2) Hampton's Magazine and Mr. Bannell Sawyer	130
(3) The Mining Society of Nova Scotia	130
(4) Peterson Lake	130
(5) Editorial Notes	130
Forestry and the Coal Areas of the Yukon Territory. By D. D. Cairnes	131
State Aid to Mining	132
The Protection of Mine Timbers from Fungus	133
Prospects of the Tyee Copper Company	133
Electric Storage Battery Locomotives in Hungarian Mines. By F. C. Perkins	135
Advance Chapter from H. P. Davis' Handbook of the Cobalt District	136
The Porcupine Gold Fields. By W. H. Spencer	137
The Geology, Mining, and Preparation of Barite in Washington County, Missouri. By A. A. Steel	138
Canadian Mining Institute—Western Branch	143
Mining in Ainsworth and Slocan Districts. By E. Jacobs	143
The History of Stevens' Copper Handbook. By H. J. Stevens	145
Correspondence	146
Canadian Patents	147
Resolutions Adopted by the Canadian Commission of Conservation	147
Personal and General	147
Book Reviews	148
Special Correspondence	148
General Mining News	152
Company Notes	153
Stock Reports	158
Statistics and Returns	158

THE CANADIAN MINING INSTITUTE'S TWELFTH ANNUAL MEETING.

The twelfth Annual Meeting of the Canadian Mining Institute will begin one day after this number of the Canadian Mining Journal appears. A large and representative attendance is assured. The number of visitors from the United States will be larger than usual. It is altogether probable that the sessions will be in all respects the most profitable on record.

In commenting upon last year's gathering in Montreal, we wrote thus: "In one respect the meeting that has just been concluded was an improvement on all preceding conventions. We refer to the fact that the proceedings were much facilitated by the presentation of papers in synoptical form. This saved time and made fuller discussion possible. Undoubtedly steps can still be taken in this direction. For instance, an inflexible time limit could be fixed for the presentation of any paper. Subjects foreign to the matter in hand should be rigidly excluded. . . . The custom of attaching consecutively numbered badges to all delegates has much to recommend it. An arrangement of this kind would obviate confusion and would provide an easy means of distinguishing members from non-members."

These remarks apply with equal force to-day. The discussions that follow the reading of papers are often of wider interest than the papers themselves. Not seldom, however, a speaker is permitted to ramble off into matters totally irrelevant to the subject in hand. It is hard for the chairman to correct this. The best preventive is the habit of putting one's remarks in writing first. Verbosity, unintentional or otherwise, is a cruel affliction. We hope, therefore, that no members will transgress in this respect.

Objectionable as long speeches are at any time, they are most intolerable at the Annual Dinner. On other occasions it is not impossible for the listeners to express their impatience. At the Dinner this, of course, is out of the question, and the offender gets off scot free except that he carries with him the undying aversion of those who have writhed under his eloquence. It is only fair to add that members of the Institute are not the worst sinners.

At the approaching meetings several questions of prime importance are to be settled. Among these are the formation of an independent professional society and the adoption of a new set of by-laws. Undoubtedly there will be much pother and some warm feeling. But it will be well to remember that diametrically opposite opinions can be held on nearly every question by equally competent and honest men. No harm can

result from open discussion, even if the atmosphere become tropic. Mischief comes in when a clique or faction is used to railroad a measure through, even though the measure be a good one.

One word more and we shall cease preaching. The success of all arrangements rests not alone in the Secretary's hands, nor is it in the power of special committees to make everything go smoothly. Every member must do his share. Prompt attendance at each session is most desirable. Equally desirable is prompt compliance witth the printed requirements issued by the Secretary. In short, the Secretary and the committees need all the assistance they can get.

. . . . .

The Canadian Mining Journal extends a warm welcome to all the visitors. Our sincere hope is that the coming Annual Meeting will be made exceedingly pleasant and profitable for one and all.

HAMPTON'S MAGAZINE AND MR. BANNELL SAWYER.

A magazine that appeals to the public for support must, tacitly or openly, accept responsibility for its advertisements. Hampton's Magazine stands sponsor for the exotic advertisements of Mr. Bannell Sawyer. That gentleman sells stock in the Cleopatra Mining Company, Ltd. "Messages" have been appearing from him in several numbers of Hampton's. This he declares to be his last—and for this mercy our gratitude is due.

Readers of Mr. Sawyer's effusions will be surprised to learn that there is no Cleopatra mine. There is a dubious prospect of that name. Moreover, Mr. Bannell Sawyer's advertisements are grossly misleading. Let us quote a gem from his latest announcement: "Foot by foot, yard by yard, our big compartment shafts are being driven down. . . . Very soon we shall tap at a depth of 100 to 150 feet the silver treasure that has been lying there for centuries waiting for the quick stroke of the drill to release it." This flower of imagination is surmounted by an ideal section in which the artist portrays two quaintly impossible shafts. These shafts penetrate successively "diabase formation," "Keewatin formation," and "silver level." Mr. Sawyer's diagrammatic geology is truly marvellous in its simplicity. Not less to be wondered at is the simplicity of those persons who purchase Cleopatra shares.

Incidentally, we do not admire the device to which Hampton's Magazine resorts. Instead of labelling such announcements as that of Mr. Bannell Sawyer plainly and simply, they are permitted to appear as a "supplement." This is manifestly cheap and nasty.

THE MINING SOCIETY OF NOVA SCOTIA.

Last year the annual meetings of the Mining Society of Nova Scotia and the Canadian Mining Institute were fixed for practically the same dates. Hence those who would otherwise have attended both were forced to make a choice. This year, we are glad to announce, the meeting of the Mining Society of Nova Scotia is set for March 15th and 16th. This will give ample opportunity for western members to attend without foregoing the Toronto meeting of the Canadian Mining Institute.

It is appropriate here to urge upon mining men generally the desirability of attending the Nova Scotia meeting. Much can be learned of undoubtedly good business and professional openings in the Maritime Provinces. The journey itself is decidedly attractive, and the meetings of the society are most creditably conducted.

Mr. A. A. Hayward, the Secretary of the Mining Society of Nova Scotia, will cheerfully furnish information. Further notice will be found in our "Personal and General" columns.

PETERSON LAKE.

One result of the litigation between the Peterson Lake Silver Cobalt Mining Company and the Nova Scotia Silver Cobalt Mining Company is that the treasury of the former has been enriched by 160,000 shares of stock and contains $58,000 in cash. Another result is that the Peterson Lake directorate is adopting a vigorous plan of development both on its own responsibility and, as has been done in the past, by means of leasing parcels of its territory.

A circular issued by the company will be found on another page.

EDITORIAL NOTES.

The freight rate on copper ore from Skagway to the Tyee smelter, Ladysmith, is $1.46 per ton. The distance is about 1,000 miles.

One item that lends colour to the rumoured purchase of the Dunsmuir collieries by the C. P. R. is the fact that the latter corporation some time ago filed at Ottawa plans for the erection of large coal bunkers on the Indian reserve. However, the newspaper reports concerning the McKenzie-Mann activities have not been contradicted.

The terms of the new agreement under discussion between the employers and the colliery workmen of South Wales include some interesting new provisions. Among these is one requiring all men applying for work to be subjected to medical examination. This is thought by the employers to be a necessary safeguard against complications arising under the Compensation Act.

It is much to be regretted that the American Institute of Mining Engineers has seen fit to hit upon the first week in March for its annual meeting. That meeting is to be held in Pittsburg. Many of the members of the Canadian Institute are also members of the

merican body. These members would have been glad f the chance of seeing Pittsburg under the auspices f the A. M. I. E. Unfortunately they can do nothing ow beyond projecting their astral bodies into the ircle illuminated by Dr. Raymond and his fellow-conspirator, Dr. Struthers. The incident is the more regrettable since the practice of the American Institute heretofore has been to hold its meeting during February. We hope that somebody's wrist will be well slapped.

FORESTRY AND THE COAL AREAS OF THE YUKON TERRITORY.

By D. D. Cairnes.

(By permission of the Director of the Geological Survey Branch of the Department of Mines of Canada.)

So much has, of late, been said and written concerning the preservation of our forests, and the rapidly-approaching time when all the known deposits of coal will have become exhausted, that in treating of the forestry and coal areas of the Yukon, it will not be necessary to emphasize the vital importance of these natural resources for the welfare of the district; as they are quite as essential factors in the industrial advance of these northern and somewhat sparsely-settled districts, as they are of the more populous portions of the continent.

As extensive portions of the Yukon Territory, which embraces 207,076 square miles, are as yet but slightly or altogether unexplored, our knowledge concerning its timber is very imperfect, but as far as is known the district is generally wooded and the forest consists chiefly of 12 species, 8 of which attain the dimensions of trees, the others being possibly better considered as shrubs. These are white spruce (Picea alba), a black spruce (Picea nigra), balsam fir (Abies subalpina), black pine (Pinus Murrayana), balsam poplar (Populus balsamifera), W. balsam poplar, (Populus trichocarpa), aspen poplar, (Populus tremuloides), three species of birch and two of willows (Salix).

The white spruce is the most widely distributed and most useful tree in the Yukon, and is found of fine, to good, quality in all the valleys and lowlands. It makes a fair grade of lumber and is well suited for purposes of construction generally. It is seen at its best on the islands and alluvial flats of the main rivers, where it forms fine groves of merchantable timber, easy of access. The groves are small, as a rule, but the aggregate amount of good spruce timber which they contain is considerable. Here trees, measuring one to two feet in diameter, occur in most places and, in a few localities, individuals have been noted which measured three feet, and logs 60 feet long, with a diameter of one foot at the smaller end, can be obtained. Up the slopes of the valleys, the white spruce, under favourable conditions, continues to be a fine forest tree, but decreases in size near the heads of the rivers, where it generally does not exceed eight inches in diameter. In the Klondike district, timber only extends to 3500 feet above sea-level, but in some other portions of the Yukon it reaches as high as 4700 feet.

Balsam fir, which is, in places, as large as 18 inches in diameter, is next in importance to the white spruce, and occurs only in high valley bottoms and on mountain slopes, and appears to thrive best at about 1200 feet above the main valleys, decreasing in size above and below this elevation.

Black pine is fairly abundant in certain localities in the southern Yukon, and occurs chiefly in swampy portions of the valleys on moss-covered slopes facing the north, and, in thin groves, upon dry benches bordering the rivers at 40 to 300 feet above the water. However, it is not an important forest tree, being generally only 4 to 6 inches and seldom over 9 inches in diameter.

The poplar grows on islands and alluvial flats of the main rivers, and is seen in all stages of growth, from a small shrub to a considerable forest tree. The aspen are found over a large portion of the Yukon territory and are especially characteristic of the dry, open grassy hillsides. Three varieties of birch have also been noted, two of which are in most places only poles, but the third (Betula resinifera) is sometimes 8 inches in diameter and has supplied a considerable portion of the fuel consumed in the Dawson mines. It is never tall, however, seldom giving a trunk that will produce two 16-feet lengths for fire-wood.

The most widely distributed shrub is the dwarf birch, (Betula glandulosa), which occurs chiefly on the higher hills and ridges above the timber line. Along the river banks, alder, willows, and brier-rose are abundant.

It will thus be seen that the timber of the Yukon is limited, but that there is, however, considerable, practically everywhere, except in a few localities where there has been a heavy drain upon it, such as in the vicinity of Dawson and along the river banks from Whitehorse to Dawson. But nowhere are the forests of the dense nature encountered to the south, as in British Columbia and in Eastern Canada. The thin growth is probably due to the permanently frozen ground just below the forest floor in most parts of the territory.

Concerning the mineral resources of this immense territory, our information is of a very fragmentary nature, and this is particularly true regarding coal, which naturally has received much less attention at the hands of prospectors than the precious metals. However, anthracite and bituminous coals and lignites have been found in the Jura-Cretaceous and Tertiary rocks of the Yukon Territory at numerous points along the Lewes and Yukon Rivers and their tributaries, particularly the Nordenskiold, Klondike and Indian Rivers and Coal Creek; and three mines have been opened up and a certain amount of work has been performed in other places. However, the known occurrences of each are nearly all along the waterways, where the more detailed investigations have been made. In fact, very little prospecting has been conducted away from the main lakes and rivers, so that, in all probability, further exploration will show a considerable extension of the coal-bearing horizons.

The Sour Dough Mine is situated 12 miles up Coal

Creek from where it joins the Yukon river, 50 miles below Dawson. Here are a number of good workable seams of lignite, up to 12 feet thick, which have been worked to some extent, during the past few years, and from which a few thousand tons have been shipped to Dawson. There is also a 6-foot seam of good lignite about 20 miles from Dawson on a branch of Rock Creek, a tributary of the Klondike. Also some seams of coal have recently been reported to have been discovered on Indian River. These are all believed to occur in rocks of Tertiary Age which have an extensive development to the west and south-west of the above-mentioned localities.

The Tantalus mine is situated on the left of the Lewes River, 190 miles downstream from Whitehorse, and about midway between the latter and Dawson. At this mine three seams of bituminous coking coal have been developed, averaging perhaps, 7 feet, 6 inches, 6 feet, 6 inches; and 3 feet in thickness, which have been mined for several years and from which in 1907 nearly 10,000 tons of coal was shipped. Across the river from where the same measures outcrop on Tantalus Butte where seams of good, clean, coal, 8 feet 10 inches, 9 feet 10 inches; and 7 feet, have been prospected to some extent. These same measures, which are of Jura-Cretaceous age, were found outcropping for several miles to the north and south of Tantalus Butte and Tantalus, respectively, and are believed to be extensively developed to the south and southwest of the latter. From the Five Fingers mine on the right limit of the Lewes River, 16 miles below Tantalus,, considerable coal was shipped some years ago, but since then the company has been chiefly engaged in prospecting and developing the property. The widest seam here is about 4 feet thick, and is a good bituminous coking coal.

A few miles southwest of Whitehorse several seams of anthracite coal have been discovered, two of which are 9 feet 8 inches and 10 feet 4 inches thick respectively, and which belong to the same geological horizon as the coals at Tantalus. Only a small amount of prospect work has been done here, but the measures have been traced several miles to the west.

Seams of lignite are also known to exist in the Kluane district to the west of Whitehorse, and prospectors report having found numerous valuable coal seams in this district. So, judging from the wide distribution of the coal-bearing formations, it is believed that extensive portions of this territory are underlain by valuable coal deposits, thus to some extent counterbalancing the lack of the forests with which nature has endowed other parts of Canada.

For more detailed information concerning the coals of the Yukon the reader is referred to the writer's reports on the Yukon Territory for the past four years, published by the Geological Survey Branch of the Department of Mines of Canada.

The following are a few analyses of Yukon coals:—

Locality.	Water.	Volatile Combustible Matter.	Fixed Carbon.	Ash.
Sour Dough Mine, average of scowload	14.46	33.94	40.52	11.08
Tantalus Mine, from adit where seam was 6 ft. 6 in. thick	0.76	24.74	58.60	15.90
Tantalus Butte, surface average of 8 ft. seam	13.64	31.83	51.84	2.69
Five Fingers Mine, 2 ft. seam	5.95	40.46	45.16	8.4
Whitehorse anthracite average 9 ft. 8 in. seam	2.15	6.01	69.86	21.9

STATE AID TO MINING.

The government of Australia pursues a most en lightened policy in regard to the management of min ing. During 1908 the following specific appropriation were made:—

Advances in aid of mining work and equipment o mines with machinery, £8445 16s. 5d.

Advances in aid of boring, £1038 3s. 7d.

Subsidies to provide crushing plants, £2076 5s.

Purchase of boring plants, £1596 9s.

Providing means of transport, £2001 17s. 2d.

Mining water supply, roads, cartage of ore, drainag timber tramways, developmental work below 100f level, £1338 6s. 11d.

Private crushing plants subsidies, £2075 5s.

The total is £18,573 3s 1d.

The subsidies given to private crushing plant own ers are on condition that they crush for the public a fixed rates. Mr. A. Montgomery, the State Minin Engineer, has recommended for the last two years, tha the Mining Development Act should be recognized an amended, so that guiding principles may be clearly lai down as to the sort of applications for assistance tha should receive consideration and the terms on whic State aid can be made available. The revenue receive by the Government in 1908 in return for its expenditur on mining was:—By refunds on loans, £539 1s. 11d. from sales of securities realized upon, £1559 14s.; mis cellaneous sources, £1043 14s. 10d.; total, £3142 10s. 9d During the same year £3836 14s. 3d. was written off o account of advances deemed to be irrevocable.

Advances under the head of "Pioneer mining" cover all mining work, including the purchase of ma chinery. It is stipulated, however, that the propose operations must be approved by a professional officer o the department. The limit of any individual advanc under this head is £1000 and the borrower must spen a like sum. Individual advances under "prospecting" are limited to sums of £300. In this case the borrowe has to put up an equivalent of pound for pound in la bour or material. On the erection of State batteries the capital outlay to the end of 1907 was £237,029. The profit and loss account for 1907 shows an expenditure of £92,973 and an income of £91.274, leaving a debit balance of roughly £1698 on the year's working. This includes the accounts of cyaniding slimes and tin plants all of which operated at a profit, but such profit was absorbed in the deficiency of revenue from the batteries which in that year, totalled £8725. Altogether, the State spent £95,624 in the smelter business. The receipts, including the money for the sale of the plant amounted to £81,690. So the business resulted in a direct monetary loss, but the Government consider that this is more than offset by the benefits accruing from their having opened up the Phillips River field and the consequent introduction of foreign capital.

The lowest price on record for copper during the past thirty years was reached in 1894, when the metal fell to 9 cents per lb. During that year also, the average price was lower than recorded during thirty years, namely, 9.43 cents per lb. The highest recorded price during the same period was 26.25 cents in 1907.

THE PROTECTION OF MINE TIMBERS FROM FUNGUS.

From the Journal of the Canadian Mining Institute, by John Macoun, Dominion Naturalist, Ottawa, Ont. (Paper to be read at Annual Meeting, Toronto, 1910.)

There is nothing connected with the working of mines of greater importance than the protection of mine timber from rot. It is a matter concerning which little is commonly known. When so much depends upon the strength and stability of mine props, it is remarkable that at the present time practically no efforts have been made to lengthen the life of mine timber. Of the most destructive fungi, even science has not much knowledge. Many of them belong to the genera Merulius and Polyporus. Merulius is the commonest form of dry-rot, and attacks chiefly pine and fir. The name dry-rot carries with it a wrong impression, as dry wood is never attacked; damp, unventilated situations being most favourable to the growth of dry-rots. Well ventilated mines are to a very considerable degree free from fungus growths. In both the genera referred to—Merulius and Polyporus—the rot is caused by the mycelium which penetrate the wood, thus destroying it. The fungi themselves are often of large size, but the actual damage is done by the thread-like mycelium. The molds which are so frequently seen on mine timbers, most of which are of the family Hyphomycete, are not really injurious to the timbers; their natural habitat is on the surface of wet wood, and when the conditions are suitable they grow in mines, just as they do in our cellars, without any direct injury to more than the surface of the wood. It has been generally assumed that the treatment that has proved so efficacious in preserving railway ties, telegraph poles and fence posts might be used in mines; but this is not the case, and saturating the wood with creosote is not only expensive, but is not a sure preventive. Apart entirely from the great expense these methods entail, the conditions are so vastly different that it is more than doubtful whether the results of open air experiments are of much value when applied to deep mines.

Acting under instructions from the Director of the Geological Survey, I visited several mines in the Rossland district in September, 1908, and was astonished to find that nothing whatever was being done there to protect mine timber from rot; and from what I have been able to learn from men familiar with Canadian coal mines, the conditions in these mines are even worse than they are in any other kind of mine, because—as I shall explain later—the timbers now in place in these mines may be preserved at a very small cost.

During the last thirty years I have spent many seasons on both the Atlantic and Pacific coasts, and the difference between the condition of the driftwood on these coasts and that found along our interior lakes attracted my attention many years ago. Members of the Geological Survey staff inform me, moreover, that the wood found along the shores of Hudson Bay, the Mackenzie Delta and Behring Sea is of the same character as that which has come under my own observation. Speaking generally, all wood found on the seashore is free from fungus rot, while that found along fresh water streams or lakes begins to rot within a year or two after it is left on the shore. The inference is plain. Some constituent in the salt water protects the wood, and when we remember that all fungi are produced from spores—microscopic in size—it is evident that if these spores can be prevented from developing, fungus rot is impossible. Since my return from the field last autumn the Director of the Geological Survey has shown me a description of what is known as the Henry Aiken method of treating timber for use in mines. A full account of Mr. Aiken's treatment may be found in the Summary Report of the Geological Survey for 1908, and only the briefest summary need be given here.

In this process the timber is soaked in water, raised to a temperature of from 190 to 200 degrees Fahr., and contains enough common salt to form a thoroughly saturated solution. The timber should be free from bark, fairly well seasoned and thoroughly dry. Tests made in many British collieries have proved conclusively that this treatment is in every way a satisfactory one. In one mine the timbers, after being in place five years, were perfectly sound, and in another they had shown no sign of rot at the end of six years. What is even more noteworthy is an experiment made in Fifeshire. Two pieces of ordinary fir, 3½ inches in diameter and 3 feet long, both weighing 10 pounds, before being treated, were selected. One of the pieces was treated by the salt process and the other not. After being treated, it weighed 12 pounds. Both were taken underground and placed in a return air-course and after eleven months were examined and re-weighed. The untreated timber then weighed only 5 pounds whereas the treated wood weighed 12 pounds, or exactly the same weight as when it was put in. They were replaced in the mine and allowed to remain eleven months longer, with the result that the untreated timber weighed 6 pounds and the treated timber weighed 11¾ pounds. They were again replaced in the mine, and after an exposure of three years they were examined, and while the treated piece was sound, the untreated one was decayed. Such evidence as this must be considered as conclusive, and as the salt water treatment is inexpensive, there seems to be no good reason why all mine timbers should not in future be treated in this way. Timbers already in place might from time to time be sprayed with salt water for, while such treatment could not be expected to prove as efficacious as if the wood were soaked in brine, still it is reasonably certain that few fungus spores could develop on wood that was so treated. In coal mines where spraying is systematically done for the purpose of preventing coal dust explosions the addition of salt to the water used would entail very little extra expense. What is certain is, that when the greatly enhanced price of timber in recent years is taken into consideration, the cost of treating mine timbers with salt is insignificant as compared with the money that would be saved.

PROSPECTS OF THE TYEE COPPER COMPANY.

During a visit to London, at the close of the past year, Mr. W. H. Trewartha-James, general manager of the Tyee Copper Co., Ltd., delivered an address at an informal meeting of the shareholders. Extracts are reproduced herewith:—

"With regard to your smelting industry, let me recapitulate the great advantages which give you such a commanding position in the smelting industry on the Pacific coast. You have, in the first place, a beautiful land-locked bay, which is also an important coaling station for the steamers of the Canadian Pacific coastal

trade and for the shipping generally, which plies along the Pacific coast. You have a valuable smelter site, consisting of some forty-four acres of land abutting on the sea, which I estimate is worth to-day, as an industrial site for a lumber mill, or any other industrial purpose, not less than £9,000. That asset is therefore one of considerable value, though it does not as yet appear in your balance sheet. You have a valuable contract, ensuring you a continual supply of coke and water—coke at a lower price than it can be obtained anywhere else on the Pacific coast—water to the extent of 1,000,000 gallons daily practically free. You have your own wharf, at which the largest vessels plying the coastal service can lie securely and discharge cargoes in bulk at the rate of from 80 to 100 tons per hour at all stages of the tide. The new furnace, now in operation, contains practically all the most up-to-date improvements in furnace work and you have the great advantage of being able to draw from the prosperous and rapidly-growing town of Ladysmith ,in which your smelter is situated a competent band of workmen, both skilled and unskilled, at fair wages, with every facility and convenience for themselves and their families. We are not hampered by any restrictions or unduly severe regulations as to noxious fumes and furnace smoke. The municipality of Ladysmith, and the government of British Columbia recognize that industrial expansion is necessary, and they seek to assist rather than to hinder progress. As you know, the rapid growth of towns and populations tends to restrict in a remarkable way the available smelting sites on the American seaboard south of Canada. You have a geographical position which assures cheap freight rates on ore in both directions. The main traffic going north consists of goods, provisions and machinery, and the vessels are short of return freights, so that special rates are obtainable for ore cargoes southward bound to your smelter. We can carry ore from Skagway to Ladysmith, some 1,000 miles, in bulk for 6s per ton. Then again, going south, we have vessels laden with lumber and coal, which have to come back in water ballast unless they can bring ore. Thus we have a back cargo rate as far south as South America of 14s. per ton, and we are now in a position to compete for our share of that valuable and growing business. . . . . So far, I have, in dealing with the past and in bringing your knowledge down to date, confined my remarks solely to the facts as facts. The conditions upon which our future prospects depend are so complex, so liable to variation from causes entirely beyond our control, that you will fully appreciate the necessity for my restricting any natural enthusiasm I possess, and of giving my reasons for dealing with our prospects from a most careful and conservative standpoint. Mr. Daniel Guggenheim was recently quoted in New York as saying that the copper ore customs smelting business is the most worrying and ungrateful business he has ever been connected with, and I think my own experience makes me most frankly echo these same sentiments. Who could have imagined that your customs ore supply of 4,800 tons per month in 1907 would have fallen to 800 tons per month in 1908? And only by dint of the most strenuous exertions, and, I admit, with a full measure of good luck, has it been possible to get back to a normal basis of 50,000 tons per annum. I have already explained that I attribute this partly, not wholly, to the slump in the price of copper, and to the New York panic of 1907, which forced producing mine owners to close down, as the owners had no margin on which to continue operations. This will show you, gentlemen, that our prospects are to some extent, dependent on the price of copper, and I do not believe there is any man in the world, be he never so wise, who can possibly give us any certain prognostications hereabout on which we can absolutely rely. My own opinion is necessarily largely formed by association with prominent Americans, who may, I believe, in the course of a few years, almost completely control the production of this important metal. In my opinion—I am referring now to what you have read about the great American copper combine in New York—we have to-day associated the best, the most powerful and the wisest men in the Western land in an effort to standardize and regularize the price of this product. I do not believe they intend immediately to put up the price of copper unless the relative proportions of consumption and production justify that course. I believe their object is to maintain a fair and regular price for copper, so that trade conditions shall not again be subjected to the extraordinary variations caused by the great fluctuations in the price, such as those which occurred in1907, when copper fell from £115 to £55 per ton within a few months. I believe too, that this powerful American copper combination will ultimately attain its object. Now in London most of the best informed people I have met (there are a few notable exceptions) believe that the production of copper is, and will be for the next two or three years, largely in excess of demands. As I understand it, the Americans connected with what has been called "The Great Copper Combine" see their way clear to place in industrial circulation every pound of the heavy excess stock of copper, the existence of which we must freely admit. Trade conditions tend to become more normal, and money for investment appears to be freer out West than it is here, and so far as I am justified in expressing any personal opinion, I say unhesitatingly I expect a steady upward movement in the price of copper until a maximum of £70 per ton has been reached. The industrial developments on the Pacific Coast are progressing now so rapidly and by such leaps and bounds that when last year President Taft came to visit the Seattle Exposition, notwithstanding his close touch (through his statisticians and principal advisers) with all the facts and figures of that development, it was not until he had made his personal inspection that he realized what progress was being made, and this is what he is reported to have said: 'I see spring up on the Pacific coast a new empire, which will in the course of a few years dominate the commerce of the world.' This is a great thing to say, but that is President Taft's view and was expressed in public. Certainly in Canada and in America the trend of capital investment is most decidedly westward, and your industrial enterprize lies right in the path of that movement. It can hardly fail to benefit you. Our prospects, of course, also depend on your getting more ore contracts. During the past eighteen months, we have done well—indeed we have so far got more than our share of the business going on the coast, so that all I need say in this respect is that I see no reason why we should not continue to hold our own."

In the fifteenth century the world's annual production of gold did not exceed $4,000,000. Since then it has increased one hundredfold.

ELECTRIC STORAGE BATTERY LOCOMOTIVES IN HUNGARIAN MINES.

By Frank C. Perkins.

There are a number of mines in Austria-Hungary which have been equipped with electric storage battery locomotives of the unique construction noted in Fig. 1 and 2 and drawing Fig. 3, the batteries being mounted on the top and being removable for charging. There is a special gearing provided with permanent rolls fixed in the top of the locomotive, which makes it possible to shift the discharge batteries and replace them with fully charged sets for the locomotive, with a minimum expenditure of labor and time.



Fig. 1.

There is no doubt that the storage battery locomotives have some advantage over those operated by overhead trolleys or third-rail conductors. They are thoroughly reliable and are of no danger to the miners. They also have a radius of action without extensive overhead construction.

In the Hungarian Petrozseny mine there are 8 storage battery locomotives in operation, of the type shown in illustration Fig 4, each having a capacity of 12 horse power. These locomotives of the Zalgo-Tarjaner-Kohlen—Bergbau Aktiengesellschaft are operated in pairs. These double accumulator mining locomotives thus formed, have a total capacity of 24 horsepower and

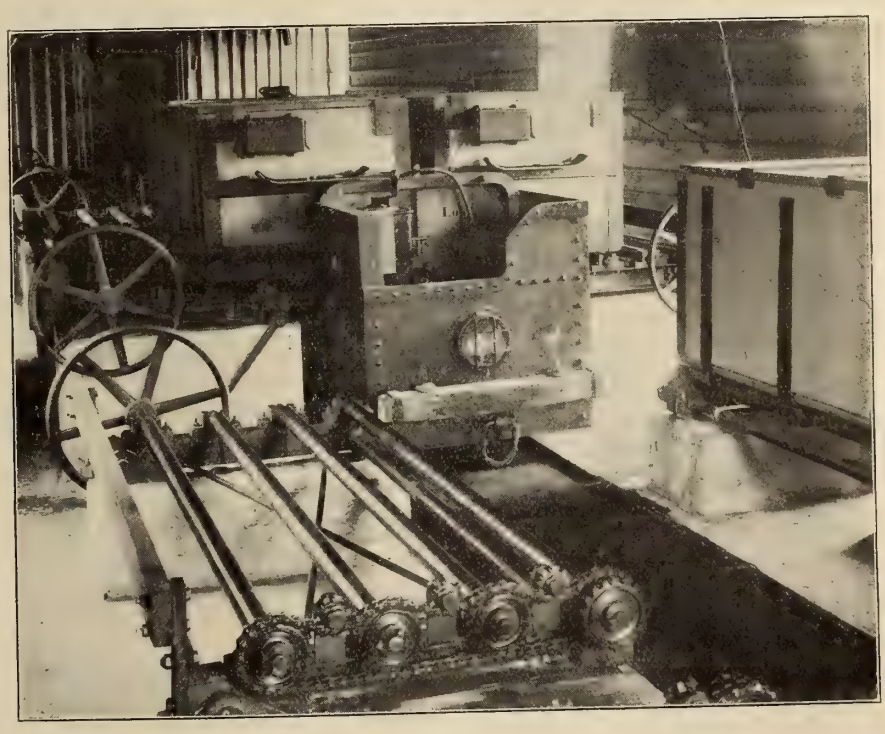
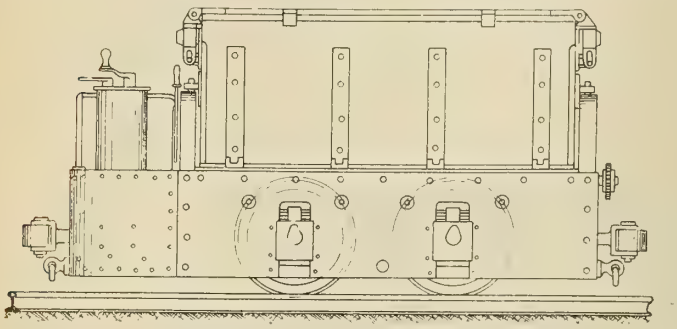


Fig. 2.

are capable of hauling 40 cars without difficulty. At this mine there are 16 sets of batteries used. The Tudor type of cells are employed as built at Budapest by the

Tudor accumulatoren Fabrik Akiengesellschaft. Each locomotive has 51 cells, with a capacity of 74 ampere hours each.

The largest Elektromontana storage battery mining locomotives usually installed in German mines are of 24 horse power and 32 horse power capacity and each locomotive is provided with two sets of batteries when un-



Fig, 3.

interrupted service is required, one of which is being charged, while the other is operating the locomotives.

The unique roller and chain arrangement on the locomotive frame and charging table, makes it possible to shift the batteries with very little difficulty. The batteries are seldom discharged more than 60 or 70 per cent of their capacity, and it requires for charging only about one-third of the time usually taken for discharge in operating the mining locomotives.

When partially discharged, the storage batteries may be fully charged in about one and a half hours. The 20 horsepower mining locomotive is equipped with two independent sets of batteries of 90 cells each, having a capacity of 74 ampere hours, which are capable of giving 400 effective ton kilometers in normal service.

When two storage batteries are employed with the small locomotive, the cost is about 1200 marks, or $300.00 per horse power while for the larger locomotives the cost is considerably less, or about 800 marks, equivalent to about $2,00 per horse power.

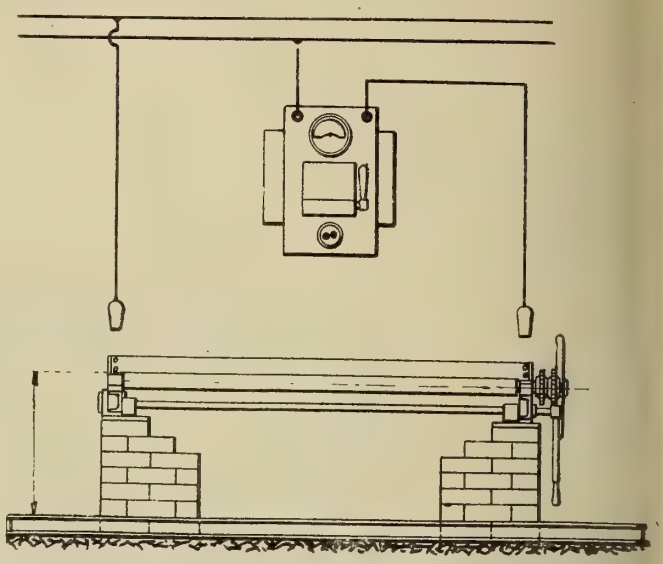


Fig. 4.

It is maintained that the cost of operation for these storage battery mining engines is from one-third to one-half the cost of animal power for similar service, and the current required is from one-quarter to one-third kilowatt hour per ton kilometer capacity. An advantage of these storage battery mine haulage equipments worthy of consideration is that no added weight is required for adhesion and the storage batteries supply all the necessary weight needed.

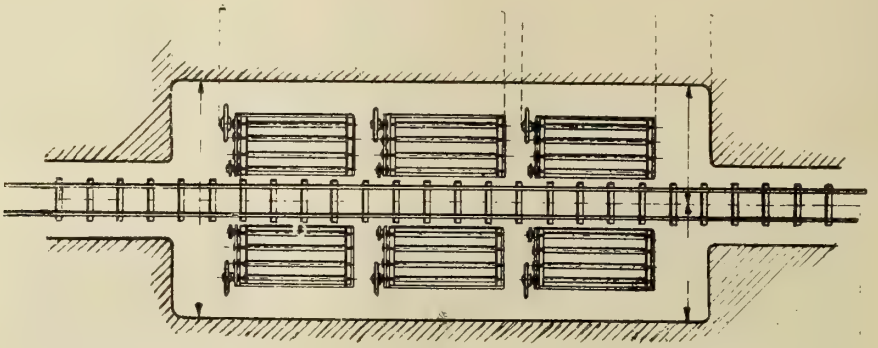


Fig. 5.

ADVANCE CHAPTER FROM H. P. DAVIS' HANDBOOK OF THE COBALT DISTRICT.

Production and Dividends.

The tables included in this volume give the production of the Cobalt mines to December 31st, the authorized and issued capital and the dividends paid by each company.

An analysis of these tables shows that forty-four mines have shipped in six years *78,589.94 tons of ore, which yielded **62,500,000 ounces of silver of a gross value of **$33,304.260.00. The recorded sales of cobalt, nickel, and arsenic, bring the total up to not less than than $34,000,000.00. Of the forty-four mines which have shipped ore, ten contributed a total of less than 200 tons, and can hardly be counted on for further shipments. Seventeen of the thirty-four shipping mines have paid in dividends and in profits to private owners

a recorded total of $17,101,504.82; adding to this the proceeds from ore sales by private owners before incorporation brings the total to not less than $17,860,000.00

During 1909 twenty-eight mines shipped *29,996.51 tons of ore, which yielded 25,000,000 (estimated) ounces of silver, of an estimated value of $12,875,000.00. Of these twenty-eight shippers, twenty-six were public companies. Thirteen of these twenty-six companies, with a total issued capitalization of $35,000,000.00, shipped 25,414 tons, or 85 per cent. of the total, and paid in dividends $6,468,853.42, or 18½ per cent. on their issued capital at par.

To this must be added profits divided by two privately-owned properties estimated at $600,000.00, making a total of $7,068,853.42 paid in dividends and profits in the twelve months.

Value of Ore Per Ton.

	Average Value per Ton.	Average Price Silver per Ounce.
1904	$862.00	$0.572
1905	687.00	0.604
1906	705.00	0.665
1907	426.00	0.653
1908	362.00	0.528
1909	429.00	0.515
Average for 6 years	442.00	0 5895

The increase in value per ton for 1909 over 1908, in spite of the decrease in the price of silver was the result of the shipment of concentrates.

The average value per ton for the six years was $442. Including all dividends and profits distributed, $215 has been paid for each ton of ore shipped, or about 50 per cent. of the gross value of the production. The record for 1909 is even more remarkable. The average value per ton was $429, while $236 was paid in dividends for each ton of ore shipped.

The following table illustrates the rapid advance and increasing importance of Cobalt as a factor in the world's production of silver:—

Silver Production (Fine Ounces).

Year.	World's Production.	United States.	Per ct.	Montana.	Per ct.	Cobalt.	Per ct.
1904	168,390,238	55,999,840	33.25	12,817,285	7.61	206,875	.12
1905	157,339,962	56,101,600	35.66	13,454,700	8.55	2,451,356	1.56
1906	158,313,445	56,517,900	35.70	12,540,400	7.92	5,401,766	3.41
1907	159,456,333	56,514,700	35.44	11,129,600	6.98	10,023,311	6.29
1908	203,186,370	52,440,800	25.80	10,,356,200	5.09	19,437,875	9.51
1909	*205,819,977	53,849,000	26.16	12,000,000	5.83	25,000,000	12.14

*1909, estimated.

In 1904 Cobalt produced twelve one-hundredths of one per cent. of the world's silver. In 1909, five years later, Cobalt produced over 12 per cent. of the total world's production, placing Canada third in the list of silver-producing nations.

Last year Cobalt shipped almost one-half as many ounces of silver as the United States, and more ounces than the combined output of Colorado and Montana.

* Net tons as shown by T. & N. O. R. R. freight statements.
** Estimated for 1909.

THE PORCUPINE GOLD FIELDS.

By W. H. Spencer.*

The Porcupine gold district is situated about 30 miles west from the 222 mile post on the Temiskaming & Northern Ontario Railway. This means 222 miles north from North Bay on the Canadian Pacific Railway. Porcupine Lake, in Whitney Township, so far appears to be the centre of activity, and from the showings on the surface this district promises to be one of the great gold producing camps of the continent. Claims are being staked by the thousand and as the assessment work is being done the gold discoveries are very numerous. The best showings to date are in Whitney and Tisdale Townships. This is altogether on account of these being the first discoveries, and having so far most work done on them; but good discoveries are being made in Shaw, Mountjoy, Godfrey and Carman Townships, and in the Temagami Reserve.

There is said to be about 50 miles square of this gold-bearing country. The properties so far being operated are the Bannerman, Way, Griffin, and Foster claims in Whitney, the Davidson-Dobie and the Hollinger and Wilson in Tisdale. There are also some good showings in the Temagami Reserve immediately south of the Wilson and Hollinger groups. The McMahon group lying south of Lots 8, 9 and 10 in Tisdale consists of six claims, and has veins from 2 to 10 feet wide showing free gold. The assessment work is now being done on this group, and on the completion of the work there is no doubt but this group will give a good account of itself. These claims are directly in the trend of the best showings in Tisdale.

The Hollinger has most work done of any in the southern part of Tisdale, and from the indications on this property there is no doubt that the ore will change into a sulphide with depth.

They have a shaft down about thirty feet, and are in a milky white quartz showing galena and free gold. This ore is very soft, and I presume an ordinary thousand-pound stamp would crush three tons per twenty-four hours without any trouble. The surface showings on the Hollinger and Wilson are quite spectacular, and will without doubt resolve themselves into large low-grade propositions. The Hollinger vein at the present showing is 125 feet wide and only one wall in sight. I presume the greater part of this ore will run below $10, but with the rich ore used to bring the average up, it will probably make a milling proposition of $12 to $20 per ton. This will require large concentrating and cyanide plants. The present year will be required to

get in sinking and prospecting plants, and it will take another year before the permanent plants and machinery can be erected. This means that it will take two years from date before any returns can be depended upon.

There are large tracts of this country that are considered to be swamp, when in reality they are not. The country generally is low and rolling, with elevations perhaps 30 or 40 feet above the level of the water, but the timber grows so thick that the sun never gets to the ground, and the consequence is that the moss becomes thick and holds the moisture, giving it the appearance of swampy ground, but by raking the moss away with a pick, rock is laid bare.

Again, the lowering of the Frederickhouse River by cutting away the falls, which has now been done, will drain thousands of acres that would otherwise be swamp.

THE GEOLOGY, MINING, AND PREPARATION OF BARITE IN WASHINGTON COUNTY, MISSOURI.*

Extracts from Paper Read Before the American Institute of Mining Engineers, Spokane Meeting, September, 1909.

By A. A. Steel, † Fayetteville, Ark.

Barite deposits are scattered over nearly the whole of Washington and adjoining counties, but the product is all mined from the areas indicated upon the sketch-map, Fig. 1, and is shipped from the stations of St. Louis, Iron Mountain & Southern Railway, between Blackwell and Potosi, from 45 to 60 miles S.W. of St. Louis.

The topography is for the most part gently rolling, with slightly graded streams, usually less than 200 ft. below the higher hill-tops. Along Mineral Fork and Indian Creek are some steep bluffs and cliffs, affording good exposures of the formation. Nearly all the rest of the area is covered to a depth of from 5 to 40 ft. with residual clay containing chert, barite, etc. This overburden greatly interferes with the study of the bed-rock which is exposed only at intervals in stream-beds, in a few barite pits and in those lead mines which have not been abandoned.

Present Condition of the Barite.—As the dolomite became dissolved the barite accumulated with the clay, flint, and other residual material. Commonly the barite is somewhat concentrated at a depth of from 2 to 6 ft., probably the lower limit of the disturbance of the soil by frost and other agencies. Above this, the clay contains an unusual amount of flint or chert uniformly scattered through it.

Beneath the first bed of barite the clay seems more undisturbed and the barite is scattered irregularly through it. Most of the slabs of barite have fallen over and are now horizontal, and there is likely to be a little more barite immediately above the bed-rock. The upper part of the weathered dolomite is soft and crumply and is often called sandstone. Some of the larger slabs of barite are dug from this until it becomes too hard. Near the bed-rock the barite is quite hard, more nearly translucent, and contains iron-stains only upon the surface.

Near the surface the barite is commonly not much softened, but thin layers of limonite are deposited in the cleavage-planes, along which the barite breaks up. When very dark and purplish this barite is sold at half price as No. 2, or "battle axe," on account of the difficulty of bleaching it. There is a little which is deep yellow all through. It was said that this stain was not due to iron and could not be removed by sulphuric acid in the bleaching process, even by those mills which grind before they bleach. It cannot therefore be sold. Laboratory tests show that the stain is only iron and clay, and perfectly soluble in rather strong sulphuric acid. Frequently, quite a lot of barite of walnut-size is found near the bottom of the flint-zone.

In places, the lumps of barite adhere to a good deal of chert which probably once projected from the walls of the caves. Upon other specimens are shells of hard, dark limonite, called "metallic iron," and representing weathered marcasite. Both the flint and iron can be chopped off with a hatchet. The quartz crusts, called "mineral blossom," are so irregular and so frequently included in the barite that they cannot be chopped off, and reduce the grade to No. 2, because the resulting grit is especially objectionable in the barite floated for pigment. Where there is much mineral blossom, the barite is therefore not mined. A little barite which probably once contained strontium sulphate, is now very soft and dazzlingly white. It is sticky in the grinding mills and cannot be sold.

The Mining Industry.

1. Amount of Barite Available and the Output—The entire area is very irregularly supplied with barite, which is commonly mined in patches from 10 to 15 acres in size. The longest single patch is at Mineral Point, where the crest of a low ridge has been mined almost continuously from 50 to 300 ft. wide for a distance of half a mile. The barite, or "tiff," as it is called by the miners, is mostly mined from cleared farm-fields, which showed a little barite upon ploughing and were accordingly prospected. The patches are therefore most frequently upon the slopes of hill-sides, where the barite is likely to be exposed. There are probably several good patches in the woods which have not yet been found, although the country has been prospected for more than a century.

James Long, of Potosi, the largest and oldest shipper of barite, estimates that of the entire area of about 100 sq. miles, one-tenth is workable barite-land. The best fields have produced from 2,500 to 4,000 tons, which is probably only about one-half the barite they contain. The average field, under the present system of mining, yields about 600 tons per acre to a depth of 8 ft., of about 100 lb. per cubic yard, but it takes many

* Published by permission of the Director of the United States Geological Survey.

† Professor of Mining University of Arkansas.

years to produce this amount, and very few fields have been anything like exhausted as yet. Upon this basis of estimate, the probable total yield, without a change in mining methods, will be about 4,000,000 tons, or more than a century's supply, if we count new discoveries equivalent to the amount already taken out.

Every little country store accepts barite in exchange for supplies, but it is all shipped through half-a-dozen contractors. The total amount shipped was given as 33,046 tons. Nearly all of this was first-class barite, and sold for $4.35 per ton at the shipping point, or $5 at St. Louis. In 1905 the price was reduced to $4.10, at which it now stands. The royalty to the owner of the land is quite uniformly 50 cents per ton, but is 80 cents on one especially good field, and as low as 15 cents when very far from the railroad. The miners get as much as $2.75 a ton when much cleaning is necessary, but usually from $2.20 to $2.50, and only $1 a ton at Richwoods, from which the wagon-haul costs $2.50. The haul usually costs from 25 to 50 cents a ton, and the contractor gets the rest. Farm-land containing barite in some of the fields sells at $35 an acre, which is not much different from its farming value. Wild land, from which the best timber has been cut, is worth only from $2 to $8 an acre. Some land, next to the railroad siding, and all containing a little barite was bought at $60 per acre. One ten-acre field near Potosi has yielded a royalty of $200 per acre each year for 10 years, and a neighbouring field, which is supposed to be just as good, is still farmed and held in reserve. About 400 miners are supported wholly by the barite industry, besides those engaged in hauling, etc. So far as I could ascertain, these men do practically no farming, although it is so stated in the books.

2. Mining Operations.—A little barite is still produced from mines extending below water-level into bed-rock, but only when associated with enough lead to pay expenses. The small scale of this work, and the inexpensive farm plant form a striking contrast to the great mines at Flat River, a few miles east. Each shaft usually follows a vertical fissure until a cave is reached, when a drift only 3.5 or 4 ft. high is driven along the little horizontal stringer of galena and barite, which is commonly less than 6 in. thick and carries about 25 per cent. of the lead. Deposits having a cave above or below are naturally preferred, since the cost of blasting is reduced, and in addition large crystals of galena frequently occur on the surface, from which they are easily cobbed off. The little ore-streaks are followed as long as they nearly pay expenses, since they sometimes lead to large and profitable bodies of ore.

Most of the barite is dug from the residual clay. The common plan is to sink a pit, 3 ft. in diameter to a depth of from 6 to 9 ft., to the first lean clay below the upper barite-layer. The miner then selects the richest side of the shaft, which he digs out beneath the upper clay, which is rather barren for from 3 to 6 ft. below the surface. In this way, he "drifts" as far as he thinks is safe, usually from 4 to 8 ft. Up to this stage, all of the clay, flint and barite loosened is hoisted in a small bucket by a primitive hand-windlass; but the miner usually sorts out the barite, which he recognizes from flint only by its greater weight, since it is completely covered with tough, red clay. When the first drift is finished, all the waste from the new drifts is shovelled into it, and the miner digs other drifts wherever the ground looks good, so that the working soon resembles an inverted mushroom.

When the first hole is finished, another is started in the direction that looks the best, at such a distance that the safe drift backward will just connect with the old workings and give a little ventilation. The second hole is exhausted as before, and a third one dug beyond. This plan produces a more or less regular row of pits, and gives rise to the theory of leads. When a lean place is struck the lead is said to have given out, and another row of holes is started, until finally they are scattered over an old field like the squares of a checkerboard, and perhaps one-half of the barite is removed.

I have heard of no accident attending the mining, and since many of these holes remain open for many years, in spite of the rain, it seems probable that the length of the drift is not limited by safety, but rather by the distance reached by daylight, and the greater convenience of working near the shaft, which about balances the labour of sinking a new pit with the ordinary amount of covering. Owing to the tendency to imitate, the size is the same whether there is 2 ft. or 6 ft. of barren cover.

When the upper layer of barite has been exhausted, or the field is very rich, the pits are sunk deeper. In summer, when the ground is cooler than the air, the ventilation is poor, so that the pits are seldom deeper than from 15 to 18 ft. In winter they go to bed rock, or sometimes more than 30 ft. These deeper pits are often worked like the others. The more intelligent miners generally drive drifts from 4 to 6 ft. high for 8 or 10 ft. in three directions, and connect the ends so as to leave pillars. The roof is then caved or stoped upwards and the waste left on the floor. As the space fills up, and the old workings are approached, the area is decreased. The new pit is sunk so close to the last forward drift that but little drifting is required to make the air connection. The connection-drift is often stoped from the second shaft. By careful work, four-fifths of the area covered by the row of workings can be mined; but since the drifts are stopped wherever the ground looks poor, and the pillars are larger than the drifts, and the stopes decrease in size upwards, more than one-half or two-thirds of the ground is seldom mined. Since one row of pits is driven without regard to the others and a good deal of a pillar must be left between rows, at the best, only a small percentage of the barite is recovered. Indeed, so much is left, that I saw no field of pits which was said to be worked out.

As the price paid for mining increases, men will dig around among the old workings, in spite of the annoyance of striking old drifts, even where the pits have been sunk to bed-rock. This shows that much barite is lost between the pits. There is also a loss due to the irregularities in the surface of the bed-rock and the caving-in of unfinished holes by rain. Since the miner leaves the poorer parts, the loss of barite is not as great as the percentage of ground unworked. In a field rather carefully worked to bed-rock, it was roughly estimated that half the barite was lost.

While one man digs the barite, his partner or wife stays on top to work the windlass and with a small tomahawk-shaped hatchet cleans the barite of the clay, the worst iron-stain, and any flint that may adhere to it. In summer a rough sun-shade of branches is built.

Most of the clean barite is in lumps, weighing from 3 lb. (large fist-size) to 20 lb., and the finer stuff is thrown away, except near the railroad. Here the small pieces at the top of the barite pile are piled upon the ground, where the weather loosens some of the clay. This barite is later cleaned in a tumbling-barrel or "rattle-box" and shipped as second grade on account of the larger amount of iron-stain upon it. The rattle-box, shown in Fig. 3, is a strong box, 18 by 30 in. by 10

in. deep, with a slat bottom and the ends thickly studded with strong spikes driven through from the outside. On the sides are uprights of 2-by-4-in. pieces, forming legs 1 ft. long and handles 3 ft. long. From 100 to 150 lb. of small and thoroughly-dried barite is shovelled into the box, which is then rocked upon the feet by two men. When the end of the box strikes the ground, the barite is thrown forcibly against the spikes until all the clay is knocked off and falls through the slats.

The miners receive from $1.60 to $2.75 per ton for cleaned barite, and by working 6 hr per day a pair will usually earn from $6 to $7 in 5 days. Since they can live a week upon this amount, they seldom earn more than $8in a single week, and when a rich spot is struck they spend the time loafing and drinking up the excess earnings. When the ground is lean they work longer.

The miners are usually the most ignorant "gumbo French," and speak no language but their own French dialect, and therefore resist any change in the system of mining. Their scheme has the advantage of all "gopher" mining, that the minimum of barren material need be handled. When the over-burden is thick, this method is probably as good as any, if controlled by an efficient superintendent who would see that the pits are regularly spaced, except where there are real leads. The drifts could generally be higher and longer with advantage.

The Point Mining and Milling Co. installed a pneumatic cleaning pick and mechanical washer, and tried to buy un-cleaned barite at a lower price. By having one top-man for two diggers, the miners earned more money upon this basis; but they did not want to work in threes, and, according to the old arrangement, the top man has plenty of time to clean the barite. Therefore this machinery is not now used.

Some of the better farming land will not be released for barite-mining, since the pits and dumps ruin the land. Occasionally the top layer of barite in a small field is mined out rapidly and more systematically, and the miners are required to put the waste material into the pit immediately behind. When the larger stones are put in first, this mining improves the land.

In two or three cases fields having but little stripping were mined by advancing a trench 6 ft. deep across them sidewise. This method gives much better recovery, and affords a good opportunity of placing the best soil on top and would be used oftener, except that it is hard to get the miners to work for day's pay, and constant supervision is required.

One large company, now bankrupt, wasted a good deal of money upon a traction engine and wooden-rail tramways for hauling, in competition with the Missouri mule in his own home. At the time of my visit, uncleaned barite was mined by day-labour, the clay washed off in a patent trommel-washer, and then the iron and flint chopped off by hand. This system gave a considerable saving, even though the work was inefficiently managed. A little saving was probably due to the greater richness of the newly-opened field, but the method is hopeful.

At the Duffy farm a big company undertook to work for barite hydraulically. The exact arrangement of the sluices could not be determined. On the gentle hill-side above the reservoir is a pit 40 by 80 ft. and about 10 ft. deep to bed-rock. Everything seems to have been well constructed, but the method soon failed for lack of water and of fall to remove the tailings. A little trouble also arose from the depressions in the bed-rock. There are but few places in this field where there will not be trouble with tailings. So it is apparently better to abandon sluices, hydraulic the material over a grizzly, pick out the barite, and remove the tailings by some sort of elevator. The tough clay is hard to handle by water, and labour is so cheap that labour-saving machinery may not pay.

The engineer of the Point Mining and Milling Co. was thinking of mining the residual soil with a steam-shovel, running it through a trommel to shake loose the clay, and carrying the refuse to the dump by belt conveyer, from which the barite should be picked by hand. This system would be especially adapted to the thicker level deposits. The daily output would be very great, and a large crew of pickers would have to be organized, and there would be some expense in handling the tailings. Since much of the land will yield from 125 to 250 lb. of barite per cubic yard of soil, and the cost of mining uncleaned barite by present methods is about $1.50 per ton, this system shows a margin of from 10 to 20 cents per cubic yard for handling by steam-shovel, which is not especially attractive. In localities where water is available, it might be better to treat the soil in a modified log-washer, and pick out the partly-cleaned barite.

In most places the best method of mining seems to be to strip the barren cover with plows and scrapers, and mine the rest with pick and shovel, as is done in Tennessee and in central Missouri, where the deposits are smaller and richer. It had not been tried in Washington County previous to 1905.

Preparation for the Market.

1. The Barite Mill at Mineral Point.—Previous to 1905, most of the barite of Missouri was prepared in the mill of Nulsen, Klien & Krausse, and some by J. C. Fink Mineral & Milling Co., both of St. Louis. The former has a department for making floated barite, resembling that of the new mill at Mineral Point, but a second-grade pigment is also made from unbleached selected barite. These mills are not in Washington County, and it seems better to omit a discussion of them, since they are similar to many other mills which have been previously described.

During 1904 the Point Mining & Milling Co., invested about $150,000 for barite-land and what is claimed to be the largest wet-process mill in the United States. Its capacity is about 35 tons of finished product per 24 hrs., or allowing for delays, about 10,000 tons per year, the mill was designed by W. R. Macklind, who has kindly given me the following data.

The barite is weighed upon a platform-scale and shovelled into the ore-house, which has a horizontal air-drill with chisel point for cleaning the flint and iron from the barite when this is not done by the miners.

From the ore-house the barite is shovelled into an 11-by-16-in. Blake breaker below the floor, which reduces it to pieces of 1in. size. It is then elevated to a 30ton bin at the top of the room, whence it is taken to three modified log-washers in series, in which nearly all of the clay is removed.

The washed barite is wheeled across the floor to two Macklind "slip"-mills or modified arrastres, through which a large stream of water flows, and floats the fine barite over the edge of the pan. This milky water is raised to the top of the mill by a 4-in. centrifugal pump, and fed through a small screen into 12 iron spitzkasten, 4 by 4 ft. in size. The oversize is drawn off through

spigots at the bottom of each box and returned to the slip-mills. The fine barite overflows opposite the entering stream into one of 8 settling tanks, 7 by 9 ft. in size. The clear water is siphoned from these tanks and returned to the slipmill. The thick, cream-coloured barite mud, which contains but 25 per cent. of water, is drawn off through 4-in. plug-valves and a rubber hose to one of 20 bleaching-tanks on the ground floor below.

The required amount of 66 per cent. sulphuric acid is added, and the mass ignited and kept at the boiling-point by a jet of steam introduced through a lead pipe. When the barite becomes white it is drawn off through a plug-valve in the bottom, and raised by an acid-egg to the first of the three Macklind continuous decantation-washers, in which nearly all of the free acid is removed. From the bottom of the last washer the barite is drawn off to one of two settling-tanks, 2.5 ft. deep and 10 ft. in diameter. Here as much clear water as possible is siphoned off and the barite let down into a storage-tank provided with an agitator to keep the barite mobile, since it contains but 15 per cent. of water.

From the storage tank the barite flows to a Macklind continuous automatic drier. A screw-conveyor collects the pellets of barite below the drier and delivers them to a belt-elevator supplying a bin above a Williams hammer-mill which pulverizes these pellets. The product is packed in 100-lb. duck sacks, and stored in a warehouse of 3,000 tons capacity.

The mill is driven by an 18-by-36-in. 200-h.p. Fulton-Corliss engine, running at 75 rev. per min., and supplied with steam at 100 lbs. per sq. in. pressure, by two 72-in. by 18-ft. return-tubular boilers. There are a feed-water heater, duplicate feed-pumps, etc. A 35-kw. direct-connected Westinghouse unit supplies current for lighting the mill, and a Curtiss belt-driven compressor supplies the compressed air.

Besides the superintendent and office-man, there are 12 labourers at $1.50 a day on the two shifts, two slip-mill men at $2, one bleacher at $2, two engineers at $2.50, and two firemen at $1.75, all working 12-hr. shifts. At the time of my visit the mill had not been operated long enough to get reliable data of costs and details of operation were being constantly improved. The cost of manufacture is somewhat high.

Much of the machinery is standard and need not be described. Each unit of the washer consists of a 12-in. screw-conveyor, 10 ft. long, inclined at an angle of 20°. The housing of the conveyor is arranged to hold the water-level high enough to cover two-thirds of the length of the screw. Above this the barite, while being stirred by the screw, is sprayed with about 25 jets of water, ⅛ in. in size, under a 45-ft. head. The edge of the screw-conveyor has a V-shaped notch, 1.5 in. deep, every 4 in., which allows a larger part of the fine material containing the most clay to flow back and be rewashed. At the lower end of the conveyor a strong jet of water washes the mud and a little of the finest barite over the edge of the housing. The barite is fed upon the lower end of the first conveyor and discharged from the top of the last one. These washers have a capacity of about 120 tons of barite in 24 hrs., and consequently are not operated continuously. Each unit requires about 40 gals. of water per minute.

The slip-mills were designed and patented by Mr. Macklind. Briefly, each mill consists of a tub of steel, 10 ft. in diameter and 3 ft. high, which is paved with carefully-cut blocks of Missouri granite. Over this pavement are dragged four granite blocks, roughly triangular, 36 in. on a side and 18 in. thick when new. A heavy three-armed cap is clamped to the top. This cap has four holes about 6 in. apart along the leading side, and the dragging-arm is frequently changed from one to the other of these to change the direction of the drag and prevent corrugations in the bottom of the stone. Once in about 60 days the cap is loosened and the stone turned to present another leading-edge, which makes it wear evenly. At such times the bottom of the stone is rounded slightly. The stone should last for three years, but the wear on the bottom of the mill is about twice as rapid, and is, of course, greatest at the periphery. About once in two years the bottom will have to be raised or renewed.

Among the new features of this mill are an unusually heavy spider, and an arrangement of a weight and lever, like a safety-valve, by which any fraction of the weight of the spider can be transferred to the stones. This is adjusted to suit the different grades of barite. The weight-pin can also be lengthened to allow for the wear on the stone. The rest of the weight of the spider is carried upon a ball-bearing toe-piece raised above the water.

In the old-style mills, trouble was caused by the tendency of the charge to form a self-supporting ring between the stones, which would then rub upon the bottom and wear more rapidly, and even at times break the gear or spider on account of the rapidly-increasing load. In this case the mill had to be stopped and the ring laboriously broken by hand. Mr. Macklind corrected this difficulty by providing the main shaft with a ball-bearing collar, which can be raised 6 in. by steam or compressed air piston. This also raises the stones, and the water soon causes the ring to collapse. It seems that this difficulty would be avoided if the distance between the stones were made greater by decreasing their number or increasing the diameter of the mills. according to the Mexican style. Mr. Macklind's scheme, however, has the incidental advantage that when the stones are raised the spider can be easily revolved by hand for inspection or repairs or for cleaning out the mill. In starting up it can also be brought to its normal speed of 20 revolutions per minute by hand, so a simple positive clutch can be used on the gear.

When the mill is grinding properly, the stones tremble or chatter noticeably, and the gearing runs without noise. When one of the stones begins to rub on the bottom the groaning of the gear should be immediately noticed by the attendant, who then raises the spider for a moment. The mills should have about 8 in. of barite in the bottom, and the attendant sounds them with a rod to determine the need of more feed, but of course soon learns how rapidly to shovel in the barite. At 20 rev. per min. each mill has a capacity of from 15 to 18 tons per 24 hr., but generally 12 or 13 tons is ground, and this output determines the capacity of the entire plant. About 15 h.p. is required for each mill.

The water flows through this mill at the rate of 100,000 gal. per 24 hr. This large stream of water may be necessary to provide for an increase in the capacity of the mill, but since more than 40 h.p. is required to raise the water 45 ft. to the separating tanks, it does not seem to be as economical as increasing the number of mills. The number of spitzkasten was increased in order that the floated barite should be fine enough. It is said that this fine barite was examined with a microscope, and the largest pieces were small enough to go through a 300-mesh sieve. The stream is divided

equally among all the boxes, and enters through a fine screen to reduce the agitation. This screen also removes a few small pellets of clay and chips of wood. There is also a vertical screen in the middle of the box to prevent the formation of eddies.

The bleaching tanks are lined with three lengths of 36 in. sewer pipe without bells, and four special tiles form a cone-shaped bottom. They are made waterproof by an 8 lb. hard-lead covering on the outside. The hydrostatic pressure is resisted by oak staves and iron hoops outside the lead. The tanks are charged with 2 tons of settled barite, containing 25 per cent. of water, and a minimum of 240 lb. of 66 per cent. sulphuric acid is added. The acid is received in tank cars, and costs a cent a pound. It is run into a large steel storage tank, from which it is pumped by an acid-egg to an elevated lead-lined tank; thence it flows through lead pipes and valves to the bleaching-room on a level with the top of the bleaching tanks. Here it is handled and measured in a small lead-lined tank car. After the acid is added, steam is run into the bottom of the tank to agitate the mass and heat it to nearly the boiling point. At first, lead-lined iron agitators were used, but they wore out very rapidly. The tile lining of the tanks protects the lead from all mechanical wear, and it soon becomes coated with lead sulphate.

It requires about 45 min. to heat the mixture, and the best quality of ore can be bleached in from 6 to 7 hr.; but since there is plenty of tank capacity, the bleaching is always continued 12 hr. or more. If the bleaching is not finished in 12 hr., more acid is added; but it is unsafe to reduce the amount below 120 lb. per ton, on account of uncertainties as to the ore. No attempt is made to save the unused acid. To tell when the bleaching is complete, a 2 oz. bottle, full of barite, is compared as to colour with a standard sample.

The bleached barite is drawn off through lead-covered plug-valves in the bottom. The handling of this hot, thick, heavy, and corrosive material has proved very troublesome. It has been most successfully pumped to the washing tanks by a very heavy acid-egg.

These washers, designed by Mr. Macklind, consist of lead-lined iron tanks, 10 ft. in diameter, 19 ft. high, having a cone-shaped bottom. In a lead cup above the centre of the tank the bleached mud is mixed with a strong jet of water, and then distributed by a flat lead cone to the circumference of the tank and discharged upon baffle-plates. In the centre of the tank is a bottomless lead cylinder, 8 by 8 ft., inside of which the water rises so slowly that all the barite settles out, and only clear acid water is discharged to waste through a lead pipe at the surface.

From the bottom of the first washer the barite passes to a similar one 3 ft. lower. From this it goes to a third one still lower. Since, with this head, the heavy settled barite would not flow from the bottom of one tank to the top of the next, the current is maintained by a strong jet of wash water directed upwards in the discharge pipe. (A similar arrangement might be serviceable in elevating the thick barite from the bleaching tanks.)

All the acid should not be removed, or the barite will immediately turn a light yellow; the end-point used to be determined by a slight acid taste, but the washing is now continued until there is no taste, but the iron sulphate remaining in solution will give a slight blue colour with potassium ferrocyanide, thrown upon the last spreading cone. When this does not show, the quantity of wash-water is reduced. The reason for the change of colour when no acid is present is not understood. This acid prevents the use of floated barite for weighting rubber and paper, but for paint it is not objectionable. If the settled barite mud at the bottom of the washer has 50 per cent. of water, this leaves about ⅛ lb. of acid to the ton of barite; if it has 100 per cent., which is more likely, 1 lb. to the ton will be left.

The wash-water is filtered through six sand-filters, 36 by 60 in., and is obtained from a small creek by a separate pump. The general mill supply is filtered only when very muddy.

The essential part of the Macklind drier is a cylinder of wrought iron pipe, 36 in. in diameter and 8 ft. long, revolving one and a half times per minute, and heated inside by live steam. Upon this cylinder the barite is dropped by a plate shaken 200 times per minute by a cam. The thick, settled barite mud is fed upon the shaker-plate in fine streams 4 in. apart through pin-valves from the feed-trough, which contains an agitator to prevent packing. The drops of barite falling upon the hot drum are soon dried and are scraped off by a plate after nearly a full revolution. This scraper leaves a thin layer of strongly adhering barite, which prevents discoloration from the iron. The live steam enters through a stuffing-box at one end, and the condensed water is drawn off through a siphon-pipe in the other trunnion and circulates through coils along the side of the housing, and dries whatever barite is spattered off by the boiling pellets.

To prevent the accumulation of air in the cylinder, some steam is drawn off through a straight pipe entering through the siphon and carried to the bleaching tanks.

The finished barite is tested for colour by putting a spatulaful upon a glass plate beside a standard sample, smoothing it down beneath a piece of paper, and comparing as to colour. It is then moistened with turpentine and again compared. In this way it shows as white as a standard sample of white-lead, which had a slight buff color, but not as white as good zinc oxide, which is blue in comparison. The product is tested for grit by rubbing it with a spatula upon soft glazed paper, which should not be scratched. Barite which contains flint will be apt to show more grit when floated, since the equal-falling grain of quartz is so much larger than the heavy barite. Barite ground between burr-stones gets grit from the mills. In the wet-process mill, in which the barite is ground before bleaching, hard iron or steel could be used in the mill and the pigment would be entirely free from grit if the barite contained no quartz.

Barite, on account of its prismatic cleavage, forms a "sliver" pigment rather than a granular one. These slivers mat together in the paint, and since barite is slightly harder than the other pigments, it forms a more durable paint. It is also entirely unaffected by weather, and does not dissolve like zinc, or blacken with sulphur like lead.

White-lead is said to saponify linseed oil. At any rate, after a few years, a pure white-lead paint will chalk and rub off, leaving the surface in good shape for a second painting. So far as known, zinc is not used alone, but if the paint contains too much barite it peels off and a second coat of paint will not stick. The mixture of white-lead and barite pigments is therefore better than either one alone. Some of the peeling may be due to inferior oil.

When barite is sufficiently ground it will spread well. The chief objection to it is its translucency and

lack of covering power. This deficiency is best corrected by zinc oxide, which has the greatest covering power. Some of the paint men therefore say that an equal proportion of the three pigments makes the best paint. The unfortunate feature is that usually good barite costs less than a cent a pound, while the other pigments cost 6 or 7 cents, so that much of the prepared paints contain too great a proportion of barite, up to 60 per cent.

Very little barite is now used in making fine book paper, since the weight of a book is no longer considered an advantage, and fibrous talc is used instead. Its use in rubber goods seems to be a trade secret.

For making barium salts a very inferior barite can be used, but most of this chemical manufacturing work is done in Europe. There would be a big demand for barium oxide for treating boiler water containing much calcium and magnesium sulphates, but it is not yet supplied cheaply enough in the United States.

CANADIAN MINING INSTITUTE—WESTERN BRANCH.

The seventh general meeting of the members of the Western branch of the Canadian Mining Institute will be opened at Vancouver, British Columbia, on Friday Morning, February, 25, 1910.

Members are requested to rendezvous at the Hotel Vancouver at 11 o'clock on that morning, when the place of meeting will be announced and the business be commenced forthwith.

Business Agenda—

1—Reading of Annual Report of Secretary of Western Branch.

2—Appointment by Chairman of meeting of Scrutineers to examine ballots for election of Chairman of Branch for the year 1910. Result of ballot to be announced before the final adjournment of meeting.

3—Routine Business, if any, at pleasure of meeting.

4—Reading of papers and discussion of these and other suitable subjects.

It is proposed to discuss several papers presented at previous meetings, also any other matter bearing upon the Mining and Smelting industries of the West that shall be brought before the meeting. The suggestion is made that mining for placer gold, copper, iron and coal being of particular interest in the Coast District, these have the attention of the meeting. Members can easily make the meeting both interesting and useful by taking part in conversational discussions on such subjects. Expressions of opinion relative to the advantage or otherwise of gold recovered in Western Canadian mining districts being purchased by the Federal Government are also invited.

The provision of facilities for the early development of the mineral resources of Northern British Columbia is another important subject worthy of attention.

Ballot for Members of Branch Council—This will not be taken until after the result of the next Annual Election of Members of the Council of the Institute shall have been made known. Ballot papers will be sent to all members of the Western Branch next month (March) after it shall have been ascertained who of the Western members are members of the Council of the Institute and consequently ex officio members of the Branch Council. In this connection it is respectfully requested that if a ballot for Members of Council of the Parent Institute be taken, all Western Members will make a point of marking their ballots for the six Western Candidates and returning them to Montreal in ample time to be effective.

Finances—The Branch Council has been informed that nearly one-third of the Western Members are in arrears with their annual dues. Members are reminded that if dues be not promptly paid, the work of the Branch is hindered, since it is only entitled to a proportion of the moneys actually received by the Treasurer of the Institute, Montreal, from Western Members.

Please Note.—That all members of the Canadian Mining Institute in good standing residing in Western Canada and neighbouring parts of the United States are by virtue of such membership, also members of the Western Branch. Members are earnestly requested to make an effort to attend the ensuing meeting, and are cordially invited to contribute papers or notes on suitable subjects, and to take part in the discussions at the meeting. Non-members taking an interest in the objects and work of the institute will also be welcome, both to attend and join in the discussions on papers, etc., submitted.

E. JACOBS,
Secretary of Western Branch of the Canadian Mining Institute.

Victoria, B.C., February 1, 1910.

MINING IN AINSWORTH AND SLOCAN DISTRICTS.

By E. Jacobs.

The total quantity of ore produced by mines in Ainsworth and Slocan parts of West Kootenay District in 1909 was approximately 150,000 tons, in the proportion of 104,000 tons from mines in Ainsworth division and 46,000 tons from those in Slocan. The larger producers in Ainsworth division were the Canadian Metal Company's Blue Bell mine, on the east side of Kootenay Lake, opposite the town of Ainsworth, 60,000 tons; the Whitewater and Whitewater Deep, 28,000 tons; and the Selkirk Mining Company's Cork mine, on the south fork of Kaslo Creek, 15,000 tons. There were fifteen other shippers, ranging from 320 tons down to only a couple of tons, the latter of dry ore rich in silver. In Slocan division, the Van Roi Mining Company produced rather more than 28,000 tons; the Lucky Jim, 5,000 tons; the Consolidated Mining and Smelting Company's Richmond-Eureka and associated Summit mines, approximately 3,500 tons; the Standard, on Four Mile Creek, 3,000 tons; the Hope mine of the Ruth Mines, Ltd., group at Sandon (including both silver-lead and zinc concentrates), about 2,000 tons, and the Rambler-Cariboo in excess of 1,000 tons. The smaller shipping mines numbered 18 or 20, with an output of 668 tons for the highest down to half a dozen tons of high-grade dry ore for the lowest. The aggregate tonnage above shown does not agree with that appearing in other ore production statistics recently published, the reason being that in some instances the figures now given include

ore mined and not shipped, but stored for milling later when facilities for concentrating it shall have been provided at mines at present without them.

It will be noted that the information already given relates to less than 50 mines, but there are others upon which development work was done during the year which did not ship any ore. If the total number of properties upon which mining was done in 1909 be placed at 70, say 30 in Ainsworth and 40 in Slocan division, it will be well within the mark. Further, the total value of the mineral production in 1908 is on official records as: Ainsworth division, $422,181; Slocan, $676,580; total, $1,098,761. The estimated value of that for 1909 is: Ainsworth, $932,134; Slocan, $1,073,080; total, $2,005,214. The latter indicates an increase of 82.5 per cent. in total value, and this notwithstanding that the difference in average prices at which the respective calculations were made is against 1909 to the extent of nearly 14,600.

That there is a distinct improvement in the condition of the mining industry of Ainsworth and Slocan mining divisions is known to those who are well informed concerning the situation to-day, but it has over so long a period been the custom for those not possessed of the facts of the case to take it for granted that the available mineral resources of these parts of the West Kootenay district are practically exhausted, that the gradual yet substantial improvement in the position which has marked recent years has not been recognized by more than a comparatively small minority of the general public, even in the Kootenay district itself. However, production statistics should convince the most sceptical, so they are now quoted, and it should be kept in mind that, save for the year 1909, which have been estimated by the writer after careful enquiry and compilation, they are official, having been taken from the Annual Reports of the Minister of Mines for British Columbia. They are as under:—

Year.	Ainsworth.	Slocan.	Total.
1905	$100,273	$970,544	$1,070,817
1906	268,111	532,228	800,339
1907	364,868	619,842	984,710
1908	422,181	676,580	1,098,761
1909 (estimated)	932,134	1,073,080	2,005,214
Totals for 5 yrs.	$2,087,567	$3,872,274	$5,959,841

These figures show that in 1909 Ainsworth mining division more than doubled its highest previous year's record (that of $440,545 in 1897), while those for Slocan are greater in total value than those of any other year since 1904. It should be explained that zinc and marble to a total value of about $280,000 were included in the estimate of the value of the mineral production of Ainsworth division in 1909, but even after making allowance for these there remains an increase of approximately $212,000 over the previous high record in total value—that for 1897. But since prices fluctuate year by year, the most satisfactory comparison is that of quantities of metals produced, and these are exhibited in the next following tables:—

Ainsworth Division.

Year.	Silver, Oz.	Lead, Lb.
1905	99,781	1,002,114
1906	165,915	3,173,353
1907	301,322	3,654,775
1908	314,142	4,790,216
1909 (estimated)	494,350	10,748,220

Slocan Division.

1905	1,045,948	5,399,330
1906	571,613	2,975,674
1907	590,998	4,305,826
1908	848,595	6,572,268
1909 (estimated)	1,005,603	6,297,897

The respective prices at which value was calculated for the several years were as under:—

	Silver, per oz.	Lead, per lb.
1905	57.33 cents	4.24 cents
1906	63.45 "	5.09 "
1907	62.06 "	4.80 "
1908	50.22 "	3.78 "
1909	49.00 "	3.80 "

To show the difference varying prices make, it is pointed out that the total value of the silver and lead produced in the Slocan in 1909 would be approximately $225,000 more if calculated at the average prices for those metals obtained in 1906, which were the highest average prices in the five years under notice, than is shown as the result of the calculation at the average prices for 1909. This would appear to make evident the greater reliability of a comparison of quantities of minerals produced in different years rather than of values, since the latter fluctuate, as shown above.

Zinc Smelting Problem of Moment.

The early solution of the problem of how to utilize at profit the large quantity of zinc ore occurring in the Kootenay, particularly in Ainsworth and Slocan districts, is of much moment to local mine owners, for zinc is found in considerable quantity in most of the larger mines. Usually it is in association with lead, and in some mines there is also much iron. Indeed, so complex are some of the ores that the separation of lead, zinc and iron cannot be effected by the ordinary water concentration process prevailing throughout the district under conditions and on a sufficiently large scale to make operations in this connection profitable to mine owners. Hence the community of interest and unity of recent action in urging upon the Dominion Department of Mines the great importance of the Federal Government making provision for prolonged object of determining how the zinc ores of Canada can be profitably treated.

Several mining companies operating in the district under notice have already overcome some of the difficulties that earlier were in the way of the zinc content of their respective ores being made marketable, but there are many others, and among them numbers of owners of properties that, so far as yet developed, are comparatively small, whose mining operations are practically at a standstill consequent chiefly upon their inability to profitably utilize the zinc ores, or the zinc content of the silver-lead-zinc ores occurring in quantity in their mines. The chief exceptions are the Lucky Jim Mining Company, which possesses much zinc ore of such a nature as to admit of its being sent to the smelteries without having to first be put through any concentration or separation process; the lessees of the Whitewater group; the Ruth Mines, Ltd., and the Van Roi Mining Company. These were the only British Columbia shippers of zinc ore or concentrate as a marketable product during the year 1909. It is probable two or three others will be added to the list in 1910, for both the Payne and Slocan Star have zinc-saving appliances installed in their respective concentrating mills, and it is hoped the Canadian Metal

Company's Blue Bell mill will also shortly produce a saleable zinc product as well as a lead-silver concentrate. The Van Roi Mining Company plans to make provision in the mill it is preparing to build and equip for separating the zinc from the other metal contents of ore from its Vancouver group of mines, and in doing this the management will have the benefit of the experience gained in operating the Wakefield mill on its ores, for the company worked that mill under lease during 1909, and is still operating it, until such time as the Silverton Mines, Ltd., shall require possession of it to treat ores from its Hewitt-Lorna Doone group, in which mine there is also much zinc ore.

The companies and mines named above are but a small minority of those deeply interested in the zinc ore treatment problem, the satisfactory solution of which would result in a transformation as regards the output of ore from Ainsworth and Slocan. That the difficulties now in the way of zinc ores being mined generally throughout the district will eventually be successfully overcome, those chiefly interested are hopeful of. Meanwhile developments of new processes and improvements in old methods of treatment are of almost universal interest to local mine owners, who expect that it will yet be profitable to turn to good account the zinc ores that have heretofore been found a detriment and a loss.

THE HISTORY OF STEVENS' COPPER HANDBOOK

Written for the Canadian Mining Journal by Horace J. Stevens.

[Editor's Note.—The following sketch was written at the request of the Canadian Mining Journal. The Copper Handbook occupies a unique place in periodical literature. It is almost inconceivable that it is the product of one man's labour. This, however, is literally true. We consider the subjoined history inspiring and interesting.]

Like many other works of reference, the Copper Handbook had a small and most casual beginning. While I have lived in the Lake Superior district since boyhood, I did not locate in Houghton until 1894, and then, as I was writing about the local copper mines, I soon felt the need of reliable data regarding the local properties. This I found to be scattered through a great many different publications, with many a hiatus between. The best works of reference regarding the local mines were the annual reports of the Michigan Commissioners of Mineral Statistics, but this having been a political office, some of the commissioners neglected to issue annual reports, and the statistics were very incomplete.

Finding that there was no work published that would meet my requirements, I began collecting data for myself, and filing same in some sort of system. It occurred to me that a pamphlet, giving bare facts regarding the Lake Superior copper mines, would meet with favour, and the first man with whom I talked over this idea was the late Jas. B. Sturgis, of Houghton. Mr. Sturgis approved of the idea warmly, and suggested that I prepare and print a pamphlet, immediately, embodying this material. I did not feel, however, that the data at hand were sufficiently complete, and continued collecting and collating and filing material.

During the big copper boom of 1898-99, Messrs. Russel and Hornstein, of the Marquette Mining Journal, decided to print a pamphlet on Lake Superior copper mines, and requested me to prepare the historical and statistical sections. I explained that I was too busy to attend to the matter, and furthermore would be absent, but Mr. Hornstein assured me that, relying upon my collaboration, they already had committed themselves to the printing of such a pamphlet, and in fact had sold about 15,000 copies, before bringing the matter to my attention.

By reason of old friendship, I prepared short historical and statistical summaries for the publishers of this book, writing under great disadvantages, in Boston, while my reference library and files were in Houghton. The publication issued by the Marquette Mining Journal bore the somewhat ambitious title of First Annual Review of the Copper Mining Industry of Lake Superior, making 189 pages, in demy octavo, set in brevier type, of which about 75 pages were written by me, this book being issued in the spring of 1899.

In 1900 I advised Messrs. Russell and Hornstein that I had been gathering matter for six years for a copper



J STEVENS.

manual of my own, and they advised me that they had no desire to issue another edition of the Annual Review of the Copper Mining Industry of Lake Superior, as that work had been sold mainly in quantities, to brokers and promoters. A few weeks later, Mr. Jas. Russell was appointed Commissioner of Mineral Statistics of the State of Michigan, and requested me to act as his deputy and prepare the annual report. This I did, arranging with Mr. Russell that the copper section of this report should be reprinted and copyrighted by myself, individually, as a separate book, and, this being done, the copper section of the report of the Commissioner of Mineral Statistics for 1900 became Vol. 1 of the Copper Handbook.

The exigencies of politics separating Mr. Russell and myself, as his deputy, from the pay-roll of the State of Michigan, after eighteen months only, although the usual term is two years, I prepared, without payment therefor, and Mr. Russell printed at his own per-

sonal expense, a second annual report to the State, but this had no connection with Vol. II of the Copper Handbook, which since 1901, has been an entity.

The first volume dealt with Lake Superior mines only, and its arrangement left much to be desired. Vol. II was put out in somewhat better form as to arrangement of matter, and the two chapters in Vol I, devoted respectively to idle and active mines of Lake Superior, were consolidated, and, in addition, several short preliminary chapters were given, devoted to the history, chemistry, mineralogy and metallurgy of copper, with a glossary of common mining terms and a chapter devoted to the copper deposits of the world. There also was a chapter, of 13 pages only, devoted to leading foreign mines, and a chapter of 68 pages devoted to American copper mines outside of Lake Superior, while Chapter X included various statistical tables.

With the issue of Vol. III, the work was put into substantially its present shape, though the number of preliminary chapters has been added to since, and all copper mines were treated in alphabetical order, regardless of location. While this plan has serious disadvantages, on the whole it is considered the best system for presenting the descriptions of the various properties. In Vol. 111 the number of titles of mines was 2231, comparing with 6767 titles in Vol. VIII, the last edition.

The preliminary chapters have been re-written and amplified for several editions, but not for each successive issue, the preliminary chapters in Vol. VIII being the same as in Vol. VII, but the long chapters, devoted to mine descriptions, and that pertaining to statistics, have been re-written for each edition, with the exception of Vol. VII, issued in 1907, in which case the mine descriptions remained unchanged from the previous issue owing to the loss of about half of that year through an unfortunate combination of fire, sickness, surgical operations, and unavoidable absence.

As an average of nearly fourteen months has been required for each edition of the book, all of the work being done by myself, notwithstanding the general impression that I have a large number of assistants, Vol. VIII, dated 1908, was issued only May last, and, in order to catch up with the years, I find that it will be necessary to issue Vol. IX with merely a revision of the statistical chapter, and the addition of a short chapter giving descriptions of new properties, which will be about 1,000 in number. This will not be altogether a satisfactory book, but it seems the only way out of the unfortunate situation in which I find myself placed, as I cannot afford to allow an annual to miss a year's issue, and it will require nearly a year to revise completely the full mine descriptions. All old subscribers will be notified of the shortcomings of Vol. IX before its issue, as was done with Vol. VII, which, for reasons already given, was not up to the usual standard.

The annual average of the world's gold production jumped in the year 1721, and continued abnormally high until 1810. After the latter year it fell to the mark set before 1721. The annual average for the period 1701-1720 was about $8,520,000. For the period 1721-1810 the world's production fluctuated between $12,000,000 and $16,000,000. During this period of 90 years the placers of Brazil were contributing hugely to the world's stock of gold.

CORRESPONDENCE.

Editor The Canadian Mining Journal,

Sir,—In The "Journal" of February 1st, there was an unsigned article entitled "The Nickel Industry." It would deserve no attention except that it contained certain mis-statements identical with those made on January 19th, before the Mines and Minerals Committee at Ottawa. The Committee now knows that the statements were incorrect.

What is the motive that prompts such inaccurate statements? If accurate information about the industry is desired, it is not difficult to obtain, and will show that the world's annual consumption of nickel is not 18,000 tons; that there is not an agreement between producers to keep up the price of nickel; that the profits of the International Nickel Company are not and never have been $3,000,000 per annum, and that there is not a combination or monopoly that prevents others embarking in the business.

The article in question indicates that there is some sentimental feeling for the Sudbury nickel deposits, but its false statements, whether made through ignorance or sentiment, are mischievous.

Yours truly,
A. P. TURNER, President,

The Canadian Copper Company, Copper Cliff, Ont.
February 10, 1910.

Toronto, February 4th, 1910.

Editor Canadian Mining Journal, Toronto:

Sir,—It is with great pain and reluctance that I take up the pen to pass strictures on your evident lack of appreciation of the relative importance of accuracy as compared with piquancy of diction. But the divergences from "Reason's dusty way" are too frequent, and I feel I must call you back. In your last issue, February 1st, p. 67, the amount of land in arrears for taxes and subject to forfeiture in the Kenora and Rainy River District was given you as 86,779 acres, or 45% approximately (i.e., of the area in those districts subject to taxation), whereas the figures printed in that issue were 4,072 acres, or 29%. This is quite a noticeable difference. A glance at the statement published would show that it is incorrect and does not agree with the amount given before as the total area.

I think I know the reason; you have been influenced too much by the advice of the poet quoted below. Could you not in future strike a better balance between accuracy and fancy? The poem is by an unknown, and was suitably illustrated by a representation of a sage and a beautiful maiden, which you can no doubt picture to yourself. Personally, I rather admire your taste for showing a preference to the maiden:

Grau ging und grämlich der Verstand
Den Weg der Theorie,
Da nahm ihn lachend bei der Hand
Die blonde Phantasie.
Sie zog das Buch aus seinem Rock
Und schüttelte ihr Blondgelock
Und war so hübsch wie nie.

Er wollte ihr zürnen könnt'es nicht
Sie schien so wunderbar
Er sah ihr kindlich Angesicht,
Und strich ihr übers Haar
Und leichter rascher ward sein Schritt,
Sie zog ihn nach sie zog ihn mit
Bis er am ziele war.

This has been translated by Dr. Ellis as follows:—

With weary footsteps Wisdom trod
In Reason's dusty way,
When Fancy, with alluring nod
Once tempted him away.
Laughing, she snatched away his book,
Her golden curls she gaily shook,
Ah, who so fair as she!

Who could resist such winning grace?
Her beauty charmed his soul.
He gazed into the childlike face,
His arm about her stole.
And lo! his weariness was gone,
She led him up, she led him on
Till he had reached the goal.

Yours, etc.,
G. R. MICKLE.

CANADIAN PATENTS.

The following is a list of Canadian patents granted on Jan. 25, 1910, relating to mining and metallurgy, and furnished by Fetherstonhaugh & Co., 5 Elgin St. Ottawa, Canada, Russel S. Smart, resident, from whom all information regarding same may be obtained:

123345. W. H. Gregg, Cambridge, Ohio, safety apparatus for mine railway.

123360. A. R. Freedmann, Piqua, Ohio, shaft braces, The Pioneer Pole and Shaft Co.

123370. H. W. Bresler, Charlottenberg, Germany, processes of producing metallic tungsten.

123412. A. S. Dwight, New York, apparatus for roasting and suntering ore.

123428. W. Hancock, Township of Snowdon, County of Haliburton, Ont., composition of matter to be used for the purpose of a high explosive.

RESOLUTIONS ADOPTED BY THE CANADIAN COMMISSION OF CONSERVATION.

Resolution respecting waters and water-powers, adopted at the annual meeting, January 18-21, 1910:—

That in future no unconditional titles to water-powers should be given, but that every grant or lease of powers should be subject, among others, to the following conditions:—

(1) Development within a specified time.
(2) Public control of rates.
(3 A rental with the power to revise same at a later period.

Resolutions of Executive Committee.

At a meeting of the Executive Committee of the Commission of Conservation on February 2, 1910, the following resolutions were adopted:—

1. That a memorial be prepared and submitted expressing the opposition of the Commission to the proposition to dam the St. Lawrence at the Long Sault, or to any similar proposition involving the construction of a dam across the St. Lawrence.

2. That the meeting records its opposition to the export of power at Fort Frances being authorized by the Government.

PERSONAL AND GENERAL.

Messrs. Webb and Cooke, power specialists and industrial engineers, have taken offices at 338 Ellicott Square, Buffalo, N.Y.

Due to fast-increasing business, both the Chicago and Baltimore branches of the H. W. Johns-Manville Co. have outgrown their present quarters, and about March 1st both will move to new locations, with more room. The Chicago branch, now on Randolph Street,



PERSONAL RATHER THAN GENERAL.

will move to the four-storey-and-basement building at Nos. 27-29 Michigan Avenue, located in the block between South Water and River Streets. With 32,500 square feet of floor space, offices, store, and stock-rooms will all be under one roof, with ample room for all. A full stock of J-M products will be carried, thus assuring prompt shipments. The Baltimore office, store and warehouse will be located at No. 30 Light Street. Here the company will have considerably more room than before, and will keep on hand a large stock of J-M products, and will be in much better position than ever to give all orders prompt attention.

Mr. J. J. Harpell has returned to Harrow, England.

Mr. P. N. Nissen is in Toronto.

Mr. A. B. Willmott has moved from Sault Ste. Marie to Toronto, where he will have his headquarters for some time.

Mr. H. P. Davis is to address the Canadian Club, New York, on the evening of March 8th. The subject chosen is "The Development of Mining in Northern Ontario." Mr. Davis has arranged for a display of typical specimens from Cobalt, Porcupine and Gowganda.

BOOK REVIEWS.

Metal Statistics, 1910. Published by the American Metal Market Co., 81 Fulton Street, New York. Price 50 cents.

In this little annual are many useful statistics. Figures of production, price fluctuations, etc., are given for iron, steel, copper, tin, spelter, lead, antimony, gold and silver. Many other serviceable data are included.

The Mining Manual 1910. By Walter R. Skinner. Price $5. For sale by the Canadian Mining Journal.

We have given frequent notices of this invaluable manual. It is too well known to require more than brief mention for its new edition. Those of our readers who are unacquainted with the book will be surprised to learn that it contains particulars of 3,600 mining companies operating in all parts of the world.

To the consulting mining engineer Skinner's Manual is particularly necessary.

The Colliery Manager's Pocket Book, Almanac and Diary for the Year 1910. Edited by Allan Greenwell, editor of The Colliery Guardian. Published by the Colliery Guardian Co., Ltd., 30 and 31, Furnival Street, Holborn, London, E.C. Price $1, $1.25 and $1.50, according to binding.

For forty-one years the Colliery Manager's Pocket Book has made its annual appearance. In addition to an almanac, a very convenient diary, cash account, blank memoranda pages, etc., etc., much general information and statistics are presented. On such subjects as rescue work, estimation of noxious gases, and other pertinent topics, special articles are given. Numerous working formulae, tables for calculations, surveying data, have been included. Careful editing and selection are apparent.

The exceedingly moderate price of the volume puts it easily within the reach of all. Its usefulness is beyond question. The imprimatur of the Golliery Guardian goes far towards assuring the merit of any publication.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, Feb. 15.—The Dominion Coal Company's output for the first half of February amounted to 105,000 tons, being a daily average production of 8,800 tons. Banking-out coal was commenced in January, and despite the supposed state of strike it is expected to accumulate a fairly large stock-pile against the opening of navigation, which from present indications will be earlier than usual. The river ice in the St. Lawrence has been very light this year, and so far no drift-ice has made its appearance on the Cape Breton coast. Persons experienced in St. Lawrence navigation predict that the river will be open before the middle of April.

An accident which happened at Dominion No. 2 on the 14th proved once more the usefulness of the safety detaching hook. Owing to the loosening of a pin in the reversing gear of the Phalen man-engine, the descending cage with eighteen men aboard was dropped without proper control into the pit-bottom, while the ascending cage was drawn up into the head-frame, and safely suspended by the operation of the "butterflies." Two of the men in the cage sustained broken legs and six others received slight injuries and shock. The remaining ten men were uninjured.

The regular work of training at the Coal Company's Rescue Station has been seriously interfered with by the strike conditions, but the work has been resumed under the more normal conditions now existing. The company has just added to the equipment of the station twenty of the Hubbell type electric handlamps. Lamps of this type have been in use at the station for about two years past, and have proved satisfactory and durable.

The United States Government has recently ordered that apparatus for rescue work in mines and all the accessories connected therewith are to be placed on the free list and exempted from all Customs duties. This is a precedent which it would be well for our own Government to follow. Under a special Order-in-Council the duty payable under the tariff has been remitted in several instances on mine rescue apparatus, but at present it is necessary to make payment of duty charges on imported rescue apparatus—and it is necessarily imported, because no such apparatus is manufactured in Canada. Rescue apparatus for work in mines should come under the same head as fire appliances for fire brigades, or life-saving devices for humane societies, but the Customs authorities do not take this view. It is to be regretted that the coal-mining industry of Canada has not a representative in the House of Commons, who could lay this and many other matters which relate to the welfare of the industry before our legislators. Of some learned professions, notably the legal profession, the Legislature contains a superfluity, but the profession of the mining engineer is conspicuous chiefly by its absence from Parliament. Recent events in the United States have proved how useful and necessary some form of oxygen breathing apparatus is after a mine explosion. In most of the civilized countries of Europe—and in some that

we might here regard as more or less uncivilized—the provision of rescue apparatus at coal mines is made compulsory by law. This is not yet the case in Canada, although several requests have been made of late by coroner's juries that the same rule should obtain here. However, it would seem that the least the Federal Government could do to encourage the provision of these very necessary appliances is to exempt them from Customs duties. Any doubts which may arise as to the necessity and usefulness of oxygen rescue appliances can easily be dispelled by a perusal of the recent report of the British Royal Commission on Mines, which deals with this subject.

Another matter which is more open to opinion is the question of Provincial certificates of competency for mine managers and under-officials. At the present time each coal-mining Province will recognize only those certificates of competency which are issued in that particular Province. The Nova Scotian manager who goes to Alberta must sit again for an Albertan certificate, and so in every other coal-mining Province. It is to be feared that in many instances the granting of Provincial certificates is not in accordance with the best ethics of the mining profession, and this is so well-known that it is not necessary to particularize. Would it not be possible to issue certificates of competency from a central examining board under the direction of the Federal Government assisted by the faculty of the large Canadian universities? The examination would be a rigorous one, safeguarded by the usual qualification of experience underground and proper technical training, and possibly the application of such a certificate would need to be supplemented by a certain length of residence in the Province where it might be used. The present rate of expansion in the coal-fields of the West is going to drain the eastern mines of qualified men, and at the same time there is reason to believe that the eastern mines will before long see a great development. The free exchange of competent men from one Canadian Province to another should not be hindered by Provincial laws, unless there is very good reason for them, nor should the exigencies of the moment be allowed to bring into disrepute the value of certificates of competency.

The U.M.W. vs. the N. S. Coal Operators.—Mr. J. R. Cowans, the General Manager of the Cumberland Coal and Railway Company, and Mr. Alex. Dick, the General Sales Agent of the Dominion Coal Company, were committed to the Supreme Court in Halifax on a charge of conspiracy to limit the facilities for producing coal in Nova Scotia, to lessen competition and to unreasonably enhance the price thereof. The suit was brought against the two gentlemen named by a nominee of the United Mine Workers of America, and the costs of the prosecution have been paid by that organization. The magistrate refused to make public his reasons for his decision. It is probably sufficient for the public to know that this prosecution was instituted by the U.M.W. against representatives of the two coal companies at whose works the U. M. W. have called a strike. It is interesting to note in this connection that Mr. Tom Lewis the President of the U.M.W., is said to have made the remark at the Toledo Conference that the miners of the United States must have higher wages, and that if the price of coal was too low to give the operator a working profit, the price of coal must be increased. This is good logic in the United States, and it is good logic in Nova Scotia. The organization which sanctions a special reduction in the wage scale of United States coal mines in order to enable these same mines to compete with Nova Scotian coal in the Montreal market, while at the same time it calls a strike in Nova Scotia for higher wages and shorter hours accompanied by the prosecution above referred to, would seem to be run more in the interests of the American coal operator than in the interests of the miner either here or in the United States.

ONTARIO.

Kenora.—A meeting of the Prospectors' and Mine Owners' Association of the Kenora Mining Division was held on Tuesday, February 8th, at which a report of the By-law Committee was accepted. Amongst the new by-laws for the association the most important was that one making the dismissal of any member who made use of the association for wild-cat schemes compulsory. Its wording was:—

"Any member using the association for fraudulent purposes by false reports or otherwise shall be summarily expelled on a two-thirds vote at a special meeting called for the purpose."

The next important was that which called for the election of members by ballot.

Formerly the nomination of an applicant was all that was necessary for membership; however, the members saw the necessity of preventing the admission of persons of questionable business morals and adopted this by-law requiring each application for membership to be voted upon before such applicant could become a member.

These two by-laws show that the association is determined by every means in its power to prevent any wild-cat schemes in this district.

Mr. R. B. Nickerson, Manager of the Laurentian Mine, has been to the Mikado and made an examination of the surface workings and as much of the inclined shaft as he could. In his opinion the prospects were sufficiently good to warrant the pumping out of the mine, which work has been undertaken and is now in full swing, so that the end of the week should see it completed. Another examination will then be made and if satisfactory, work will be commenced at once, as we understand the necessary capital has been subscribed.

The report of a remarkable strike comes from Dryden, where an old prospector claims to have struck a four-foot vein heavily loaded with free gold. Several other claims have been staked on the same head and a good deal of work is going forward there at present.

Cobalt.—The big Temiskaming mill is practically completed and as soon as the power is ready it will start running. The rock-breaking end of the concentrator has been built next the head frame and is distant from the main part of the mill several hundred feet. The crushed ore will be transported to the concentrator by an aerial tramway, where it will be sized and then passed over the jigs. Some time ago a test was made on a carload of Temiskaming ore at the Trout Mills concentrator, and it was found that about 65 per cent. of the total silver contents could be extracted in the jigs. The management estimates that there is a year's supply of milling ore on the dumps and two years' supply in the mine above the 350-foot level. The shaft has now been sunk to a depth of 420 feet and a station is being cut at the 400-foot level. The vein dipped from the shaft to the east and a cross-cut will be run from the lower levels to cut it. Winzes have been sunk from the 300-foot level and the ore in the bottom is good. The annual meeting, which is to be held in Toronto shortly, will probably give rise to a good deal of discussion among the shareholders. Several large holders of stock in Buffalo have organized to send delegates to the meeting and have sent out circular letters to other shareholders asking them to organize in a similar manner and also send delegates. The object is to protect the interests of the shareholders and to obtain all the information possible about the affairs of the company. The low level that the stock has gone to lately has caused considerable uneasiness among its holders.

Several petitions have lately been circulated in Cobalt and the outlying districts with the object of trying to obtain a legal eight hour working day in the mines of Northern Ontario. It has been stated that few western miners would stay in this camp on account of the long hours worked. One or two of the mines work eight hour shifts, while several work nine

hours, but in the great majority of the mines a ten hour shift is worked. When these petitions have received a sufficient number of signatures they will be forwarded to the member for this district, who, it is expected, will bring the matter before the Legislature. For some time past there have been underground rumours of a strike among the miners next summer. This would be an unwise move on the part of the union, which is not in so good a shape as when the last strike was called. The Mine Managers' Association, which was responsible for the miners being defeated last time, is exceedingly well organized and can be depended on to put up a strong fight in the event of such a contingency.

Some time ago it was stated that the Buffalo had recommended work in an old drift that had been in the Keewatin when stopped. After a few rounds had been taken out the drift went through into the conglomerate again, and it was found that the Keewatin was simply an intrusion and that the valves reappeared in the vein in the conglomerate. Drifts have been run on the vein for over 200 feet in this new conglomerate area and the silver contents were found to be as high as ever.

During the month of January there was shipped from the Cobalt camp a total of 67 cars of ore, aggregating 2,054 tons. As compared with the same month the previous year, the shipments were about 400 tons less, but there are three more properties that are shipping concentrates, and this, though it cuts down the tonnage, raises the silver contents. One of the most interesting features of the shipments is the output from Gowganda, consisting of three cars, aggregating 92 tons. One of these cars, from the Reeves-Dobie, is stated to have been one of the richest ever shipped out of Northern Ontario. This district is beginning to make good and although it will never realize the extravagant promises that were made for it, a better attitude towards that country may be looked for. During the month the O'Brien shipped its first lot of bullion, amounting to 29,000 ounces.

The engineer sent up by the Dominion Government to look into the damage done by shooting out the falls in the Frederickhouse River, reports that navigation in the bodies of water affected is hopelessly ruined. Father Paradis, one of the pioneers in the country, cut through the falls in the river, and this caused the water in Frederickhouse and Night Hawk lakes to be lowered about eight feet. The engineer states that he does not consider the Dominion Government to be in a position to take any action in the matter.

As the result of a conference between the Mine Managers' Association of Cobalt and Mr. E. T. Corkill, provincial inspector of mines, it has been decided to petition the Dominion Government to order an inspection of all dynamite, fuse and caps used in the province. This action was determined by the alarming number of accidents that have been occurring in the mines. It was decided to petition the Dominion Government in preference to the Provincial as the former is in a much better position to carry out tests. A great many of the accidents from explosives can be traced to the use of gelignite. This blasting compound is entirely untrustworthy in cold weather as it is particularly sensitive when it is frozen. The advantage in using it lies in the fact that it is much more powerful than common dynamite and is comparatively free from noxious gases when exploded.

The Nipissing Company is again working its famous 49 vein that was at one time the wonder of the camp. Development on other portions of the property are also very satisfactory, especially at No. 64 vein, which is a continuation of one of the Hudson Bay's main producers. When this vein was first encountered it showed thirty inches of ore that would run 2,000 ounces. Although the vein as at present opened up does not show this width there is a large body of high grade ore that will aid materially in helping to swell the resources of the company. The Nipissing is in an enviable position as regards resources, and has an immense territory, a large portion of which is as yet practically unexplored.

The Bartlett mines will be completely reorganized and work resumed in a short time. The stockholders who actually paid cash for their stock will be recognized, but others will not. This property will at last have a chance to make good, although it is handicapped by an excessive capitalization. When work was stopped the main shaft was down about 115 feet. The vein left the shaft at about 40 feet, and when the cross-cut was run from the bottom of the shaft to cut it the values were found to be very low. However, there are other good showings to be opened up and the rest of the property is practically virgin ground. The Blackburn mine has shipped another carload of high grade ore aggregating twenty tons. Negotiations have just been concluded for one of the most important options ever given in the Gowganda district. An English syndicate has taken an option on the Morrison claims, which are owned by the Northern Mining Company. The option is for only a fifty per cent. interest and the price to be paid if the option is taken up is $200,000. The syndicate is to spend $100,000 in developing the property, which has one of the most sensational surface showings in the north country. The present owners do not receive anything unless the option goes through, as the $100,000 is to be spent entirely on the property.

In diamond drilling toward the Drummond boundary the Crown Reserve cut two new veins at a distance of 190 and 420 feet, respectively, from the No. 2 cross-cut. The core showed native silver and a large extent of mineralized area. The veins were cut about 150 feet below the surface.

The White Reserve Mine, in Maple Mountain, has cut veins Nos. 6 and 21 in a cross-cut at the 140 foot level. Another dividend of 300 per cent. has been declared by the T. & H. B., this making the second for the year. Up to date this company has paid a total of 15,700 per cent. on an issued capital of $7,761.

Porcupine.—Interest in this district received a great impetus when it was learned that the Timmins had taken up their option on the Hollinger-McMahon properties in Tisdale township. The first payment of $15,000 has been made and the total purchase price is $300,000. Already a plant has been ordered consisting of two 60 horse-power boilers, two hoists, a five-drill compressor, drills, etc. The main shaft is down forty-two feet and a drift is being run on the vein which shows free gold at that depth. When the machinery is installed the shaft will be sunk to a depth of 100 feet before any work is done. The fact that this option has been taken up will have a very beneficial effect on the district and many sales have been reported. As a general thing, however, the prices at which the claims are held are ridiculously high, but in the spring a more normal state of affairs may be expected and more properties will probably change hands. Additional discoveries of free gold are being reported constantly, but in the majority of cases these rumours may be heavily discounted. A good deal of trouble has been experienced by prospectors on account of thieves stealing their supplies, which is a very serious matter in a country such as that. In some cases camps were broken into and everything portable stolen. Some provincial constables have been sent up lately and matters have much improved. By an order-in-council the Provincial Government has withdrawn all lands under Night Hawk Lake, Frederickhouse Lake and all the lakes adjoining the townships of Whitney, Tisdale and Mountjoy. The Government has also provided for a right-of-way for a branch line from the T. & N. O. should the conditions in Porcupine warrant it, and by an order-in-council the surface rights over a right-of-way 99 feet wide have been reserved.

BRITISH COLUMBIA.

Rossland.—The situation here remains about the same as it was as the year was ushered in. The mines are working stead-

ly and shipping an average tonnage with the possible exception of the Velvet, which cannot ship at present owing to the snow having melted from the road.

The report of the Le Roi Mining Co. for the fiscal year ending Sept. 30th, 1909, has come to hand, and shows a small profit despite the adverse conditions under which the property was operated for a period of the time reviewed. The amount of ore shipped by the mine to Northport smelter during the part of the year that it was operated amounted to 26,935 tons, which carried an average of .642 ounces gold, .33 ounces silver, and .85 per cent. copper. The report shows that the cost of mining, including depreciation on its large plant and considerable development, was $9.21. Smelting and realization was $6.02 per ton. It may be pointed out here that this is $4 or $5 higher than the average cost of mining at the Le Roi when working full force, and was caused by the property only being worked a part of the year and then not shipping heavily. For instance, in 1907 the figures ran $4.04 and $5.98 respectively. For the year in question £20,712 7s 1d was written off for exploration and development; £10,378 8s 4d for depreciation on machinery, plant, etc., and £2,935 13s 4d for sundry items, making a total of £34,026 8s 9d. The amount carried forward to the credit of profit and loss is £79,331 6s 10d, so there is a surplus of assets over liabilities of £29,758 6s 3d, and this is exclusive of mine and smelter. The Le Roi Company is handling a difficult and perplexing condition of affairs in a commendable manner, and it is hoped that the results of the energetic campaign that is being waged will be such that the company will be placed in a much better position than it enjoys at present. During the first five weeks of the year the Le Roi has shipped nearly 2,000 tons of ore to Trail smelter, and diamond drill exploration on the lower levels has been in steady progress—lately with two machines, one having been laid off a while ago. Two feet of $85 ore has been opened up on the 600-foot level and a three-foot shoot on the 1200-foot level.

Work on the Mayflower, in the South belt, which is under lease, has disclosed some good shipping ore, and the lessees will make a small shipment to Trail smelter in the near future.

Boundary.—The ore shipments from the Boundary district are close to the 200,000-ton figure for the first five weeks of the year, the Granby, Mother Lode, Snowshoe, and Oro Denoro being the principal shippers.

At the Rawhide mine of the New Dominion Copper Co. good results are being obtained in the diamond drilling and preparations are now being made to begin shipping shortly. Buildings, crushers, conveyors etc., are being arranged so that the ore can be handled at least possible expense. It is proposed to do some diamond drilling on the Brooklyn mine of this company as soon as the work has been driven to the desired point on the Rawhide.

Permission has been granted to the liquidator of the Dominion Copper Co. to call a meeting of the creditors. The application of the agent of the New Dominion Copper Co. to have the liquidator discharged has been set aside. The application of the liquidator to be permitted to take action against the directors of the company in the Supreme Court of New York was held over. It is to be hoped that the affairs of the old company will in the end be equitably adjusted. It seems that the liquidator is doing all he can toward this end and just now is making good headway.

The B. C. Copper Co. is going to try and place a profit-sharing scheme before its employees, in an effort to do away with labour dissatisfaction. This plan is now being worked by several large corporations on this continent with success and it is thought that it would steady conditions locally to some extent. Stock in the company at a low enough price to warrant a good return on the investment may be offered, or else a sliding scale of wages will be adopted, which will work to a finer degree than the sliding scale now in force, which only covers "abnormally unfavourable," "normally favourable," and "abnormally favourable" metal mining and marketing conditions. The Conciliation Board is sitting in Greenwood this week to adjust the existing difference between the company and its men. The annual meeting of the company will be held in a few days at Charleston, W. Va., when it is expected that action on several important matters will be taken and a probable change made in the directorate.

The compressed air plant is working at the Greenwood-Phoenix Tram. Co. tunnel and 22 men are employed. Driving will be continued now at the rate of about 12 feet per day.

Nelson.—It is rumored that something is likely to be done to further develop the rich iron deposits controlled by the Canadian Pacific Railway east of Kitchener. Over $50,000 has already been expended on these deposits. Several Crow's Nest capitalists have had a steel plant in mind for this section of the country for a year or two, and it is highly probable that their plans will be realized at no late date.

One of the Spokane shareholders in the Sullivan Group Mining Co. is suing that company for the return of $500 that he paid for stock in 1906. He alleges that the company's financial statement was fraudulently prepared, and that instead of having a cash deposit of $9,000, an operating profit of $138,000, and a net gain of $102,000, that the company was bankrupt. The events of the last 18 months would appear to bear out this contention for the affairs of the company are in poor form. The mine is now being operated under lease and option to the Consolidated Co., and has shipped 435 tons of ore in the last two weeks.

At the convention of the Associated Boards of Southeastern British Columbia, recently held in Nelson, the following resolutions which affect the mining industry to a greater or less extent, were adopted: Government operation of telephones; that the Dominion of Canada purchase gold and silver for coinage from the Trail refinery on the basis that the United States purchases through its assay offices; that the Dominion of Canada coin silver dollars; for a uniform Canadian boiler inspection act; that the Department of Mines conduct experimental work toward determining the practicability of economical treatment of the zinc ore of this district; that the Provincial Government abolish the personal property tax.

Everyone who has ever had to handle some of the filthy one dollar bills that are circulating in this country is in favour of the coinage of silver dollars, and, of course, this would help the silver mines of the Dominion to some extent. Canada certainly should have a uniform boiler inspection act. The existing conditions are more or less of a farce, the thing having gone altogether too far in some of the Provinces. The regulations in British Columbia, and particularly in Alberta, not only work a hardship on the manufacturers but on the mine owners as well, and the general feeling in the matter among mining men of prominence here in the west is that the thing has got to be made uniform and rational.

Vancouver—In view of the bright outlook for the Coast mines this year an American syndicate has taken over the old Van Anda smelter and will fit it up to treat a tonnage of 150 tons per day. A new oil-burning process is planned.

It seems a foregone conclusion that the Ingenica and Manson-Slate Creek districts are not what is generally termed "a poor man's district." Several hundred samples taken by one prominent hydraulic miner in that district show the ground to carry $2.65 per yard and over, exclusive of values that might be contained in the black sand content.

It looks as though the coming spring and summer would see wonderful activity on Vancouver Island, the Queen Charlotte Islands, Portland Canal, Telkwa, Babine, and others of the new north-western districts.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—The Dominion Antimony Mines, West Gore, Hants County, are being worked for English interests. The old dump is being concentrated. Little more than pumping is being done, so far as the mine is concerned. Picked ore from this property contains $40 or $50 in gold to the ton.

Halifax, N. S., Feb. 18.—The announcement was made at Glace Bay to-day that D. H. McDougall, Superintendent of Mines of the Steel and Coal companies, has been appointed assistant general Manager from this date.

J. H. Plummer, President, and C. S. Cameron, Comptroller of the Steel and Coal Companies, left Sydney yesterday for Montreal, and will be absent about a week or ten days.

ONTARIO.

Port Arthur.—Silver ore is being bagged at the Porcupine mine. Twenty men are working and more are to be hired immediately.

Cobalt.—Assessment Commissioner Frank Kennedy estimates the present population of Cobalt at 5,500, and in a statement of the town's finances, estimates the town debt at $122,000; assessable property and income, $1,484,376. The estimated revenue last year was $58,887, expenditure, $59,662. The total assets are $1,554,000, while the taxes in arrears amount to $25,000.

Cobalt.—The Watts property on Cross Lake have just completed another shipment of ore. It consisted of 21.6 tons of concentrates and high-grade, slightly richer than the average run from the mill.

Cobalt.— February 22.—In spite of the inadequate power at the Savage mine, two new veins have been cut in the last month's work and progress has been made in the process of converting the property from a prospect into a mine.

Two days ago No. 5 vein was cross-cut 26 feet north of No. 4, and some time ago No. 4 vein was struck in the first cross-cut run from No. 3 vein. Both veins have been opened up since the beginning of the year. All three veins, Nos. 3, 4 and 5, run parallel. No. 4 is 44 feet distance from No. 3, and No. 5. is 26 feet north of No. 4. At the 85-foot level, No. 4 is 2½ inches wide and No. 5 is about an inch wide. Both veins carry about 1,200 ounces average, and there is a considerable amount of milling rock on either side of the vein. As these two veins appeared on the surface, as merely fissures with no values, the discovery of ore in them at depth is very satisfactory. Four more fissures, identical with No. 4 and No. 5, appear on the surface, and under the circumstances, it is extremely probable that these will also make ore at depth.

The sorting plant at the Savage is completed and only waiting for the power. It consists of a jaw crusher, an elevator, a sizing trommel and for the fines, a Wilfley table, for the next two sizes, hand sorting tables. It is estimated that it will treat 75 tons a day and the tails will only run about 15 ounces.

ALBERTA.

The annual meeting of the shareholders of the Western Coal and Coke Company, was held yesterday, when the following directors were re-appointed: E. B. Greenshileds, Senator Mackay, J. B. Ferguson, Charles Fergie, H. A. Lovett, J. McConnell, G. B. Woods, J. N. Lake and J. E. Woods. The managing director, Mr. Charles Fergie, reported that development work was making rapid progress, and that the mine would be in a position to produce 800 to 1,000 tons a day by the end of the year, also that the coal was of excellent quality and had recently been tested by the Canadian Pacific Railway Company on their engines with satisfactory results.

At the subsequent meeting of the directors, Mr. J. B. Ferguson who had held the office of president for the past two years, resigned the office owing to ill-health, and the fact that he would be somewhat out of touch with the head office, as he now resided at St. Catharines, Ont. Mr. Ferguson nominated M. E. B. Greenshields, who is largely interested in the company, as president. Mr. Greenshields was elected by unanimous vote, and Hon. Robert Mackay and J. B. Ferguson were elected vice-presidents. Mr. Chas. Fergie was re-appointed managing director.

BRITISH COLUMBIA.

Portland Canal.—Mr. Joseph Perrault, a veteran prospector, has bonded the O. H. fraction in Portland Canal district to a Victoria syndicate for $75,000. The property adjoins the group of the Portland Canal Mining Company. It is said to have several large ledges of silver-lead ore. The Victoria syndicate will start development work early next month.

Victoria.—Mackenzie and Mann have apparently worsted the C. P. R. in a move for the Dunsmuir coal mines. Before May 1st the mines in all probability will become the property of the Canadian financiers, who have developed such wide interests in this country in the past few years. A C. P. R. option has expired and now the other interests have but to make good to acquire the whole of the coal fields with the mines now working.

It is said that Mackenzie and Mann are backed up in this latest enterprize to which they have turned their attention by no less a financier than J. P. Morgan, and the alleged interests of J. J. Hill. To such an extent is Morgan allied with the proposition that it is said that the $11,000,000 which Mr. Dunsmuir is to receive is to be paid over in actual cash.

The acquisition of the mines is to be followed by further extensions. The output is to be increased very materially just as fast as the work can be done. There is also included in the scheme of development on this coast, the erection of steel works which will provide for a considerable output from the mines, and at the same time develop the resources of the province.

The expenditure is further developing the mines and accessory enterprizes will, according to the plans in view, represent an expenditure of an additional $5,000,000 or more. At the present time Mackenzie and Mann are developing from small beginnings, a smelter near Port Arthur, on Lake Superior, a smelter, which those qualified to understand, say will be one of the best of its kind in America within a short time. The intention of the firm is now to enter the field on the Pacific coast and build up a vast enterprize.

Some months ago, in a newspaper interview, D. D. Mann stated that if no such works were provided here before he and his partner became factors on the coast, they would erect one. Apparently the opportunity has presented itself to this firm sooner than they expected, and the work will begin almost at once.

It has long been known that the C. P. R. was willing to acquire Mr. Dunsmuir's coal mines. It is believed, in fact, that that company regarded them as destined eventually to come into their possession. Procrastination on the part of the directors, however, although at times the dealings went so far as obtaining options, resulted in the prize passing from their hands and the acquisition of it by rival financiers.

Phoenix, Feb. 8.—The Granby mines at Phoenix, shipped 112,458 tons of ore to the Granby smelter during the month of January, which is the largest output of the mines in any one single month. This tonnage forced the ore receipts at the

Granby smelter up to the high-water mark of 115,084 tons, of which amount 2,626 tons were from foreign properties.

During the month of January about 108,000 tons of ore were treated at the Granby reduction works, an average of about 3,500 tons per day. Only six furnaces were in operation during the greater part of the month.

The ore receipts at Granby smelter for January were as follows: Granby mines, Phoenix, 112,458 tons; Snowstorm, Coeur d'Alenes, 958 tons; Belcher, Republic, 1,220 tons; Duluth, Toroda, Republic, 10 tons; Copper King, Republic, 53 tons; Ben Hur, Republic, 112 tons; Lone Pine, Republic, 21 tons; South Republic, Republic, 21 tons; Arlington Slocan, 20 tons.

COMPANY NOTES.

PETERSON LAKE SILVER COBALT MINING CO., LIMITED.

Toronto, Feb. 15th, 1910.

To the Shareholders, Peterson Lake Silver Cobalt Mining Co., Limited:

Gentlemen:—Since the last report to shareholders, made on November 27th, 1909, the Board of Directors under authority given them by the special meeting of shareholders of October 6th, 1909, have pressed on to trial the several actions that were then pending against the Messrs. Steindler and Mr. Jacobs and against the Nova Scotia Mining Co. After the trial of the first action had proceeded for some time the company's claims against the Messrs. Steindler and Mr. Jacobs were settled by the payment over by these parties to the company of $50,000, together with $3,000 towards the company's costs and by the return of 160,000 shares of stock to the treasury. This settlement of the matter was made upon the very strong recommendation of the presiding judge, who, in fact, assisted in it to the extent of acting as arbitrator upon the question of the amount of stock to be returned. Your directors were also much influenced in making this settlement by the advice of counsel. While it may seem a very modest return to be made to the company for the large amount of the company's stock that was improperly issued out of the treasury, yet your directors felt that it was their duty to give great weight to the consideration that too exacting demands would mean prolonged litigation involving retarded development and the risk of all the chances attending a battle through the courts. The settlement arranged has been carried out and your directors feel confident that while some individual shareholders may be disappointed who bought shares in the company in the expectation of a rapid rise on the market as a result of the litigation, yet the great body of shareholders who bought their stock on their faith in the company's property and who have continued to hold it in the expectation that with honest and competent management the shares would become intrinsically of much increased value, will agree that the action of the Board was in the best interests of the company and a business-like arrangement of a situation that gave serious concern to the many experienced and conservative men interested in the company's welfare.

The action of your company against the Nova Scotia Silver Cobalt Mining Co. was tried on the 20th day of January, 1910, and argued on the 1st day of February, 1910, and is now standing for judgment. The Nova Scotia Co. during the progress of the trial conceded their liability to pay to this company a 25 per cent. gross royalty instead of 25 per cent. net as had prevailed under the old management. This basis will apply to former shipments as well as to the future.

The result of the litigation apart from the claims against the Nova Scotia Co. is that the company will have a sum in the neighbourhood of $58,000 in the treasury in cash and the return to the treasury of 160,000 shares of stock, making a total of shares in the treasury at the present date of 598,180 shares and 2,401,820 shares in the hands of the public. The treasury stock alone at the present market value would realize to the company $149,795, but the present management have not found it necessary so far nor is it their intention to encroach on this reserve.

Your president has, in view of the discovery of rich ore in the Little Nipissing lease (the vein of which has a strong indication of running into the Peterson Lake unleased lands), called for the sinking of a shaft on the island in the Peterson Lake Co. property midway between the shaft of the Susquehanna Mining Co. and that of the Union Pacific Mining Co., to a depth of 150 feet, and feels that in view of the latest developments that there is a strong possibility of finding the Little Nipissing ore body on sinking and drifting from this shaft and your directors now feel that it is time for the Peterson Lake Co. themselves to develop their own ground.

The Little Nipissing Mining Co. have uncovered a very rich vein, and on the first day of February last the Peterson Lake Co. shipped a car of ore consisting of 199 sacks of first grade and 509 sacks of second grade ore, which ore has been shipped to the O'Brien Smelter at Deloro, Ontario, for treatment. The Peterson Lake Co. are entitled to 25% of the gross proceeds from this car of ore and from all indications on this lease another car of ore will be ready within a very short time. A contract is at present in consideration for the shipment of a car of screenings the result of development on the Little Nipissing lease to a New York smelting firm, and this ore will be shipped in the name of the Peterson Lake Co. The Little Nipissing Co. have sunk their shaft to a depth of 165 feet and have made drifts covering a distance of 1,819 feet all at an expense of about $62,186, which ultimately must enure to the benefit of the Peterson Lake shareholders.

The Susquehanna Mining Co., who are operating and developing block A, B, C, and D, Lot 14, of their leased ground in Peterson Lake have sunk their main shaft 200 feet and have done drifting in all 490 feet and have spent in the neighbourhood of $37,058 up to this date, all of which must eventually enure to the benefit of the Peterson Lake shareholders.

The Kerry Mining Co. have done shaft sinking amounting to 393 feet and have done drifting work covering 1,187 feet and erected a plant, etc., all at an expense of over $74,688, which also must enure to the benefit of the Peterson Lake shareholders.

The Gould Consolidated Co. have done about 200 feet of shaft sinking and over 200 feet of drifting, but at present, on account of the lack of power, have stopped their work, which will no doubt be resumed with more vigor when power is installed.

The Union Pacific Mining Co. have developed their leased ground by a shaft 148 feet, which must also enure to the benefit of the Peterson Lake shareholders. This Company are also waiting for installation of power.

The St. Anthony Mining Co. have sunk a shaft 200 feet and done drifting work about 25 feet, all at an expense of $10,227, which must also enure to the benefit of the Peterson Lake shareholders. This company are also waiting for installation of power.

The Cobalt Leasors have done considerable amount of trenching and diamond drill work on their lease, all at a considerable expense, but have stopped work on account of lack of power.

In the Peterson Lake Co., as matters now stand, there are 2,401,820 shares issued out of a total capitalization of 3,000,000 shares. They are selling on the market at approximately 25c., giving a net market value of Peterson Lake property to-day of $600,455. This divided by the acreage (213 acres) gives a market value per acre of $2,819. The Nipissing Mining Co. have issued 1,200,000 shares which have a market value of over $10 per share. At $10 per share the value of the Nipissing property would be $12,000,000, and having an acreage of 846 acres would give a market value of $14,184 per acre. Since the Peterson Lake ground is almost entirely surrounded by Nipissing ground there is only one reason why this difference of $11,365 per acre should exist between the two companies. This difference is no doubt due to the undeveloped state of the Peterson Lake ground. If Peterson Lake ground were developed as fully as the Nipissing ground there is a strong possibility that the two properties should have an equal value per acre. The undeveloped state of the Peterson Lake ground to-day is due to lack of proper management in the past and there is every reason to believe that the progressive campaign of development mapped out by the present Directorate will expose ore bodies equal to those in the surrounding properties.

The Consulting Engineer of the Company is constantly supervising the work of the Lessees and the interests of the shareholders are being protected to the fullest extent. The Directors consider that the leasing system, in view of the result in other mining camps, is the best policy to pursue in the initial development of the Company's large holdings, because of the fact that a small acreage is leased to individual persons on terms which make it imperative that the ground should be thoroughly prospected and developed which the company could only do at a great deal of expense.

The result of the leasing system is that your Company derive a royalty from any result of ore found of 25% and at the end of the term of the lease will have the property in its developed state turned over to them and all ore then remaining will become absolutely the property of the shareholders of this Company.

The Company has in all 213 acres of mining property of which a considerable portion is still unleased. That veins already discovered upon leased property will extend to the unleased portion is a reasonable expectation. There are also at other points on the unleased lands indications of value that appear to justify development and which it is hoped will result in valuable discoveries. It is the intention of your Directors with the funds now available to actively prosecute the work of exploration and development. With a practically assured income from various leases with only a slight outlay on the part of the Company this policy should commend itself to the most conservative shareholder and be a source of satisfaction to many who have waited a long time to see their faith in this property justified. Further reports will be made to the shareholders from time to time and with the support of the shareholders and a very moderate degree of good fortune the Directors will be able in the near future to put the Company on a dividend paying basis,

The President, A. F. MacLaren, and Directors, thank the individual shareholders for their support in the past and trust that their recent and future activity in the proposition will warrant the same support hereafter.

R. F. SEGSWORTH,
Secretary-Treasurer.

TRETHEWEY SILVER-COBALT MINE, LIMITED.

Editor's Note.—The gross returns from ore for 1909 are reported at $314,940.28; gross value of ore at smelters and in transit, (Dec. 31st, 1909), $73,612.32; totalling, $388,552.60. Deducting from this amount the smelter charges, freight and cartage, and assaying and sampling charges—$40,688.46—the sum of $347,864.14 is left. Miscellaneous receipts bring this up to $350,257.39. Operating expenses amounted to $141,852.30; head office expenses $6,697.45, (a creditably small item); directors' fees, etc., $1,900—making a total of $150,449.75.

The net revenue for 1909, therefore, was $199,807.64. During the year one dividend of 10% and one of 15% were paid, in all $244,545. A balance of $91,302.93 remained at the credit of the Company on Dec. 31st, 1909.

DIRECTORS' REPORT.

Submitted to the Annual Meeting of Shareholders held in Toronto, on Wednesday the 23rd day of February, 1910.

The balance of the capital stock of the company previously unissued, amounting to 54,550 shares, was sold during the year at $1.50 per share, realizing $81,825.00, being a premium of $27,275.00 over par. This fund, after providing for the building of a concentrating mill now in course of construction, and other capital expenditures in connection therewith, will leave a surplus for the general purposes of the Company.

Production.

The following shipments have been made during the year:

8	cars	First-class Ore	to Copper Cliff,	weighing	453,211 lbs
2	"	" "	Deloro	"	120,689 "
2	"	" "	Thorold	"	130,078 "
25	"	Second-class Ore	to Carnegie Pa.	"	1,594,249 "
			Total weight		2,298,227 "

Gross value of ore of all grades shipped	$388,552.60
Freight and treatment charges	40,688.46
Net Revenue from sale of ore	$347,864.14

Improvements.

The physical condition of the property has been materially improved during the year. In the rock-house an additional jig was installed, also dewaterizers; set of rolls; concentrating table, etc. An independent condenser and cooling tower have been added as auxiliaries to the power plant, whereby an increased efficiency has been obtained. All buildings have been painted and kept in good state of repair, so that the appearance of the plant on the surface has been greatly improved. A substantial machine and carpenter's shop has been built and equipped with machinery suitable for wood and iron work, operated by electricity obtained from a generator in the power house, which also supplies power to the pumping station at Sasaginaga Lake and for lighting the property on the surface and underground. The plant in the machine shop includes: Lathe of large size; press drill; bolt cutting and threading machine; double rip saw and crosscut saw; buzz planer and band saw. This machinery has been a very important factor in the construction of the concentrating plant, and provides an almost indispensable permanent equipment for the future economical operation of the mine and concentrator. An additional pump has been installed which will provide ample water for the concentrator and all other requirements. Precaution has been taken in the installation of the pipe line to provide a good flow system so that in case of fire the whole pressure from the pumps will be available, together with the flow from the tanks at the top of the mill. A transformer building is in course of construction in which the high voltage current delivered by the power companies to the camp will be stepped down to 550 volts before entering the mill.

Concentrator.

A modern mill of 100 tons capacity has been built, and a large portion of the machinery has been installed. This plant will be operated by electrical power, and will be completed as soon as the power companies are in a position to deliver power

for its operation, which will probably be during the month of April. The policy of your Directors in delaying construction of a concentrator until electrical power became available, will result in a very large saving in the cost of the Plant and in its operation. Inclined tramways have been erected to connect No. 2 and No. 4 shafts with the mill, so that ore hoisted at these points will go direct to the concentrator for treatment. It is expected that the quantity and quality of ore mined will be sufficient to run the mill at its full capacity without drawing on the ore now lying on the dumps, which will be held in reserve to supply the mill in the event of strikes or other unforeseen circumstances interfering with the operation of the mine. These reserves are sufficient to keep the concentrating plant in full operation for eighteen months, at an estimated profit of not less than $1,000 per day.

Development.

No. 1 Shaft. A drift has been run during the year on the 100-foot level a distance of 340 feet, connecting with the workings on the same level at No. 2 Shaft. Connection between the two shafts has also been made on the 50-foot level, both of which drifts are in good condition for hauling a large tonnage of ore to either shaft.

No. 2 and No. 3 Shafts. A considerable amount of cross-cutting and drifting has been done from these points, exploring a large territory with very gratifying results. Work is now being carried on at three levels.

The total amount of underground work to date is as follows:

Drifts and Cross-cuts	6,558 feet
Shafts	596 feet
Raises and Winzes	845 feet

No. 4 Shaft. A double compartment shaft has been sunk to meet an upraise from a depth corresponding to the second level of the Temiskaming and Hudson's Bay Mine near the north end of the property. It is now being timbered and fitted with a cage road. During the development work which has been carried on at this end of the property, four veins have been met with, three of which are of high-grade; the total drifting thereon amounts to about 750 feet, with about 60 feet of upraising. Assays taken from ore won while drifting showed values of from three to four thousand ounces per ton. It is interesting to note that the workings on the Temiskaming & Hudson's Bay Mine near the north line of this property are now down to 250 feet, and reported to be in good ore.

The development work conducted during the past year has demonstrated the fact that the veins on the property occur, for the most part, in the form of a net-work of small fissures in an immense zone of fractured rock, which has been more or less enriched in and near the cleavages by the deposition of native silver. The extent of this zone can only be determined as development work proceeds, but the work so far conducted at both ends of the property would lead to the expectation that the whole belt of conglomerate extending from the south line to the north line will be found to maintain the same characteristics. Should this prove to be the case an enormous tonnage of ore suitable for profitable concentration will be won from the property during the next few years. With the facilities now being installed a large and steady revenue may reasonably be expected from the occurrence of bonanza veins likely to be encountered as development work proceeds.

ALEX. M. HAY,
President.

Toronto, February 10th, 1910.

A Dividend of 5 per cent., with an extra dividend of 5 per cent., has been declared on Kerr Lake. Books close March 1st, and open on March 15th.

NOVA SCOTIA STEEL & COAL COMPANY.

A meeting of the Board of Directors of the Nova Scotia Steel and Coal Company was held at the Windsor Hotel, Montreal, President Robert E. Harris, presiding. There were present Hon. Jas. D. McGregor, Vice-President, Hon. Robert Jaffray and Messrs. Robert Reford, J. W. Allison, Jas. McGregor, W. D. Ross, R. E. Chambers and Thos. Cantley, Second Vice-President and General Manager. The General Manager's report reviewing the business of the past year was submitted and showed that the volume of business was the largest in the company's history. The President submitted the statement of assets and liabilities and profit and loss account, and the directors report to the shareholders showing the profits for the year 1909 to be $907,949, as compared with $734,701.53 for the previous year, an increase of $173,247.47. Another gratifying feature of the report was the fact that the sum of $184,453 for premium and commission on the redemption of the old and for the new issues of bonds has been paid out of the profits of the year. This is regarded as a very satisfactory showing. Other features that call for attention are that cash in the bank is now $207,029 and bills payable and cash advances are reduced to $607,458, compared with $999,109 last year. Thus there is almost half a million better showing than a year ago. This is made up of cash in the bank and reduction in bills payable. The balance carried forward to the credit of profit and loss account is $336,807.38

The sum of $362,653.27 has been expended during the year on capital account in the development of the submarine iron ore areas at Wabana and for improvements, plants, etc., elsewhere. During the early part of 1909 business conditions had not recovered from the depression, but in the latter part of the year the earnings of this company showed that conditions have attained their normal. The reorganization of the finances of the company authorized by the shareholders has been carried out. A new issue of $6,000,000 5 per cent. first mortgage bonds and an issue of $1,000,000 6 per cent. debenture stock were made; $3,500,000 of the bonds and $1,000,000 6 per cent. debenture stock were sold in Canada, and the two former issues of 6 per cent. bonds were paid off and cancelled. The balance of $2,500,000 of the bonds remains in the treasury. No portion of the premium on the retirement of the old bonds nor of the commission on the new issue has been changed to property account. The regular dividend of 2 per cent. quarterly has been paid on the preferred shares. The directors have declared further dividends of 1 per cent. on the ordinary shares and 2 per cent. on the preferred shares, payable on April 15 to shareholders of record on March 31, 1910.

It is understood that three of the present Nova Scotia Steel and Coal directors will retire in a few weeks, to be replaced by Mr. Rodolphe Forget and two of his associates, who have been buying large blocks of stock lately. This means that Mr. Forget has won the representation on the board which he has been aiming for by the recent heavy purchases of stock made by himself and a group of his supporters,

---

McKINLEY-DARRAGH REPORT.

At the annual meeting of the McKinley-Darragh Mining Company held in Toronto, the financial statement as well as the statement of the physical condition of the mine, was one of the best presented to the shareholders.

The most interesting item of the report is the statement of the manager P. A. Robbins when speaking of the total output of the mine for the year. The total output of silver for the year was 1,297,530 ounces, which is equal to the entire production of 1906, 1907, and 1908, combined. It may be noted here that the total tonnage for 1908 was ahead of the tonnage for 1909, but during 1909 nothing but high grade and mixed concentrates have left the camp.

On the first of last year the company had only a small mill treating about twenty tons per day. This was increased to an eighty ton mill and later in the year additions were made to bring this up to 120 tons per day.

The annual report shows gross receipts from sales of ore and other sources in 1909 of $639,442.03, including balance from the previous year of $46,419.95. From this was paid out for operating expenses and improvements $294,262.35, dividends aggregating $224,493.03, leaving balance on hand at the end of the year of $120,686.85. The balance sheet shows $120,758.62 cash on hand, ore at smelters $106,712.48 and ore at the mine ready for shipment of $10,558.80, with current liabilities of only $16,910.70.

At the present time mining is carried on only on a small scale at the Savage mine which is owned by the company. This claim is situated near the Gillies Limit on Cart Lake. The company is waiting for the power from the Montreal River to start up this mine.

Developments for the past year on this property have shown that considerable high grade ore has been blocked out. The annual report shows 755,000 ounces, which is a considerable improvement over the previous year's estimates. At the mine a large ore house has been erected containing crushers, jigs, tables, etc., and the company hopes to treat in the neighbourhood of twenty tons of its lower grade ore per day, recovering eighty-five per cent. by this method.

Underground work at the mine consists of a seventy-five foot shaft, known as No. 3 which is connected up on that level with its main shaft. Two veins underground show good native silver values, and very little exploration work has been accomplished. With the power from the Montreal River operating their workings, the management will immediately start a couple of drills on development work to look for new ore bodies, which are believed to exist in the neighbourhood of its workings.

At the McKinley-Darragh mine, at the south end of Cobalt Lake the company is working on four levels of the main shaft. Owing to the inadequate means of handling its ore until its new addition to its mill is in operation, the company has been confining its drills to prospecting work for the past few months. No stoping is being done, the ore for the mill being taken out in drifting on its ore bodies. It is estimated that underground blocked out, at the mine there is ore containing 4,973,000 ounces of silver. This like the Savage shows a big gain over the estimates given for the previous year.

At the present time Manager Robbins employs a force of over 100 men and six drills are operating underground.

SCOTIA REGULAR DIVIDEND.

The Nova Scotia Steel & Coal directors have declared the regular quarterly dividend on the common stock of 1 per cent., and 2 per cent. on the preferred stock, payable April 15 to shareholders of record March 1, 1910.

PORTLAND CANAL MINING COMPANY, LIMITED.

Extracts from proceedings of the Second Annual General Meeting of the Shareholders.

DIRECTORS' REPORT.

Your directors have to report that during the current year they entered into negotiations with a firm of underwriters, and the sum of $100,000 was secured to the company in return for a block of the company's shares.

The above capital was required for, and is being used in the installation of a concentrator, aerial tramway, water power plant and for general purposes of the company.

The concentrator and power plant are well under way and will be completed at an early date if the snowfall is not excessive. Had normal climatic conditions prevailed during the past season, the plant would probably have now been complete, with the exception of a part of the concentrating machinery, which has not yet arrived from the manufacturers.

The concentrator has been termed a 50 ton unit, but as our ore will only require coarse concentration we expect to be able to mill about 100 tons every 24 hours. The Tramway, which is of the Bleichert type, is now about completed, and will be 8,500 feet in length and bring ore from the mine at an altitude of 2,100 feet to the concentrator in Beaver River Valley. It can be equipped to transport 200 tons every 24 hours and will be utilized for conveying all supplies from the mill to the mine.

Our water power is a splendid asset, and will be ample for all requirements when we multiply the capacity of our concentrator, and this we expect to do at no distant date. The water is brought from the head of a waterfall in a 2 ft. by 4 ft. flume along the side of a canyon, over a trestle 70 feet high, across Glacier Creek and along the mountain side to the mill, a total distance of 1,400 feet, the effective head being 100 feet. Owing to the fact that there was a large tonnage of ore in the mine available for stoping, and our camp facilities were being taxed to their utmost capacity to provide accommodation for tramway employees and others, it was considered inadvisable to carry on an energetic campaign in the mine during the summer.

No. 1 tunnel was advanced 110 feet to a total length of 180 feet, 35 feet of cross-cutting was also done in this tunnel, which, with the exception of a few feet, where purely local distorted conditions prevailed, may be said to be all in good ore. No. 2 tunnel is 124 feet in length, and, with the exception of a few feet of what might be termed low grade concentrating ore, is also all in good ore. No. 3 tunnel was advanced 65 feet to a total distance of 300 feet, and a raise and cross-cut connecting Nos. 3 and 2 tunnels was completed. At 280 feet from the portal of No. 3 tunnel a splendid body of ore was encountered, the development of which will be vigorously prosecuted this winter. This ore body is the downward continuation of that disclosed in Nos. 1 and 2 tunnels and carries the same or better values, native silver and argentite being fully as conspicuous as in Nos. 1 and 2 tunnels.

Your directors have no hesitation in assuring the shareholders that they consider the property one of the most promising in British Columbia, and there is absolutely no doubt but that substantial dividends should be paid when the complete plant has been in operation for a reasonable period.

The directors all retire from office but are eligible for re-election.

Respectfully submitted on behalf of the Board of Directors.

C. H. DICKIE,
Chairman and Managing Director.

PRESIDENT'S ADDRESS.

Gentlemen,—Before moving the adoption of the balance sheet a copy of which was mailed to each shareholder, I know it is expected that I will make a few remarks respecting our promising mining property. A brief synopsis of what we have accomplished in the north this season appears in the Directors' Report which accompanies the balance sheet.

Under the head of Mines and Concessions in the Balance Sheet the item of salaries, when compared to that of wages might occasion criticism, it should have been spread over the total expenditure, and comprised the sum voted at the last annual meeting for directors' remuneration and the salaries of the Secretary and Managing Director for the last thirteen months.

The item of travelling expenses was incurred entirely by the Managing Director and comprises the expenses incurred on seven trips to Stewart, which means over ten thousand miles,

some of these trips being very expensive owing to the fact that it was thought advisable to charter boats from Prince Rupert and Port Simpson in order to avoid delay, and as an effort was being made to keep in touch with both ends of our enterprise, the expense is justified.

The item also provides for the expense of two trips to Spokane, one to the Couer de Alene mining region in Idaho, and numerous trips to Vancouver and Seattle, all in the interests of the company.

After energetic but disappointing efforts extending over several months, your directors on March 13th last entered into an agreement with a firm of underwriters, the result of which gave us the sum of $50,000, and an optional agreement was entered into for a further sum of $50,000, which became practically available on August 16th last, and then and only then we knew we were able to carry out our contemplated installations. We have sold the underwriters 1,333,333 shares for $100,000, or at the rate of 7½ cents per share, and the concluding payment from the underwriters is the supplementary item mentioned in the Auditor's Report.

At the time we concluded this agreement with the underwriters our shares were being hawked about for six and seven cents per share, and there was only a small demand for them at that figure, and had we been unsuccessful in obtaining this capital, would have inevitably gone to a still lower figure.

Since our financial troubles have been dispelled your shares have been steadily enhancing in value, and in view of our splendid assets, should continue to do so.

The underwriters had a long period of anxiety, and I believe regretted their bargain until the latter part of August, when owing to the fact that our property was attracting considerable attention largely because of our great faith in the property as displayed in the installation of our tramway and concentrator, share values began to have an upward tendency, and were in demand, then the underwriters, whose financial bravery meant success to our company, when comparative failure would have been our portion, for one season at least, commenced to see the dawn of success to which they are well entitled. As a direct result of our success in obtaining capital our property is now attracting more attention than any other on the coast, and justly so I believe.

You can readily understand that I would have been highly pleased to have been able to inform you at this meeting that our concentrating plant was complete, but despite strenuous efforts on our part this is not yet the case, but you will kindly bear in mind that we have been doing pioneer work in that country, and under exasperating physical and climatic conditions, but we now have matters well in hand. This matter has occasioned your directors more worry than it need cause you, for the value of your holdings has not been adversely affected, nor should they be in the future. All of the machinery for our equipment has been paid for and we have a substantial amount in the bank to our credit. During the past season a number of prominent mining men have visited our property, and I have yet to hear the first pessimistic report concerning it. Among those who have visited us have been Mr. Henry Martin, Mr. Vaughan-Rhys, Mr. Knobel (McKenzie and Mann's representative), Mr. Barclay-Bonthorne, Mr. J. L. Parker and Mr. Carmichael a copy of whose Government Report you have doubtless all read, and we have been assured that had we struck the ore in our lower tunnel before that gentleman had made his inspection, his report, admirable and optimistic as it is, would have been made stronger in favour of our property.

Your directors hope that at no distant date your concentrator will materially assist in the payment of dividends, for all ores on Glacier Creek can be advantageously concentrated, and admirably situated as we are, and with splendid water power, we should build up an extensive and profitable concentrating business.

I am proud to say that our company has a reputation for fair dealing, which I hope may be maintained, and which is a valuable and effective asset in securing customs ore either for milling or smelting.

The plans and model we have here will give you an idea of our workings, and you must continue to bear in mind that the section we are at present exploiting, only comprises one-ninth of the length of the main ledge which runs through our property, besides we have the Gypsy ledge, which in itself may develop into a mine, and owing to the very favourable geological formation, and to the contiguity of adjoining prospects, it is highly probable that we may uncover other valuable outcrops when we have time to thoroughly prospect our holdings. When we struck the ledge in No. 3 tunnel the mineralization consisted solely of iron pyrites and quartz, no galena being then in evidence and I anxiously awaited the result of the first assay, as so much depended upon whether the iron sulphides continued to carry good values in depth.

The assay went in gold $10.00, and silver $40.00 per ton. In grinding up the sample, minute pellets of native silver were found disseminated all through the sample, and this thoroughly convinced me that the iron and the precious metals were deposited contemporaneously by ascending mineralizing solutions, and this formed a strong argument indeed for the probability of encountering Bonanzas or extremely rich chambers of ore in places in the vein where conditions have been unusually favourable for such occurrence.

After getting several feet into the ledge, galena and argentite came in, and the ore, a sample of which assayed in gold $34.00 and silver $54.00, to the ton, was just as strong, or stronger than in our upper workings, and the ledge had been proved 13 feet thick with the hanging wall not yet in sight, when I left camp.

To estimate the probable available tonnage of ore we now have, let us draw a line from the upper open cut to the face of our workings in No. 3 tunnel, then another at right angles out to the surface cropping, now this triangular piece of ground contains approximately 70,000 superficial feet of vein area, which is quite reasonable to suppose contains ore of the same quality as that exposed in our workings. It is a safe estimate that the ore will average 8 feet in thickness, and that 12 cubic feet will weigh a ton, this gives us 46,666 tons of available ore, if we have not overestimated it.

Taking into account the considerable tonnage of very high grade ore we have found in each tunnel, we may estimate the value of our ore-body to average $15.00 per ton, on the basis as paid by smelters. The ore can be mined, milled, transported and smelted at a cost to our company, not to exceed $5.00 per ton. As we have an ideal concentrating ore, we hope that 10% will cover values lost during concentration.

Accepting the above estimates as being conservative, and they are meant to be so, the net profit which would accrue to our company, from the ore contained in this triangular piece of property, is in round numbers $400,000.

Suppose we convert this triangle into a rectangle and consider that the same conditions prevail as in the ground we are already familiar with, and there is no apparent reason why they should not be, we simply double our tonnage and profits, and gentlemen, when we have exploited this ground, we will have made only a very modest beginning towards garnering the wealth which is undoubtedly contained in our property, for I ask you again to bear in mind that the piece of ground upon which we have been basing our calculations, is only an infinitesimal part of our equally promising holdings.

Our Consulting Engineer, Mr. Elmendorf, made no exaggerated statement in his last report, when he said, "I have no fear

as to the amount of ore this vein will produce with proper development.''

At our last annual meeting I did not place our property on as high a plane as I am doing to-day, for at that time although I was satisfied in my own mind that such would be the case, I was not absolutely certain that the high values would be found in depth, and might in a measure be due to surface enrichment or concentration. Since we have encountered the high-grade ore in No. 3 tunnel, at such depth from the surface, I am fully convinced that we have a magnificent mining property, and I have no hesitation in saying to you that I believe our shares are worth double the price they are now being quoted at, and I think they will go many times that figure, for we have surmounted our most serious obstacle and are now practically on the plateau of prosperity.

The thanks of our company are due the Provincial Government for the most generous and considerate treatment accorded the district.

On behalf of our Board, I beg to sincerely thank the shareholders who conferred a high compliment on the Directorate, and brought prosperity to the company by complying with our request and placing their shares in escrow, at the most critical period in the history of the company's affairs, time has as yet, I feel assured, only partly demonstrated the wisdom of your generous confidence in your Board of Directors. Now gentlemen, thanking you for your patience, I beg to move that the Report and balance sheet is hereby received and adopted. After the motion is seconded, and before putting it to the meeting, I will be pleased to make any explanations or answer any questions to the best of my ability to do so.

STOCK REPORTS.

By courtesy of Warren, Gzowski & Co., Toronto.

Miscellaneous.

	Feb. 21, 1910. Bid.	Ask.
Amalgamated Asbestos	.33¾	.33⅞
Dom. Coal, Com.	.84	.85
Dom. Steel, Com.	.70¾	.71
N. S. Steel	.80¾	.81
Granby	.90	.91
Consol. Smelting	.78	.80
Crow's Nest Pass	.85	.86

COBALT STOCKS.

	Toronto, Feb. 21, 1910. Bid.	Ask.
Beaver Consolidated	.32½	.33
Buffalo	2.17	2.50
Chambers Ferland	.37	.38½
City of Cobalt	.38	.39
Cobalt Central	.22½	.23
Cobalt Lake	.16	.16⅛
Coniagas	5.50	5.60
Crown Reserve	3.70	3.73
Foster	.23	.24½
Gifford	.14⅛	.15
Green Meehan	.08	.09
Great Northern	.10¼	.10½
Hudson Bay	90.	110.
Hargraves	.40	.41
Kerr Lake	9.20	9.30
La Rose	4.53	4.55
Little Nipissing	.29¾	.29⅞
Mckinl Dar. Savage	.83½	.85
Nancy Helen	.08½	.08¾
Nipissing	10.18	10.25
Nova Scotia	.36¾	.37
Otisse	.08½	.09
Peterson Lake	.25½	.25¾
Rochester	.19¼	.19⅜
Silver Leaf	.09¾	.10
Silver Bar	.10½	.11
Silver Queen	.18	.20
Temiskaming	.54¾	.55
Trethewey	1.39	1.40
Wettlaufer	1.33	1.35

New York Curb.

	Feb. 21st, 1910. Bid.	Ask.
Boston Copper	.19¼	.19½
Brit. Col. Copper	.06¾	.07
Butte Coalition	.24	.24¼
Chino Copper	.13⅛	.13⅜
Davis-Daly Cop.	.03¼	.03½
Ely Consolidated	.01½	.01⅝
Gila Copper	.08	.08¾
Giroux Mining	.09¾	.09⅞
Goldfield Consol.	.07½	.07¾
Greene-Can	.09½	.09⅝
Harcuvar Copper	.54	.56
Inspiration Cop.	.08½	.08⅝
Miami Copper	.23¾	.24¼
New Baltic Cop.	.12⅞	.13
Nevada Con. Cop.	.22¾	.23
Ohio Copper	.04⅛	.04 3-16
Rawhide Coalition	.16	.18
Ray Central	.03¼	.03⅜
Ray Consolidated	.21¾	.22
Union Mines	.02	.02⅛
Yukon Gold	.04½	.04⅝

STATISTICS AND RETURNS

STATISTICS AND RETURNS.

Following are the figures of German consumption of foreign copper for the year 1909:.

Imports of copper	157,795 tons
Exports of copper	8,053 "
Consumption of copper	149,742 tons

as compared with consumption during the year 1908 of 151,715 tons.

Of the above quantity 143,717 tons were imported from the United States. Reported by L. Vogelstein & Co., New York.

TRANSVAAL GOLD OUTPUT.

The London secretary of the Transvaal Chamber of Mines is advised by cable from Johannesburg that the total gold out-

put of the mines of the Transvaal for January, 1910, amounted to 579,743 oz. for the Witwatersrand district, and 21,625 oz. for the outside districts, in all, 601,368 oz. fine gold, total value, £2,554,451, being a decrease of 3,619 oz. in weight and £15,371 in value, as compared with December, 1909. The production in December was 604,987 oz, of fine gold, with a total value of £2,569,822. The total production in January, 1909, was 615,113 oz. of fine gold, total value £2,612,836.

GOWGANDA ORE SHIPMENTS.

Feb. 12—Blackburn Mine to Copper Cliff smelter, via T. & N. O. Ry. ..... 30 tons.
Burke-Remey, to Chippewa (test shipment) ..... 2 tons

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Feb. 11, and those from Jan. 1, 1910, to date:

	Feb. 11. Ore in lbs.	Since Jan.1 Ore in lbs.
Buffalo	.....	173,394
City of Cobalt	.....	129,970
Cobalt Central	41,687	122,386
Cobalt Lake	.....	132,000
Colonial	.....	63,660
Coniagas	.....	180,742
Crown Reserve	124,154	554,454
Drummond	.....	664,200
Hudson Bay	62,,365	62,365
Kerr Lake	180,239	482,844
King Edward	.....	49,952
La Rose	306,902	1,202,681
McKinley-Rar.	.....	144,397
Nipissing	129,080	1,101,472
O'Brien	65,800	198,906
Peterson Lake	.....	49,600
Right of Way	.....	127,963
Temiskaming	.....	120,000
Trethewey	.....	65,000

Ore shipments for week ending Feb. 11 were 909,627 pounds, or 454 tons.

Total shipments from Jan. 1 to Feb. 11 were 5,625,986 pounds, or 2,812 tons.

The total shipments for 1909 were 30,098 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Feb. 18, and those from Jan. 1, 1910, to date:

	Feb. 18, Ore in lbs.	Since Jan. 1 Ore in lbs.
Buffalo	62,440	235,834
City of Cobalt	.....	129,970
Cobalt Central	2,000	124,386
Cobalt Lake	.....	132,000
Colonial	.....	63,660
Coniagas	63,415	244,157
Crown Reserve	189,718	744,172
Drummond	.....	664,200
Hudson Bay	.....	62,365
Kerr Lake	291,640	774,484
King Edward	.....	49,952
La Rose	333,343	1,536,024
McKinley-Dar.	64,400	208,797
Nipissing	264,311	1,365,783
O'Brien	.....	198,906
Peterson Lake	.....	49,600
Right of Way	62,830	190,793
Temiskaming	.....	120,000
Trethewey	62,000	127,000

Ore shipments for week ending Feb. 18, were 1,396,097 pounds, or 666 tons.

Total shipments from Jan. 1 to Feb. 18 were 7,022,083 pounds, or 3,479 tons.

The total shipments for 1909 were 30,098 tons.

B. C. ORE SHIPMENTS.

Nelson, Feb. 12.—Steady progress has been made all week in mining circles, as is shown by the high average tonnage got out. The silver-lead properties continue to ship in increasing numbers to the Trail Smelter, two new mines being on this week's list. Appended are details for the week and year to date:

ORE SHIPMENTS.

	Week.	Year.
Granby	25,770	155,682
Mother Lode	9,000	55,305
Oro Denoro	350	1,620
Snowshoe	4,592	23,040
Other mines	...	120
Total	39,712	235,767
Rossland—		
Centre Star	3,722	22,443
Le Roi No. 2	693	3,408
Le Roi	165	1,835
Velvet	75	220
Other mines	...	8
Total	4,655	27,914
Slocan-Kootenay—		
Richmond Eureka	115	670
Molly Hughes	44	103
Mother Lode	30	120
Eastmount	31	94
Standard	37	128
Hope	19	19
Emerald	117	432
Blue Bell	133	540
Ferguson	110	218
Sullivan	359	794
North Star	29	605
Yankee Girl	358	1,204
St. Eugene	488	2,611

Silver King	127	676
Rambler Cariboo	46	114
Jessie Bluebird	35	35
Whitewater	21	291
Other mines	...	967
Total	2,099	9,621

SMELTER RECEIPTS.

Granby, Grand Forks	25,770	155,802
Consolidated Company Trail	11,391	61,035
B. C. Copper Company, Greenwood	9,350	56,925
Total	46,511	273,762

B. C. ORE SHIPMENTS.

Nelson, Feb. 5.—The feature of the week in mining is the steadily increasing number of silver-lead shippers to Trail, the total for the Consolidated Company's plant for this week being the largest on record. The general mine output was well up to the present high weekly average. Appended are details:

ORE SHIPMENTS.

	Week.	Year.
Boundary—		
Granby	25,453	129,912
Mother Lode	8,022	46,305
Oro Denoro	350	1,270
Snowshoe	3,887	18,448
Other mines	...	120
Total	37,712	196,055
Rossland—		
Centre Star	5,586	18,721
Le Roi	323	1,670
Le Roi No. 2	689	2,716
I. X. L.	8	8
Other mines	...	145
Total	6,606	23,260
Slocan-Kootenay—		
Van Roi	31	171
Ruth	29	57
Richmond-Eureka	167	555
Yankee Girl	303	846
Queen	19	93
Whitewater	67	270
Ferguson	65	108
Nugget	20	79
Banker	1	1
St. Eugene	598	2,123
Emerald	93	315
North Star	294	576
Central	38	38
Sullivan	359	435
Bluebell	33	407
Other mines	...	1,448
Totals	2,117	7,522

SMELTER RECEIPTS.

Granby, Grand Forks	25,453	130,032
Consolidated Company, Trail	12,671	49,646
B. C. Copper Company, Greenwood	8,372	47,575
Total	46,496	227,251

TORONTO MARKETS.

Metals.

Feb. 23.—(Quotations from the Canada Metal Co.)
Spelter, 6 cents per lb.
Lead, 3.75 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 35 cents per lb. (market very active).
Copper, casting, 14¼ cents per lb.
Electrolytic, 14¼ cents per lb.
Ingot brass, 9 to 12½ cents per lb.
Feb. 23.—Pig Iron., (Quotations from Drummond McCall Co.)
Summerlee, No. 1, $23.50 to $24.00, (f.o.b. Toronto).
Summerlee, No. 2, $23.00 (f.o.b. Toronto).
Midland, No. 1, (off the market).
Coal-Anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50, for 1¼ inch lump.

Coke.

Feb. 21.—Connellsville Coke, (f.o.b. ovens).
Furnace Coke, prompt, $2.25 per ton.
Foundry Coke, prompt, $2.75 per ton.
Feb. 21,—Tin, (Straits), 33.35 cents:
Copper, prime lake, 13.70 to 13.80 cents
Lead, 4.60 cents.
Electrolytic copper, 13.45 to 13.55 cents.
Copper wire, 15.25 cents.
Spelter, 5.65 cents.
Sheet zinc, 8.25 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 23.00 to 25.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, (ordinary), $29.00 per ounce.
Platinum, (hard), $34.50 per ounce.
Bismuth, $1.75 per lb.
Quicksilver, $50.00 per 75 lb. flask.

SILVER PRICES.

		New York cents	London pence
Feb.	7	51½	23¾
"	8	51⅜	23 11-16
"	9	51¼	23 11-16
"	10	51¼	23 11-16
"	11	51¼	23 11-16
"	12		23 13-16
"	14	51½	23 13-16
"	15	52	24
"	16	51⅞	23 15-16
"	17	52¼	24⅛
"	18	52	24
"	19	52⅛	24 1-16
"	21	52	24

SAFETY = SPEED = SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" OF THE ATLANTIC

FASTEST and FINEST
in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records
between Liverpool and Canadian Ports

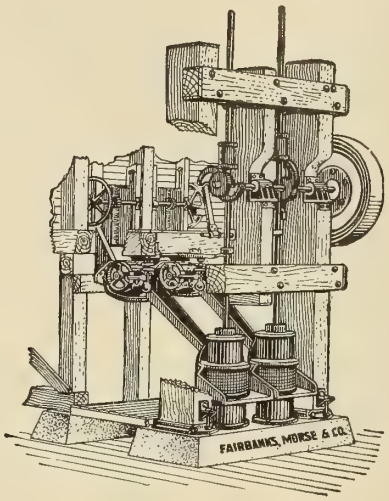
---

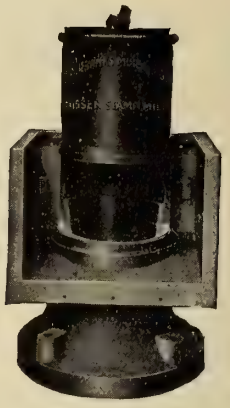
900 Miles on Enclosed and Sheltered Waters
LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent,
Board of Trade, - MONTREAL.

NISSEN STAMPS





The Modern independent Circular Mortar Gravity Stamp.

DESCRIPTION

THE MORTAR. The Nissen Mortar is of circular form and contains but one stamp; each mortar has an independent feeder which feeds the ore automatically upon the die. A cam raises the stamp and then allows it to fall by gravity on the die, which crushes the ore by impact. The ore is fed so evenly and regularly to the die that a maximum crushing efficiency is secured.

THE FEEDER. Each Nissen Mortar is fitted with an improved Challenge Feeder. The feeder is the most important element of the mill since its action governs the efficiency and capacity of the mill. The parts are reduced to a minimum, are durable, simple and interchangeable. Absolute adjustment and control of the feed is secured.

SCREENS. The Screen of the Nissen Mill is circular in form, conforming to the contour of the mortar and stamp and extends more than half way around the mortar. As the splash from the die is radial every part of the screen surface presents a free opening for the egress of pulp immediately it is crushed to the right degree of fineness.

:: :: :: :: **CATALOGUES AND DESCRIPTIVE MATTER UPON REQUEST.** :: :: :: ::

The CANADIAN FAIRBANKS CO., Ltd.

Fairbanks Scales **Fairbanks-Morse Gas Engines.**

MONTREAL TORONTO ST. JOHN, N. B. WINNIPEG CALGARY VANCOUVER

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Bateman & Brown
Campbell & Deyell
DeMorest, Stull & Low
Evans, J. W.
Gwillim, J. C.
Hassan, A. A.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Scott, O. N.
Tyrrell, J. B.
Willmott, A. B.
McGee, Boyd

Astley, J. W.

Quebec

Hardman, J. E.
Hersey, Milton L.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M. 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B.
M.A., B.Sc.
Consulting Mining Geologist
Sault Ste. Marie, Canada
Consulting Geologist
Lake Superior Corporation

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N.Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers aad Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

HITCHCOCK, C. H.
MINING ENGINEER
for LONGYEAR & HODGE
EXAMINING AND REPORTING ON PROPERTIES A SPECIALTY.
Box K, Sudbury Box 990, Cobalt

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon

RYCKMAN, KERR, MACINNES & MAHON,

Barristers, Solicitors, Notaries, Etc.

Cobalt, Canada.

Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

W. D. McPHERSON, K.C. J. M. LAING

McPHERSON LAING, & CO.

Barristers, Solicitors, Notaries, Etc.

GOWGANDA, CANADA

Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

GOWGANDA PORCUPINE LAKE SHINING TREE

DALTON THOMAS

MINING CONTRACTOR

ASSESSMENT WORK A SPECIALTY

Gowganda Head Office—Box 98

Porcupine Claims—Write Matheson Post Office

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.

All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

DOBBS & YOUNG

PROPERTIES LISTED and INVESTMENTS DIRECTED

MINING BROKERS and CLAIMS AGENTS

Wire or write us for particulars to

Box 541, COBALT, ONT.

WATCH THIS SPACE

WEBB & COOKE

R. L. WEBB, Ass. A. I. E. E.
THOMAS F. COOKE, Jr. A. S. M. E.
Specialty—Mine Power Plants.
338 Ellicott Square, Buffalo, N. Y.

THE SCHOOL OF MINING, Kingston, Can.

ASSISTANT PROFESSOR IN GEOLOGY.

Applications for the position of Assistant Professor of Geology will be received until March 15th, 1910. Special knowledge of Palaeontology desirable. Session seven months. Salary $1500.

GEO. Y. CHOWN, B.A.

Coal Mine for Sale.

A coal mine in Alberta, city of 25,000, Must be sold before the first of May.

This mine was opened last April and is thoroughly equipped.

Present capacity of over 200 tons daily and coal enough to last 20 years.

Good market for output and steady trade.

The present owner is obliged to sell and no reasonable cash offer will be refused.

For full particulars, write or wire

"Alberta" care Canadian Mining Journal

Electrical and Hydraulic engineer with over 10 years' practical experience in the design, construction and supervision of Hydro Electric power plants, is open to engagement in early summer.

Special knowledge of the requirements of mines; new proposition preferred, with supervision after completion, best of references and only moderate salary required. Address

CAN. MINING JOURNAL
CONFEDERATION LIFE BUILDING

FOR SALE

Electric light plant, consisting of two 35 KW alternating Generators, 2400 volts, 133 cycles, with exciter, all Canadian General make, together with switchboard, transformers, arc lamps, etc. Generators belt driven by two 50 h. p. Leonard Peerless Engines. Capacity of plant 25 arc lamps and 1200 16 c.p. incandescents. Admirable equipment for small town or for isolated manufacturing plant. Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONT.

A CROWN MINERAL PROPERTY

Suppose the Government should say to you there is a property worth $10,000. We will sell it to you for $10,000, payable in 20 annual instalments and won't charge interest on deferred payments. In event of your death at any time during the 20 years, we guarantee to cancel the balance due and execute a warranty deed to your wife, or if she prefers, we will pay her $10,000 in cash. If you live to complete all payments, we will pay you $10,000 cash, plus interest earned on your annual deposits. Chances are you would jump at it. We are making just such an offer backed by assets of over $45,000,000. Better investigate it.

ROYAL INSURANCE COMPANY Limited OF LIVERPOOL, ENGLAND Founded 1845.

Full particulars on application to

A. R. HOWELL, Superintendent
Royal Insurance Building, Montreal, Que.

OR

W. H. LEACOCK, Inspector
Royal Insurance Building, Toronto, Ont.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite,
etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. **Cable Address, BATHOTA, London**

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS
Montreal Office - - 324 Craig Street West
Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10 00 to the Department of Mi· es. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.



An Accurate Ore Test on any metal in 10 minutes For Five Cents.

Thats what the Mining Man or Prospector can have, provided he has a Way's Pocket Smelter Outfit. Anybody can make his own tests right in his office or in the field on **any ore.** Think of what this means to a prospector "miles away from nowhere" or to the mining man who must make dozens of tests a day.

Write for folder giving full information about **Way's Process** and describing both field and laboratory outfits.

WAY'S POCKET SMELTER CO.
Box 954, South Pasadena, Cal.

NOW READY

Mining Law of Canada

BY

ALFRED B. MORINE, K. C.
(Of the Bar of Ontario, Nova Scotia and Newfoundland)

The following table of contents conveys a fair idea of the scope of the work :

CHAPTER I
Mining Terms and Phrases.

CHAPTER II
PART 1—Laws in force.
PART 2—Dominion Legislation.
PART 3—Provincial Legislation.
(*a*) Manitoba, Alberta, Quebec, Nova Scotia and New Brunswick.
(*b*) Ontario.
(*c*) British Columbia.

CHAPTER III
PART 1—Crown Lands.
(*b*) Indian Lands.
(*c*) Railway Belt.
PART 2—Railways and Highways.

CHAPTER IV
Capacity to Work, Sell, Lease or License.
PART 1—Extent of Rights.
PART 2—Capacity to Lease.
PART 3—Partnerships and Companies.

CHAPTER V.
CONTRACTS
PART 1—Making.
(*a*) Statute of Frauds.
(*b*) Part Performance.
PART 2—Enforcing.
(*a*) Statute of Limitations.
(*b*) Specific Performance.
PART 3—Terminating.
(*a*) Rescission.

CHAPTER VI.
Mining Licenses and Mining Leases.
PART 1—(*a*) Bare Licenses.
(*b*) Profits à Prendre.
(*c*) Leases.
PART 2—(*a*) Parcels.
(*b*) Term.
(*c*) Covenants.
(*d*) Forfeiture and Re-entry.
(*e*) Reservations and Exceptions.

CHAPTER VII
PART 1—Easements.
PART 2—Fixtures.

CHAPTER VIII
PART 1—Employer's Liability.

CHAPTER IX.
Wrongful Abstraction.
Criminal Offences.

CHAPTER X
PART 1—Assessment.
PART 2—Registration.

GLOSSARY
APPENDIX I.—Statutes and Regulations of the Dominion, and Statutes of Ontario British Columbia and Quebec.
APPENDIX II.—Working Forms.

HALF CALF - $7.50

Book Dept. Canadian Mining Journal - - Toronto

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ainsworth, Wm., & Sons xiv
Ackroyd & Best, Ltd xiii
Allan, Whyte & Co. v
Astley, J. W. xx

B

Beatty, M., & Sons, Ltd. ix
Baszanger, Jacques & Co.....xi
Belliss & Morcom, Ltd viii
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply..... xxvii
Bartram, Wadsworth & Sherry xx
Behrend Concentrators Ltd.....xi
Brown A. H.....xx

C

Canada Metal Co..... xv
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Canadian Northern Ontario Ry..xxi
Curtis & Harvey, Ltd.....xxvii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xiii
Canadian Fairbanks Co. Ltd xviii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks....xxiv
C. L. Constant Co., outside back cover

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus xii
Drummond, McCall & Co.....xii
Dominion Coal Co., Ltd. xiv
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables.....iv
Davis, John & Son..... xvi
Dessau's, S. Sons.....vii

E

Evans, J. W xix

F

Fleck, Alex., Ltd. xii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gillespie, Geo. H. xix
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v
Grand Trunk Ry xxix

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iii
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank O. xx
Laurie & Lamb viii
Lymans Ltd..... xiii
Link Belt Co. xi
Leckie, J. Edwards xx
Ledoux & Co xx
The Lancashire Dynamo and Motor Co., Ltd.....xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Metal Shingle & Siding Co....xiii
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxix
Nova Scotia, Province of.....xxvi

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros. .....vi & vii
Patterson Mfg. Co. xii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx
Royal Insurance Co. xxi

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co..... xii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Sydney Cement Co., Ltd..... xiv
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,. Ltd xi

V

Vandeleur & Nichols..... viii

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Seperating Co. x

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905. Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

WHY IS IT

THAT SALES OF

MORTON'S

"BC"

Drill Steel

ARE INCREASING EVERY DAY?

MUST BE IT IS BETTER MATERIAL,

Gives Best Satisfaction

AND THE DRILL

Lasts Longer.

COULD ANYONE EXPECT MORE?

IN STOCK WITH

E. G. PRIOR, Victoria, B.C.
CANADIAN RAND CO., Cobalt.
BAINES & PECKOVER, Toronto.
ANGEL ENGINEERING & SUPPLY Co. St. John, Nfd.

Canadian Representative

D. W. CLARK, P.O., Box 521, **Toronto.**

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

WANTED

A Nickle Mine. Give full particulars, price and commission.

Address W. D. B. care of Canadian Mining Journal, Toronto.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
N. J. Holden Co.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
A. M, Ellicott Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
A. M. Ellicott Co,
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.
Drummond, McCall & Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.

Crossings (Diamond —
Montreal Steel Works, Limited

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cement—
Sydney Cement Co., Ltd.
Link Belt Co.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.
Peacock Bros.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Drummond, McCall & Co.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
The Hardy Patent Pick Co.
A. M. Ellicott Co.
Goldie & McCulloch Co.
Peacock Bros.
A. M. Ellicott Co.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
O. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Eugene Dietzen Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Drummond, McCall & Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.

Girders, Steel—
Dominion Bridge Co.
Drummond, McCall & Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
A. M. Ellicott Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Peacock Bros.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Metal Shingles—
Metal Shingle and Siding Co.
Pedlar People.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
The Hardy Patent Pick Co.
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.

Pipe (Cast, Wrought, Spiral, Riveted)—
Drummond, McCall & Co.

Roofing, Steel—
Metal Shingle & Siding Co.
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Peacock Bros.
Canadian Cleveland Drill Co.
N. J. Holden Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Durmmond, McCall & Co.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
The Hardy Patent Pick Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.
Drummond, McCall & Co.

Surveying Instruments—
Stanley, W. F.
O. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Eugene Dietzgen Co.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Drummond, McCall & Co.
Morton & Co.
Thos. & Wm. Smith
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Drummond, McCall & Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Smith, Thos. & Wm., Ltd.
Drummond, McCall & Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

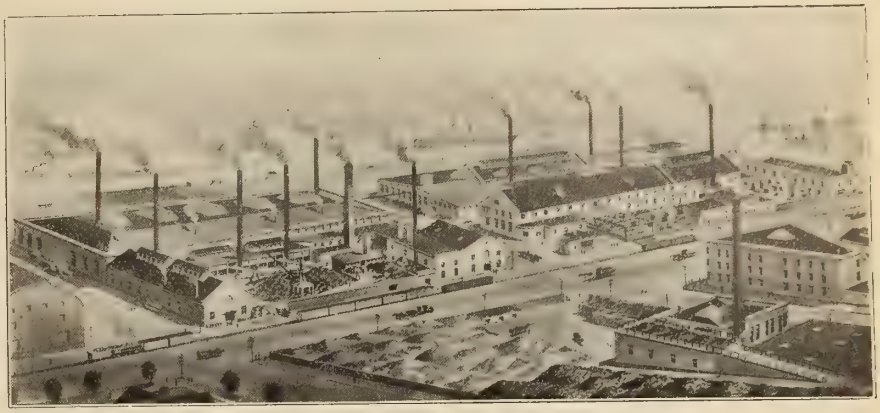
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"

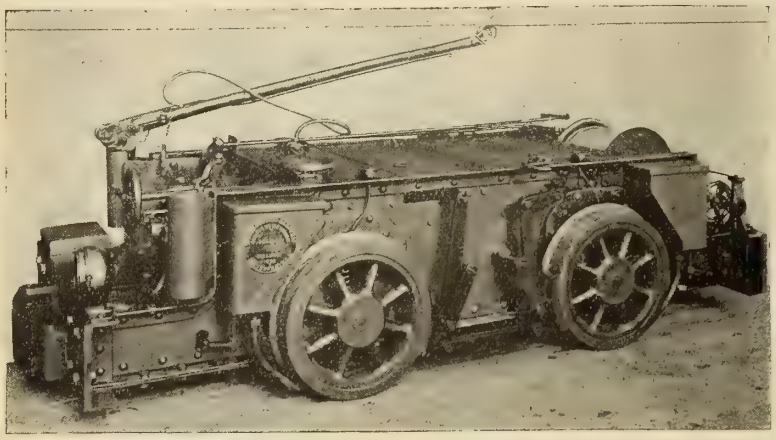


A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Baldwin-Westinghouse
ELECTRIC MINE LOCOMOTIVES



Baldwin-Westinghouse Steel-Frame Gathering Locomotive

B-W Mine Locomotives represent the combined experience of the Baldwin Co., as builders of locomotives, and the Westinghouse Co., as builders of electrical apparatus.

Built in all Types and all Capacities

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

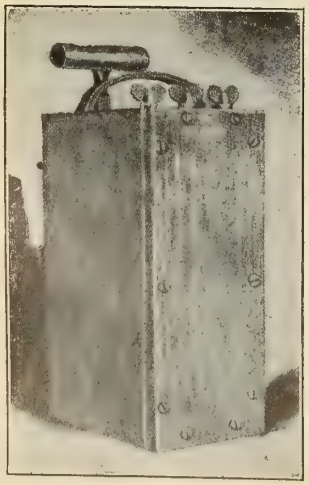
Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
252 St. James Street, MONTREAL.
158 Granville Street, HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appear ance, character and effect to ordinary Dynamite, except that the freezing temp erature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.



This Catalogue

Now Ready for Mailing

Though Easter comes very early this year, it was decided not to publish this Catalogue until we could illustrate the

Authentic Spring Styles.

We might have guessed at styles, made our Catalogue look just as attractive, and brought it out a month earlier; but we would not have been keeping faith with the thousands of customers who rely on us for authentic information. You will find the latest and best ideas in every garment pictured here, besides hundreds of novelties which our buyers, just returned from Europe, brought with them. A comparison of our prices with those found in any other catalogue will prove to you that it costs no more to be "in style," nor to supply yourself with this season's novelties, which are not obtainable at the shop near by. Your address on a post card will bring you this Catalogue free of charge.

THE ROBERT SIMPSON COMPANY LIMITED
TORONTO

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

Mining and Metallurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

THE CANADIAN MINING JOURNAL

31 TORONTO No. 6

NOTICE!

Cobalt Office and Warehouse

(opposite Right of Way Mine)

We have recently removed to a new office and opened a warehouse (opposite the Right of Way Mine) and can offer from stock Drill Steel, Fuse, Cars, Pumps, Picks and other lines which may be required at short notice.

We also desire to call your attention to the fact that we stock in our Montreal Warehouse a more complete range of Mining Machinery and supplies than any other firm in Canada.

It will be a recognition of your appreciation of our efforts to give prompt shipment if you will send us your enquiries and orders.

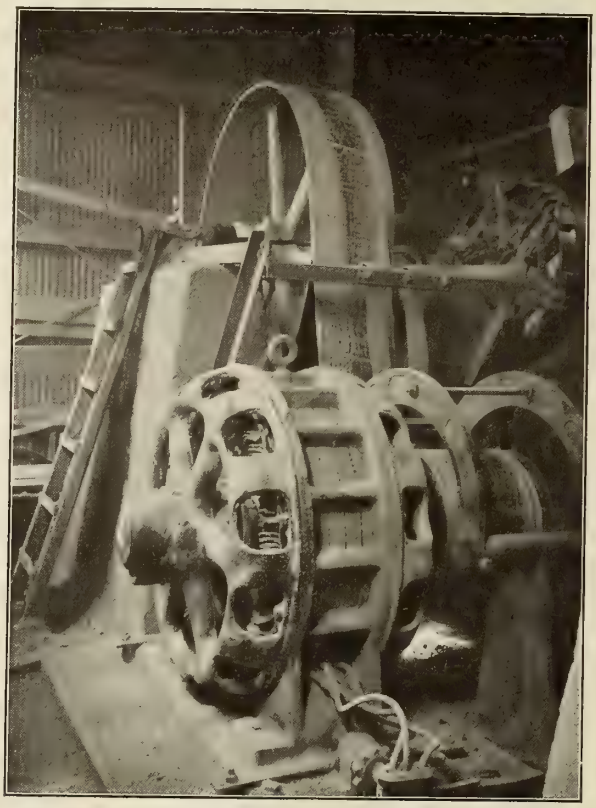
MUSSENS LIMITED

Head Office: MONTREAL

Branches TORONTO, 73 Victoria Street
COBALT, opposite Right of Way Mine
WINNIPEG, 259-261 Stanley Street
VANCOUVER, Mercantile Bldg.
CALGARY, Crown Bldg.

INDUCTION MOTORS
IN
CRUSHING & CEMENT PLANTS

Polyphase Induction Motors have many advantages in the operation of rock crushers, ball mills, tube mills, rotary kilns, hoists, conveyors, pumps and other machinery. In addition to flexibility and economy, demonstrated in many othe lines of service, electric drive eliminates long lines of counter-shafting, a specially desirable feature wh re gritty dust makes the maintenance of both belts and bearings very expensive.



In the dusty atmosphere of a cement mill the simple squirrel cage rotor of an induction motor is much less liable to give trouble than the wound armature of a direct current machine. The illustration shows one of our 100 H.P. type "AN" induction motors belted to a tube mill at the Belleville Plant of the Canada Cement Company Limited. The equipment of that plant includes over 1,000 H.P. of our motors.

See Bulletin 301 (revised)

ALLIS-CHALMERS-BULLOCK
LIMITED

WORKS - - - MONTREAL

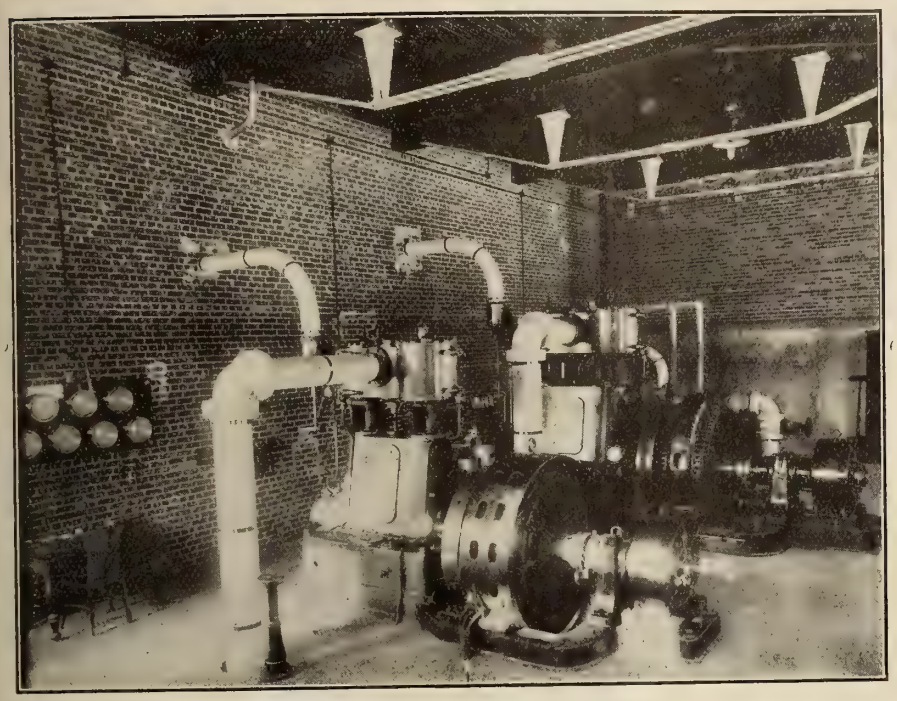
SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

BELLISS ENGINES

Self Lubricating
Quick Revolution
for
Electric Lighting, Mill Driving, Mine Ventilation, Pumping.



Belliss engines of 200 and 350 h.p. installed at Frost & Woods Works Smith Falls, Ont.

Can be depended upon absolutely for continuous running and economy.

Our Catalogue gives full details.

Sole Canadian Agents

Laurie & Lamb

Engineers

BOARD OF TRADE BUILDING, Montreal

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.



Write us for Bulletin 40-A

CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 522, Cobalt, Ontario



JEFFREY
Coal Tipples and Wire Cable Car Hauls

in design, building construction and mechanical equipment embody the latest and most successful devices in practice.

Descriptive Bulletin 22

We build Complete Coal Mine Equipments

Jeffrey Electric Locomotives

are built in sizes to suit any service and for any practicable haulage proposition.

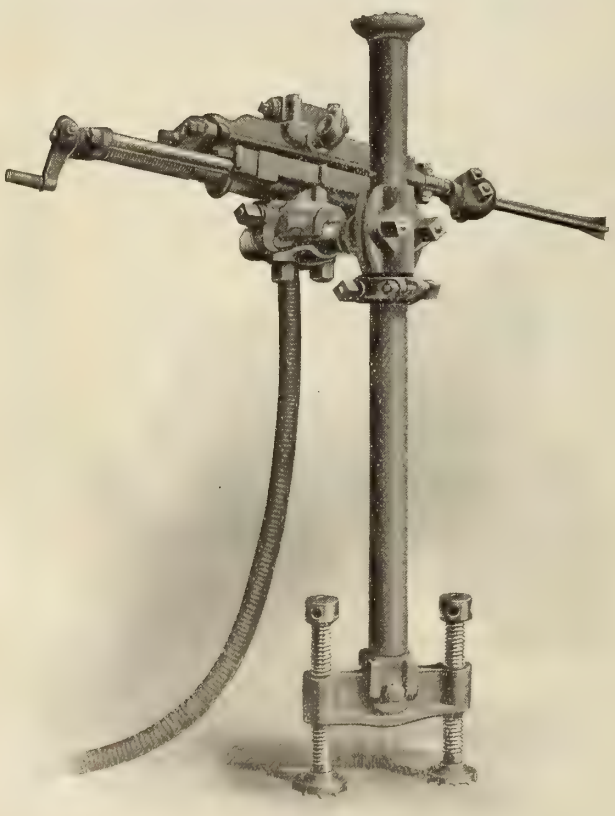
Write for Bulletins Nos. 12 and 17.



The Jeffrey Mfg. Company
Columbus, Ohio, U.S.A.

Can. Office and Works, Cote and Lagauchetiere Sts. Montreal

Toronto Office, Room 6, Dineen Bldg., Temperance St.



There's a "Sullivan"

Rock Drill, or a Sullivan Hammer Drill of just the type and size to excavate rock most rapidly and at least expense under your working conditions.

May we send you catalogues?

Rock Drills, No. 660
Hammer Drills, No. 660

Air Compressors, Diamond Drills, Coal Cutters, Hoisting Plants.

Sullivan Machinery Co.

Railway Exchange, Chicago

Claremont, N. H.

Birmingham	Joplin, Mo.	Seattle
Cobalt, Ont.	Rossland, B. C.	
Denver	Knoxville	St. Louis
El Paso, Tex.	New York	Salt Lake
	Pittsburgh	San Francisco

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE

CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

WILL END YOUR ROOFING TROUBLES



IF you will write to-day for a free sample of "Amatite" the end of your roofing troubles is in sight. After you have submitted it to every test that you can think of, you will be prepared to order it not only for your *new* buildings, but for your *old* roofs as well. You will find that it is cheaper to cover them with Amatite than to continue painting and repairing them.

We make a strong point of our "Free Sample" offer because the smallest sample of Amatite speaks for itself. It is more convincing than yards of talk.

There are all kinds of ready roofings on the market—so-called "rubber roofings," so-called "guarantee roofings," so-called "sand surface roofings.

The "rubber" roofings are no more made of rubber than a cow is made of saw-dust. The "guarantees" that are promiscuously handed out with many brands are hedged around with so many provisos that it will take three lawyers to dissect them and find out what they are all about. The "sand surface" has little or no protective value.

The point to remember is that all of these roofings have to be *painted* every year or two to keep them tight. In other words, it is the *paint* that protects, and not the roofing.

You can lay Amatite on a roof and then forget all about your roofing troubles. *No painting, no coating, no worry.* The man who puts Amatite on his buildings is insured against leaks and trouble for many years.

FREE SAMPLE

Send for sample and booklet to-day. The sample tells its own story: the booklet is written for practical men.

Address our nearest office.

PATERSON MANUFACTURING COMPANY, LIMITED,
TORONTO MONTREAL WINNIPEG VANCOUVER



MC 22 HAMMER DRILLS

Are steady workers.

They stay "on the job."

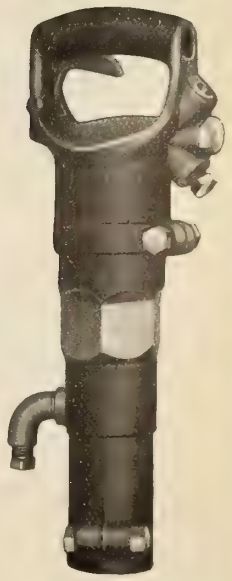
They are not habitual frequenters of the repair shop.

THEY ARE "THE TOOLS FOR SERVICE."

MA 13 PLUG DRILLER

Low air consumption or rapid drilling are not the most important things to be considered.

But the length of time your drills are on the surface being repaired, instead of underground putting in holes, is more important.

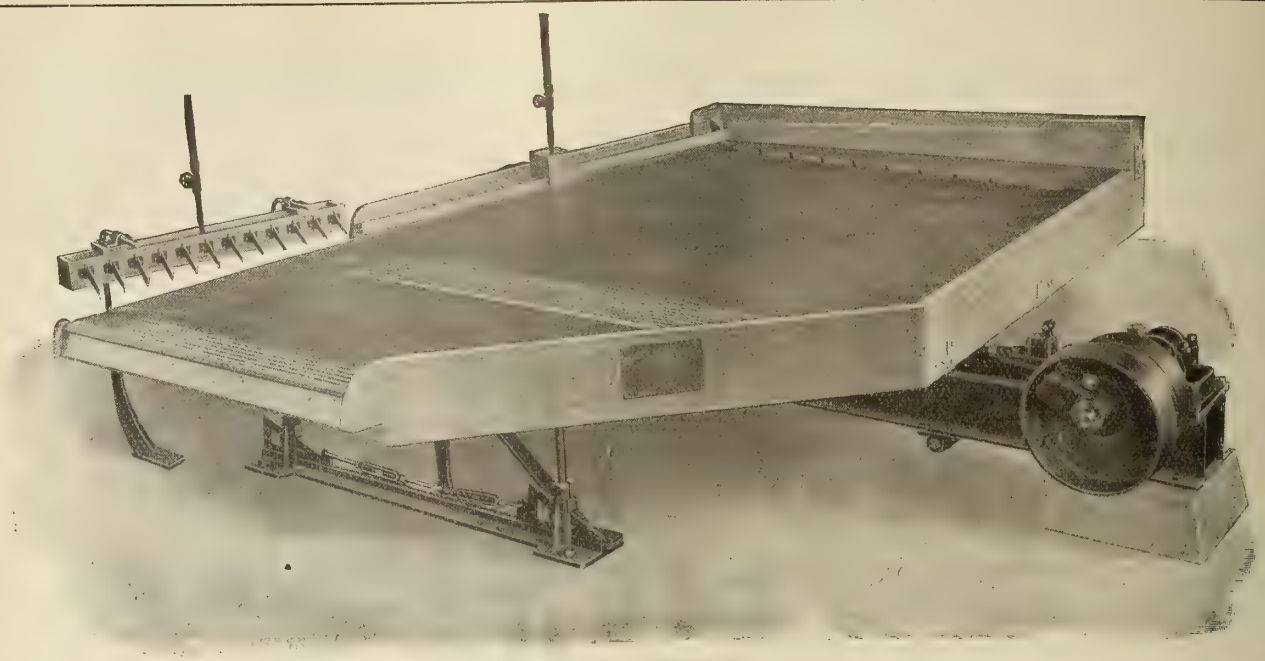


AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS



Comparative Tests Show That The Improved No. 3 Diester Slime Table

makes closer savings from fines and slimes than vanners. We are installing additional tables in the Strattons Independence Mill at Victor, Colo., as the result of a trial of *one* table.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

THE CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

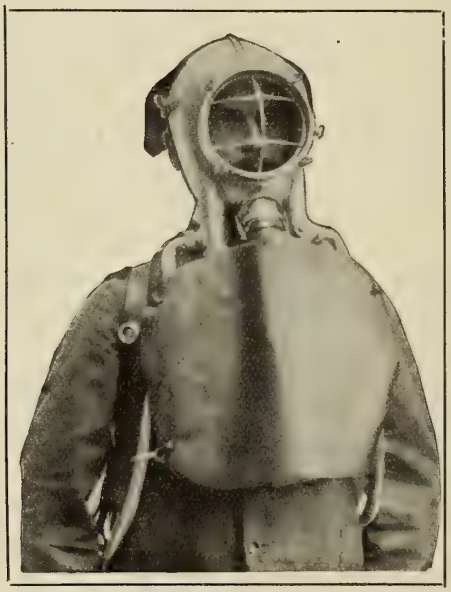
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Philippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faros Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

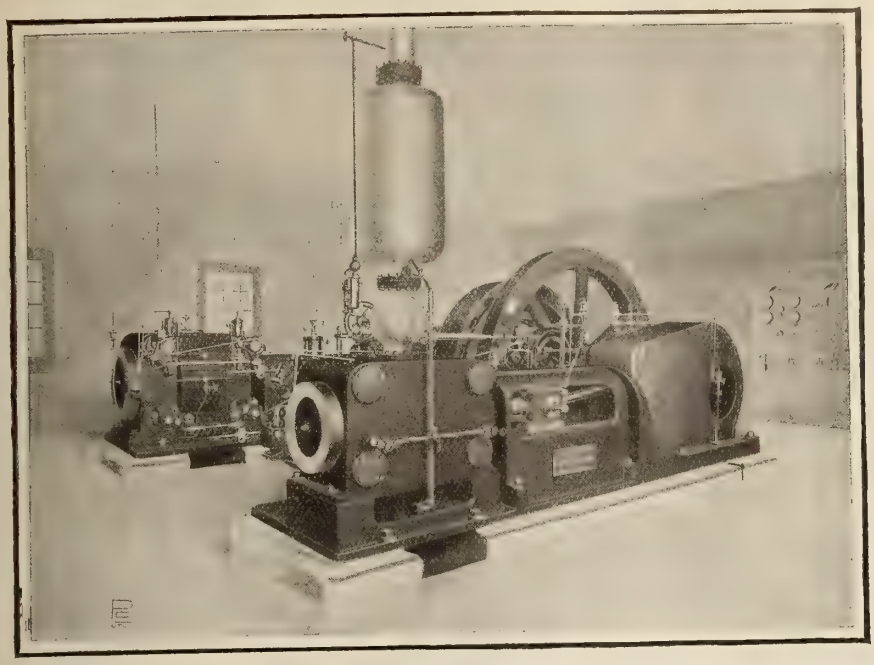
Successfully used at the following
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



POWER PLANTS FOR MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

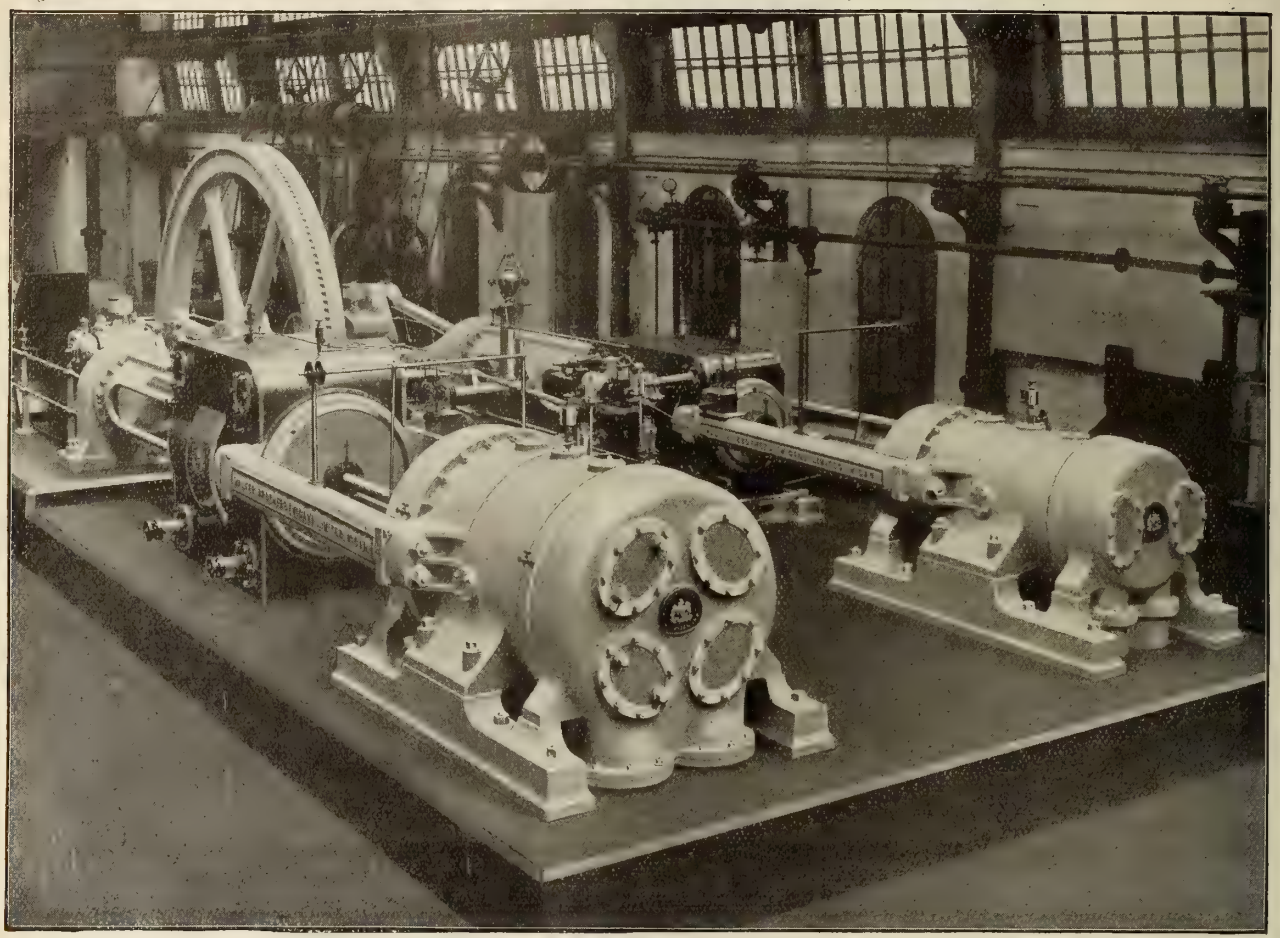
Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.

Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

Walker Brothers (Wigan) Limited

Wigan, England



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Values to Walker's Latest Patents.

AIR COMPRESSORS

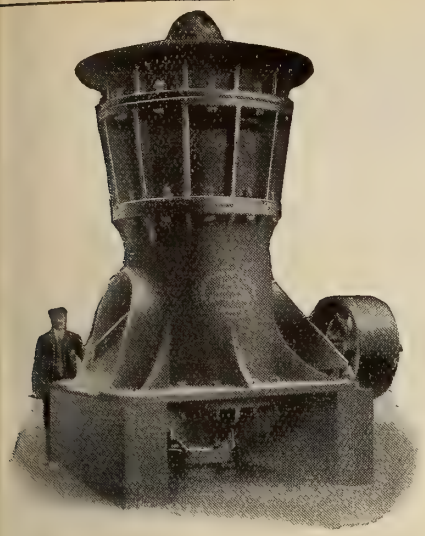
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Ieclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Iucluding
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF
AND ALL KINDS OF
BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President

C. A. MACPHERSON, Sec-Treas.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Informatiom and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

We personally break all our carbons

Goods sent on approval for selection

CARBONS
Black Diamonds)
and BORTZ for
DIAMOND DRILLS



S. DESSAU'S SONS
Importers
180 B. Broadway,
N. Y.

Carbon for all mechanical purposes

Bortz for all mechanical purposes

GREENINGS

ROPE FITTINGS — ROPE GREASE

The safest and most reliable wire rope on the market is Greening's. The wire we use is imported directly from the world's best sources of supply and is subjected to a complete set of the several tests.
We are always prepared to ship staple sizes from our large stock. At the same time our manufacturing facilities are so well organized and complete that we can arrange unusually prompt shipment of special ropes of all kinds.

The B. GREENING WIRE CO., Limited

HAMILTON, ONT. — MONTREAL, CAN.

WIRE ROPE

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: **NEW GLASGOW, NOVA SCOTIA**

ANNOUNCEMENT

BRUCE PEEBLES

& COMPANY, LIMITED

EDINBURGH - - SCOTLAND

are now represented in

CANADA

by

VANDELEUR AND NICHOLS

DINEEN BLDG., - - - TORONTO

SPECIALTIES:

DIRECT and ALTERNATING CURRENT.
DYNAMOS and MOTORS for all Conditions of Service.
PEEBLES-LACOUR MOTOR CONVERTERS.
STEAM TURBO ALTERNATORS. TRACTION MOTORS.

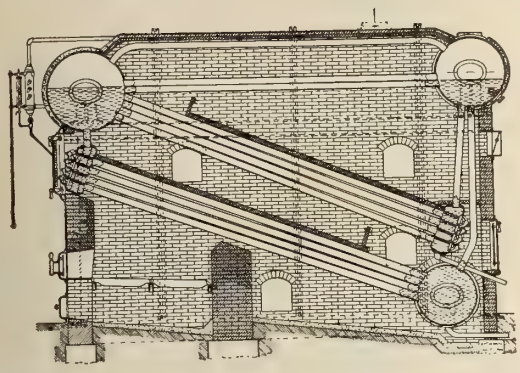
ORE DRESSING

By R. H. Richards. 4 Vols. $20.00.

Index to four volumes now ready.

Book Department, CANADIAN MINING JOURNAL

Robb Water Tube Boiler



Straight tubes. Perfect water circulation.
Dry or superheated steam.
Half the usual number of handholes.

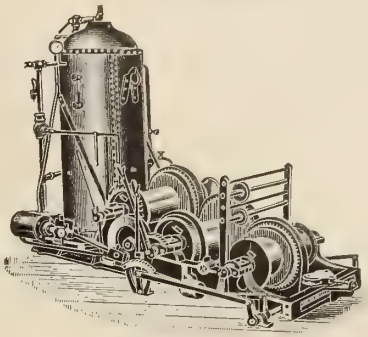
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

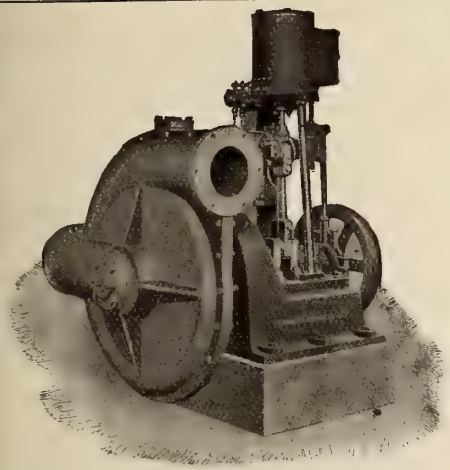
M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.
Sole Canadian Maker Williams "Faivrette" Clams
Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.
BRIDGES
TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds
BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



Morris Machine Works
BALDWINSVILLE, N.Y.
Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

New York Office—39-41 Cortland Street

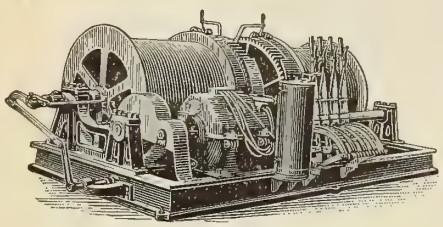
AGENCIES
Henion & Hubbell, 223-231 North Jefferson St., Chicago, Ill.
Harron, Rickard & McCone, San Francisco, Cal.
Zimmerman-Wells-Brown Co., Portland, Ore.
H. W. Petrie, Toronto, Ont.

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

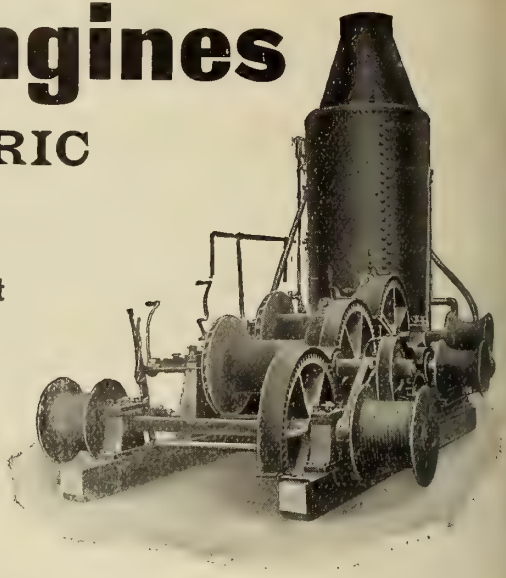
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

NOTICE OF CHANGE OF ADDRESS.

The Secretary's Office and Library of the Institute have been removed to rooms 3 and 4. Windsor Hotel, Montreal, Que. Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

CANADIAN PACIFIC

CANADA'S GREATEST RAILWAY

CANADIAN PACIFIC RAILWAY

LEAVES TORONTO FOR

Peterboro
Ottawa
Montreal
Quebec
St. John
Halifax

9.02 a.m.
10.00 p.m.

Galt
London
Chatham
Windsor
Detroit
Chicago

8.00 a.m.
4.00 p.m.
7.20 p.m.

Connections Are Made for Points on Branch Lines

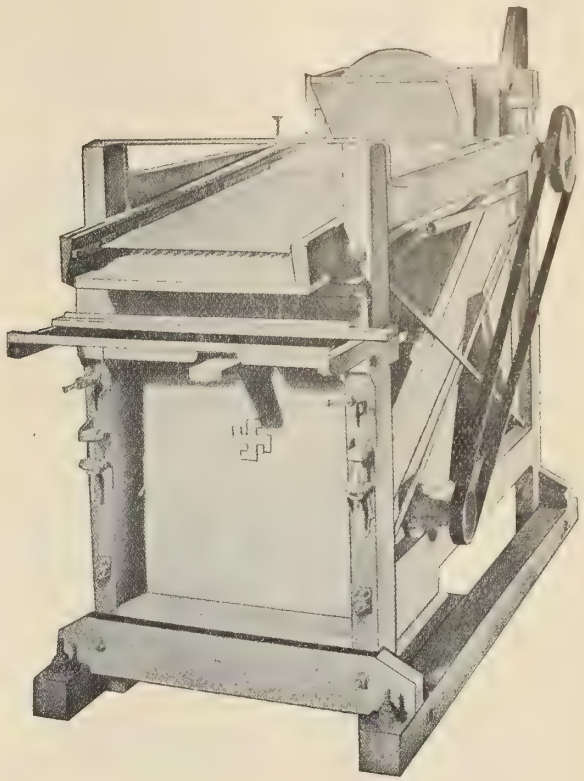
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

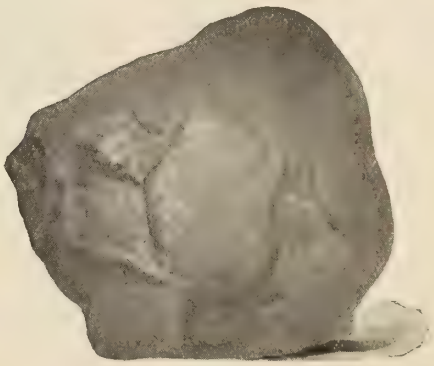
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scrantan, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

The Davis Handbook

OF THE

Cobalt Silver District

By H. P DAVIS.

ILLUSTRATED WITH PHOTOGRAPHS

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 PAPER COVER $2.00 STIFF COVER

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

TO BE SEEN AND OBTAINED AT THE OFFICES OF THIS PAPER.

NOW READY

Published February 9th. *Twenty-fourth Year.*

Containing all the latest information up to within a few days of publication.

THE

MINING MANUAL

1910

BY WALTER R. SKINNER.

The Standard Reference Work on Mines.

Price 17/- net Post Free (Abroad).

1,600 pages. In demy 8vo, handsomely bound in RED cloth.

A record of information concerning

MINING COMPANIES

(Gold, Diamond, Silver, Copper, Tin, Iron, and other Mines, Collieries, Land, Exploration and Mining Investment Concerns, &c.)

Arranged in three sections—

Australasian, African, Miscellaneous,

Preceded by Tables of Crushings and followed by lists of Mining

DIRECTORS, SECRETARIES, MINING and CONSULTING ENGINEERS and MINE MANAGERS.

Their Names, Addresses, and Descriptions, and Names of the Companies with which they are connected, and a

DICTIONARY OF MINING AND OTHER TERMS.

THE MINING MANUAL for 1910 contains particulars of over 3,600 Companies arranged in three sections, 430 Companies being AUSTRALASIAN (including Western Australia, Queensland, Broken Hill, Deep Leads, New Zealand and Tasmania); 1,030 AFRICAN (including Transvaal, Rhodesia ,West Africa, Cape Colony, Natal, Egypt); and 2,140 MISCELLANEOUS (including Siberia, Mexico, India, British Columbia, America, &c., and the Coal, Iron, Tin and other Mining concerns of the United Kingdom). The particulars given of each Company include the Directors and other officials; date of establishment; seat of operations; description of the property, with the purchase consideration; plant erected or in course of erection; present working results; ore reverses; details of capital; calls; dividends paid; and the financial position as disclosed by the accounts. Highest and lowest prices of the shares for the last four years, also latest price. The three sections extend over 1,100 pages,

Crushing tables and Gold Outputs from the principal mines are given at the commencement of the volume, showing tons treated monthly, results obtained, and yield per ton; also annual yields.

The Lists of Directors (8,000), Secretaries (1,900, Mining and Consulting Engineers and Mine Managers (1,400) include their addresses and descriptions and names of the Companies with which they are connected.

A complete Alphabetical Index, containing the names of 5,300 Companies and including many useful items of reference, occupies 42 pages.

Full particulars of all Re-constructions, Re-organisations and Amalgamations durlng 1909 are given in a simple and concise form.

LONDON:

WALTER R. SKINNER, 11-12, Clements Lane, Lombard St. E.C.

Nat. Tel.: 1323 Avenue. Tel. Address: Capitalist, London.

ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F). Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

WE DO NOT WANT

You just to glance at this advertisement, but to write us when requiring Chemical and Assay Apparatus.

LYMANS, Limited.

St. Paul Street, Montreal.

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

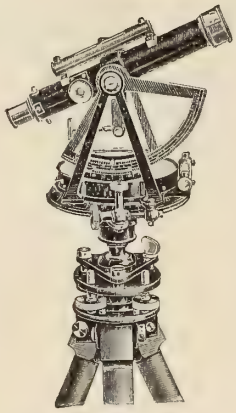
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



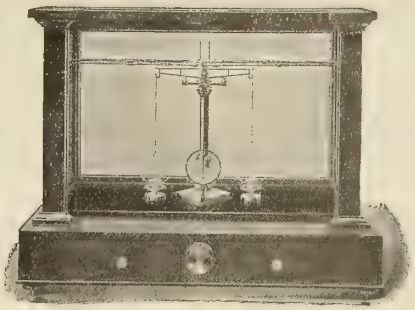
Casartelli's Improved Mining Theodolite

With Telescope and Levels, 4½-in. compass, 6-in. horizontal circle, and vertical arc, reading to three minutes. Tangent adjustments. Ball and socket motion, and parallel plates, complete in case, with set of jointed legs.

Simpler than any other instrument of equal utility. Strong, yet convenient in use, it is always absolutely precise.

JOSEPH CASARTELLI & SON

Scientific Instrument Makers,
43 Market Street,
MANCHESTER, - - Eng.



TYPE D. PRECISION BALANCE

4 INCH BEAM SENSIBILITY $\frac{1}{10}$ MILLIGRAM

This balance is used extensively by "Assayers" in Smelters, Mines Cyanide and Chlorination Mills having a large volume of very accurate weighing to make.

It is representative of the output of

THE PRECISION FACTORY

Among its many excellent features we show below

THE UNIT BASE

which carries the level vials, center lift rod and pan rest bearings thereby maintaining their perfect alignment, regardless of the warping of the case, and by the removal of three screws the entire mechanism may be removed for cleaning.

CATALOG A-16 DESCRIBES OUR LINE



WM. AINSWORTH & SONS

Denver. Colo., U.S.A.

CANADIAN AGENTS

Lyman Sons & Company,
380 St. Paul St., Montreal.

B. C. Assay & Chemical Supply Company,
Vancouver, B. C.

Dominion Coal Company

Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

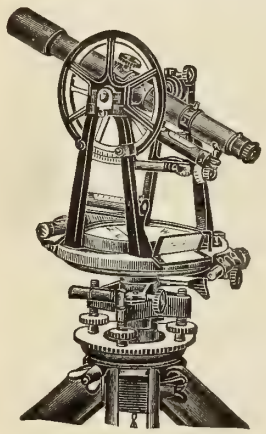
Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montrea

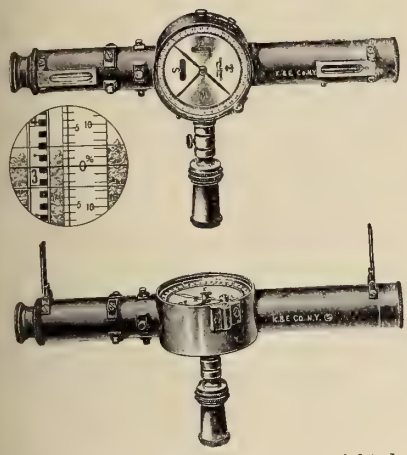
Address P.O. Box 196

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines

An Ideal Instrument
For Preliminary Surveying



THE STADIA HAND TRANSIT

The Stadia Hand Transit gives more accurate and quicker results than any similar portable instrument. It is thoroughly well made and will meet the requirements of those who are engaged on preliminary work, or on the subdivision of larger surveys made with a regular transit.

In measuring vertical angles, the sighted point and both scale readings (slopes and degrees) appear together in the field of view (see cut)

Compass bearings can be taken by use of the telescope on level ground or by the folding sights on sloping ground.

Send for complete (550-page) Catalogue.

KEUFFEL & ESSER CO.

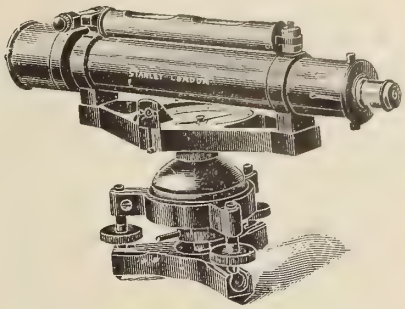
MONTREAL, 252 Notre Dame St. W.

General Office and Factories,
HOBOKEN, N.J.

New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

STANLEY, LONDON

The largest manufacturers of
Surveying and Drawing Instruments
in the World.



"Stanley Quick-Setting-Up Level"

Please send for our J 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

All genuine instruments bear our Trade Mark "STANLEY"

Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

W. F. Stanley & Co., Limited
Great Turnstile, London, England

THE
Bennett Fuse

Crown  **Brand**

MANUFACTURED BY

William Bennett, Sons & Co.
CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.
VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION.

WE MANUFACTURE

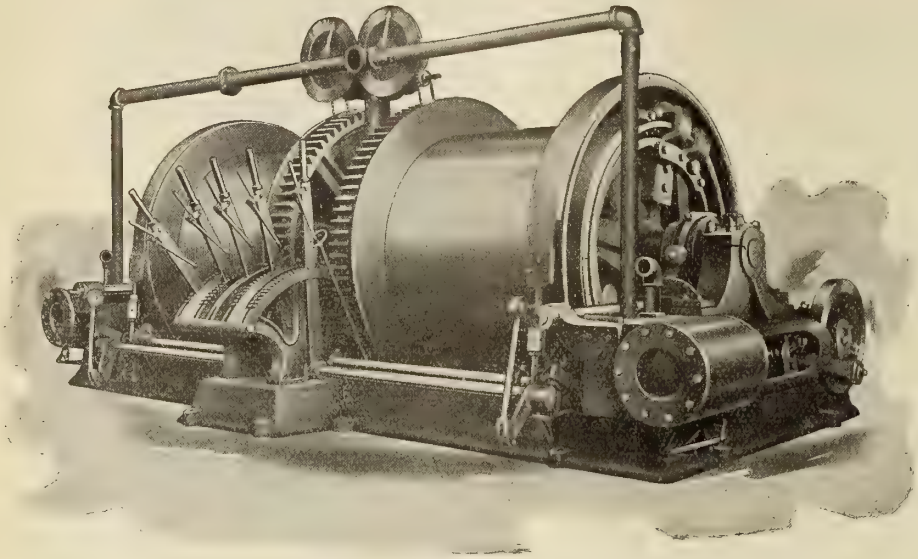
Brass Castings
Bronze Castings or
Aluminum Castings

We know how to make the best.

Let us make your Castings.

Send your Patterns.

The Canada Metal Co., Ltd.
TORONTO



When desired we equip our winding Engines in the larger sizes with the Lane Friction.

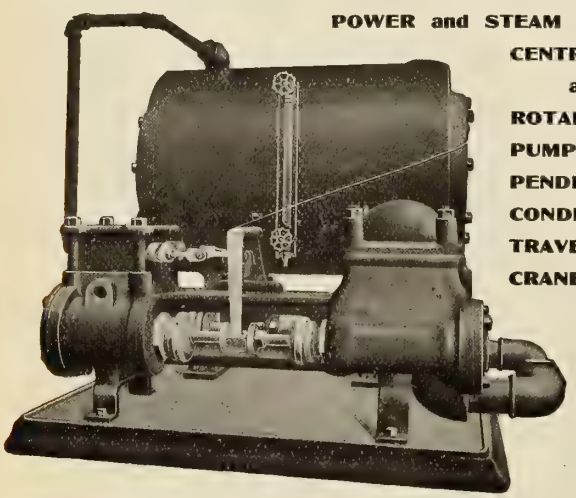
This device possesses great strength and adapts a Hoist to the heaviest class of work.

WE STOCK THE SMALL SIZES.

ARE YOU INTERESTED

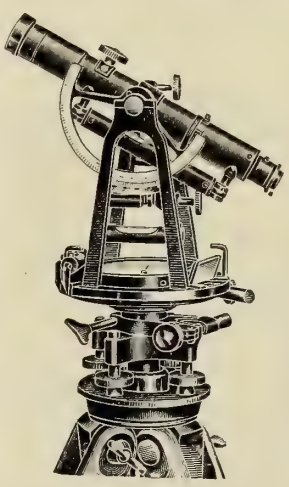
The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.



POWER and STEAM PUMPS, CENTRIFUGAL and ROTARY PUMPS, INDEPENDENT JET CONDENSERS, TRAVELLING CRANES, ETC.

THE SMART-TURNER MACHINE CO., LIMITED, HAMILTON, CANADA.



DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.
68 BEAVER HALL HILL
MONTREAL

WANTED

Copy of Canadian Mining Review, January, 1907

STATE PRICE

CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING
TORONTO

LUDWIG NAUEN
HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, March 15, 1910 No. 6

The Canadian Mining Journal

With which is incorporated the

"CANADIAN MINING REVIEW"

Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the

MINES PUBLISHING CO., LIMITED.

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 161
(a) The Institute Meeting 161
(b) The Eight-Hour Day 162
(c) Prospecting in Ontario 162
(d) Editorial Notes 163
Proceedings of the Twelfth Annual Meeting of the Canadian Mining Institute, Toronto, March 2nd, 3rd and 4th, 1910 163
Presidential Address of Dr. W. G. Miller 166
Preliminary Report of the Mineral Production of Canada During the Calendar year, 1909 170
Conservation Work of the Geological Survey for the year ending March 4th, 1910. 175
Preliminary Statement of the Mineral Production of the Province of Quebec, During the year 1909, by Theo. C. Denis 176
Notes on Prospecting in Ontario, by W. M. Goodwin 177
Our European Letter 179
Legal Column 180
The Leonard Prize 181
Richards 181
A Process for Smelting Nickel, Cobalt, Silver, Arsenic, Ores 182
An Argumentative Outfit 182
Personals and General 183
Book Reviews 183
Exchanges 183
Electrolytic Amalgamation 183
Special Correspondence 184
General Mining News 188
Mining News of the World 189
Company Notes 190
Statistics and Returns 190

THE INSTITUTE MEETING.

Now that the smoke of battle has cleared away, it is apparent that the Twelfth Annual Meeting of the Canadian Mining Institute was eminently profitable. It is evident, also, that the Institute bulks larger in the public eye than ever before. This is true, not merely because of its large membership, but more particularly for the reason that it is developing and following a more or less definite policy, and is not too timid to give formal expression to its opinions. Whilst entire unanimity of thought cannot be expected of any aggregation of human beings, yet the members of the Institute are generally of one mind on matters affecting the good name of the profession or the public status of the industry.

This is illustrated by the fact that the resolution correcting certain errors in Mr. Sifton's now historic address was not rescinded, despite the warm and, perhaps, impolitic efforts of the Secretary of the Commission on Conservation. The obvious purpose of the Institute was not to censure Mr. Sifton, but to draw attention to the unintentional inaccuracy of his statements. As a matter of fact, no society is in a better position to appreciate and assist Mr. Sifton in his magnificent task. Mr. Sifton is no super-sensitive lily. He is embarking upon a work that will bring him buffets and abuse—also it will bring him name and fame. He may count upon the whole-hearted support of the Canadian Mining Institute. That support would be meaningless if it consisted merely in blind approval.

The address of the retiring president, Dr. W. G. Miller, was comprehensive, lucid, and inspiring. His general review of railway development in relation to new mining regions was full of meat. Dr. Miller during his term of office has exercised an exceedingly potent influence on the Institute. It is comforting to know that his successor, Dr. F. D. Adams, is in every respect fitted to fill the exacting requirements of the presidency.

Especially notable amongst the papers read was that of Mr. P. McN. Bennie, on "Recent Developments in Electro-Siderurgy." The pleasant facility with which Mr. Bennie categorically answered the numerous questions put forward by his audience was, to say the least, unusual. Edifying, also, was the entire absence of the first person singular.

The audience, owing largely to the lateness of the session, did not appear to be adequately impressed with the importance of Dr. Stansfield's announcement concerning the direct production of steel from iron ores in the electric furnace. Dr. Stansfield's paper described the work of Mr. J. W. Evans, of Belleville, Ont. Illness

prevented Mr. Evans from being present. Dr. Stansfield is himself an authority on electrometallurgy. Hence the fact that Mr. Evans' results appeal to him is encouraging. We proffer our sincere congratulations to Mr. Evans.

All of the papers read by the visitors from the United States are eminently worthy of mention. Space will not permit this. But we cannot refrain from dwelling upon the addresses of Professor R. H. Richards and Dr. James Douglas. Professor Richards held his audience for a whole morning session. He gave us a glimpse of the means and methods that he has employed in searching out the whole philosophy of ore-dressing. Dr. Douglas spoke of his own early and unsuccessful attempts to mine copper in Quebec. To both of these gentlemen, as indeed to all the other visitors, the Institute should be specially grateful.

. . . . . .

The business sessions were heated. The proposed by-laws were murdered—and without anesthetics. It is a matter of regret that the discussion became vitriolic. This is totally unnecessary. However, it is not likely that any further attempt will be made to limit the membership of the Institute. The consensus of opinion appeared to be that, within decent limits, the doors should be wide open.

The proposed Nominating Committee also fell by the wayside. Here again the discussion was one-sided and quite insufficient. We must confess to a good deal of sympathy for those gentlemen who spent time and thought upon the proposed amendments. The reception offered them was scarcely courteous.

. . . . . .

The smoker, under the capable guidance of Mr. G. G. S. Lindsey, assisted by Mr. W. E. H. Carter, was a howling success. The dinner, likewise, was a well-managed and pleasant event.

. . . . . .

Glancing back over the three days, we see little to criticise and much to praise. We still believe, however, that discussions should be organized carefully before the reading of each paper, and that, except in extraordinary circumstances, papers should be presented in synoptical form. Sooner or later, of course, the Institute will be forced to resolve itself into sections so as to permit of the simultaneous reading of papers on diverse subjects.

. . . . . .

To the president, to the committees, and especially to Secretary Lamb and Treasurer Lecky, we proffer our felicitations upon having arranged and carried out so smoothly the best series of meetings of the Canadian Mining Institute on record.

THE EIGHT-HOUR DAY.

The Government of Nova Scotia has given much evidence of an enlightened desire to encourage trade and industry. Some time ago it framed enactments for the furthering of gold mining by means of specific cash subsidies. Latterly, under the guidance of Dr. B. E. Fernow, an inventory has been made of the province's timber resources, with a view to conservation and reforestation.

One of the most significant acts of the Government, however, was the appointment of a commission to report upon labour conditions and upon the practicability of an eight-hour day. The commission's report is reproduced in part on another page. The section referring to coal mining, and this more directly concerns us, while not remarkably explicit, is sufficiently definitive to provide much food for thought.

While the commission recommends reduction in the hours of employment in certain classes, it pronounces strongly against a general and compulsory eight-hour law. This, the report declares, "would be at present a fatal blow to the industrial prospects of Nova Scotia. . . . So far as coal mining is concerned, the commission would gladly report in favour of the shorter day if the facts permitted them to do so. But the existing market for Nova Scotia coal presents features of a grave character. The coal industry is fundamental to the welfare of the province, and before enacting legislation that would undoubtedly add to the cost of operating the mines, or seriously reduce wages, further consideration should be given to the features referred to."

We have no reason to think that the commission was in the least degree partizan. The members were independent citizens, chosen because of their fitness. Hence the report cannot be regarded lightly. Thus, also, it is gratifying to place on record the implied fact that, in comparison with clerks, shop-keepers, factory-hands and others, the coal miner of Nova Scotia secures better treatment from his employer. This is something to be taken to heart by our legislators. The eight-hour agitation will crop up constantly. Eventually it will become an accomplished fact. But it is the duty of our governments to see that the currents of our commercial life are not too rudely disturbed by premature concessions to agitators.

PROSPECTING IN ONTARIO.

The bona-fide and efficient prospector has always our admiration and support. Unfortunately, in the rush to stake something, many hundreds of inexperienced men have been sent north. Either through ignorance or through laziness, these men waste the season by loitering around established camps, or by following the beaten trail and the easy water route.

Mr. W. M. Goodwin's article, "Notes on Prospecting in Ontario," sets forth these and other truths, and, further, supplies timely hints to the novice.

EDITORIAL NOTES.

The Canadian Northern Pacific Railway Company, the name chosen for the British Columbia section of Mackenzie & Mann's system, is authorized by its charter to purchase and operate coal mines in the province.

The troops have been withdrawn from Glace Bay and Dominion. The expense of maintaining the contingent since the strike began amounts to about $75,000. This will be shouldered by the two towns mentioned and by the municipality of Cape Breton County.

On February 24th the Privy Council reserved judgment in the case of the Florence Mining Company vs. the Cobalt Lake Mining Company.

According to the Hon. Mr. Fielding, the Dominion Government has no present intention of renewing the bounties on iron and steel.

Proceedings of the Twelfth Annual Meeting of the Canadian Mining Institute, Toronto, March 2nd, 3rd and 4th, 1910.



DR. W. G. MILLER.

The twelfth annual general meeting of the Institute was held at the King Edward Hotel, Toronto, on Wednesday, Thursday, and Friday, March 2nd, 3rd, and 4th, 1910.

Wednesday Morning Session.

The proceedings were opened at 10.30 a.m. The president, Dr. W. G. Miller, introduced Alderman McGuire, chairman of the Reception Committee of the City of Toronto, who, on the unavoidable absence of His Honor Mayor Geary, extended a civic welcome to the delegates. Alderman McGuire's speech was brief and felicitous.

The presidential address, the text of which appears elsewhere in this issue, was then read.

The following resolution was then read by Mr. R. Brigstocke, and seconded by Mr. J. E. Hardman:—

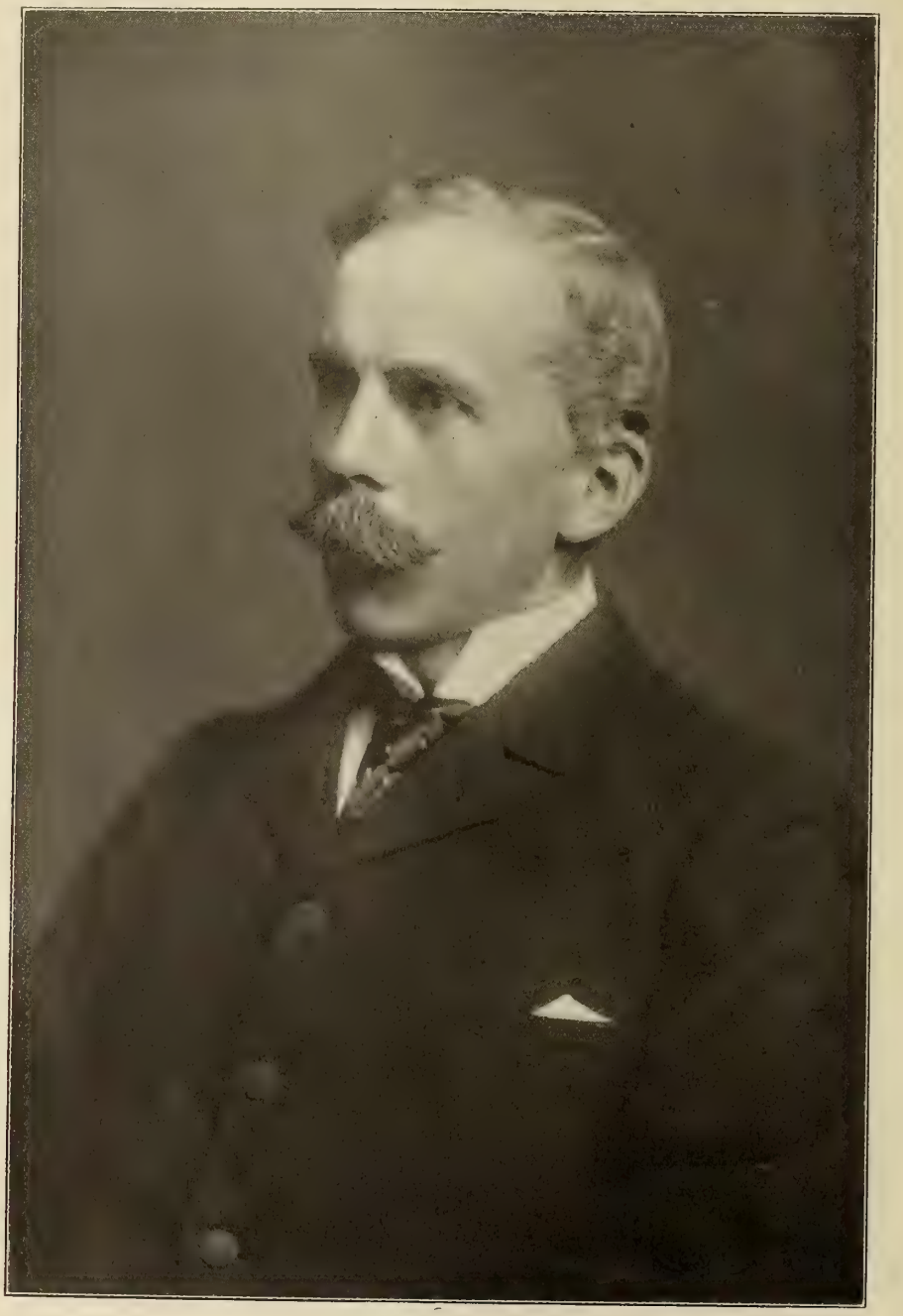
"Resolved, That the Canadian Mining Institute regrets that the chairman of the Conservation Committee should have publicly made statements reflecting on the mining and metallurgical practice of Canadian

companies, without having been fully informed as to the actual facts and conditions."

The reference here was to the speech of the Hon. Mr. Clifford Sifton, which appeared in the Toronto Globe of January 22nd, and has already been commented upon in these columns.

In the discussion that followed, Mr. W. J. Dick, mining engineer to the Conservation Commission, explained that he had been engaged to look into these matters, not, however, until a date later than that of the speech. While he found that Mr. Sifton had been wrongly informed in the matter of Canadian smelters, he also found that the fatality rate at Cobalt was, according to the figures reported by the Bureau of Mines, 27.7 per thousand.

Then, at a later session, it was fully explained that the returns for men employed applied only to the producing silver mines. The fatalities cover a wide region and all the non-producing mines and prospects. For instance, two men were killed at Rib Lake pyrite mine. One was killed at a gold prospect, and so on. It is impossible to secure complete returns of men employed in these numerous non-producers and prospects, as there are daily changes and constant fluctuations. Hence it is totally unfair to charge up the total fatalities to the producing mines, especially as conditions at these latter are incomparably better than they are in the scattered prospects.



DR. F. D. ADAMS.

The resolution was carried.

The president now called upon Mr. J. McLeish, Statistician of the Mines Branch, Ottawa, to present the statistics of the mineral production of the Dominion for the year 1909. These will be found in full on another page. It is pleasant to record that Mr. McLeish was able to report a total output valued at more than $90,000,000. This is a substantial increase over 1908.

Mr. Theo. C. Denis, Superintendent of Mines, Quebec, followed with a statement of the mineral production of Quebec during 1909. Whilst a slight falling off occurred, yet Mr. Denis spoke most cheerfully of the future. One of the main causes, he stated, of the lower figure was the fact that extensive preparations were under way for increased production of asbestos. He felt confident that a much higher figure would be reached during the current year.

The secretary then presented statements from Nova Scotia, Alberta and British Columbia, all of which exceeded previous outputs.

In the absence of Mr. T. W. Gibson, Dr. Miller referred briefly to the record output of Ontario. The session then adjourned.

Wednesday Afternoon Session.

In opening the afternoon programme, the president drew attention to a fine collection of specimens from Porcupine, secured and displayed by Mr. H. P. Davis, who, incidentally, spent about 48 hours in more or less continuous dog-sled travel in getting them hurriedly together.

The secretary read Mr. Kendall's paper on "Mining Engineers and Mining Institutes." This paper has already appeared in our columns.

Both the secretary, who favoured restricted and classified membership, and the president, who openly advocated the inclusion of all reputable persons interested directly or indirectly in mining, gave expression to their views.

A paper by Director R. W. Brock followed. It was entitled "The Necessity of Distinguishing between Prospecting, Developing, and Mining."

Mr. J. B. Tyrrell, after speaking appreciatingly of Mr. Brock's paper, suggested the possibility of forcing the promoter to expend, in actual mining, at least 75 per cent. of all moneys received.

A paper by Mr. R. W. Seelye on the Helen iron mine, and one by Mr. Einar Lindeman on "The Iron Ores of Vancouver and Texada Islands," evoked most interesting discussions.

An excellent paper "Mining Literature," written by Mr. Allan Greenwell, Editor of the Colliery Guardian, London, was read by Mr. Frederick Hobart. This concluded the session.

Wednesday Evening Session.

Mr. P. McN. Bennie's paper, "Recent Development in Electro-Sederurgy." was listened to with not a moment's loss of interest. From first to last Mr. Bennie held his audience. In his introductory remarks, he explained that the laboratory work was at an end, and that commercial work was being undertaken. "It used to be said that the electric furnace had a future. It has something more than that. It has a past. We have taken off the cloak of experimentation, and we think that we now wear the royal purple of facts accomplished."

Full discussion followed both Mr. Bennie's paper and that of Dr. Stansfield on "Steel from the Electric Furnace." Dr. Stansfield described the production of tool steel direct from iron ore, as accomplished by Mr. J. W. Evans, of Belleville, Ont.

Thursday Morning Session.

At this session Dr. A. E. Barlow presented a general outline of his investigations into the origin of asbestos, and emphasized the vital bearing of such researches upon the economic development of the industry.

Professor Dresser followed with a dissertation on "The Distribution of Chromite and Asbestos Deposits of the Eastern Townships." There now ensued a lively debate in which Dr. Walker, Dr. Coleman, Prof. Baker, Dr. Adams and Dr. Irving took part.

"Criteria of Downward Sulphide Enrichments," a paper read by Dr. Ransome, of the U. S. Geological Survey, was now brought on.

Thursday Afternoon Session.

The afternoon session was taken up partly with routine business. When this had been disposed of, Mr. James Douglas was called up to give some reminiscences of copper mining in Quebec.

It is possible here to reproduce Dr. Douglas' entertaining and informing address. It must suffice to say that Dr. Douglas spake not unhopefully of the possibilities of the industry. Mr. Hardman, Dr. Wilson, and Mr. Dresser spoke on the same topic.

Friday Morning Session.

After Professor Haultain had read his paper on "A Wet Sample Cutter," Professor R. H. Richards delivered his address, illustrated profusely with lantern slides on "Some Directions in Which Improvements in Concentration May be Looked For." The presentation of Professor Richards' paper occupied the whole of the morning session. It is to be regretted that no time remained for discussion.

Friday Afternoon Session.

The visitors, officers and reception committee of the Institute were tendered a luncheon at the Legislative Buildings by the Hon. Mr. Cochrane, Minister of Mines.

Several members took the opportunity of expressing their sincere gratitude to Prof. Richards for his kindness in attending the meeting.

The Chairman then called up Mr. B. B. Lawrence to read his paper "Remarks Upon Two Well-Known Mines," to which Dr. Ledoux added some apposite comment.

Mr. R. W. Thompson's "The Portland Canal Region," and Dr. Ries' "The Clays of Nova Scotia," were the last papers read. Many other meritorious contributions had, through lack of time, to be omitted.

The scrutineers reported a vote of only 175 ballots—a contrast to former elections.

The election results were as follows:—

President—Dr. Frank D. Adams, of Montreal.

Vice-Presidents—Mr. A. B. Cole, Charles Fergie, J. B. Tyrrell, John A. Dresser, G. G. S. Lindsey, O. E. S. Whiteside, S. C. Blaylock, R. A. Bryce, R. T. Hopper and J. J. Penhale.

The session then adjourned.

The dinner was notable for the succinctness of the speeches. Among the guests were Mr. F. Congdon, M. P., Hon. Frank Cochrane, Mr. Ralph Smith, M. P., Mr. B. B. Lawrence, Prof. Richards, Dr. A. R. Ledoux, Dr. James Douglas, Dr. Irving, and Dr. Ransome.

An heroic rescue-party, equipped with Draeger and Shamrock helmets, saved a valuable official life. The premature explosion of a flash-light completely prostrated the person in question. His intrepid rescuers, whilst they applied some unorthodox methods of resuscitation, nevertheless succeeded in carrying the victim beyond the danger zone. It must be added that the victim was guilty of more than passive resistance. Hence the test was unusually severe.

The dinner was a fitting climax to three days of hard work. Mentally, if not physically, the delegates are lions refreshed.

PRESIDENTIAL ADDRESS OF DR. W. G. MILLER.

Gentlemen,—It gives me pleasure to welcome you to this the Twelfth Annual Meeting of the Canadian Mining Institute. On two former occasions, 1904 and 1907, we residents of Ontario had the privilege of meeting our fellow-members from other provinces in annual gatherings of the Institute in this our capital city. Since the earlier of these meetings Toronto has become one of the important mining centres of the continent.

While the Institute has a history of only twelve years, a period that has witnessed great progress in our industry in this country, its lineage can be traced some years further back through its immediate predecessor, the Federated Institute, and those provincial mining societies by the coalescing of which the Federated Institute was formed.

In my presidential address last year I gave a brief account of some of the work that the Institute has accomplished. This year it will be appropriate to refer briefly to the progress of the mineral industry during the past year, and to recent developments in Canada that materially affect the industry, together with certain objects that we should strive for in the future.

Progress in 1909.

The year has been a period of steady and substantial industrial growth and activity, although no developments of a sensational character have been witnessed. Almost every year sees the exploitation of new mining camps in Canada. Those to which most attention was directed during the last year were the alliterative twins —Porcupine and Portland Canal—the one on the Pacific coast and the other in the great central region. Perhaps the most striking feature of the past year has been the tendency on the part of large industrial concerns to consolidate their interests, which, provided the industries are not unduly handicapped by over-capitalization, should make for increased efficiency and economy in management and operation. This would especially apply in the case of the amalgamation of the coal and steel interests in Nova Scotia, which industries are largely dependent on one another. In Quebec the amalgamation of the asbestos mines has at least served to stimulate mining activity throughout the Eastern Townships. In Alberta, as a result of railway construction, great activity has been displayed in connection with the acquisition and development of coal areas. In British Columbia good general progress has been made. The Ontario mineral output was the largest on record.

Notwithstanding the lower prices of metals during 1908, the value of the mineral production for 1909 should show a gain of a few million dollars. For this gain, I believe, Ontario is chiefly responsible, although British Columbia is credited with an increased production of about a million dollars, and possibly the increased output of coal in Alberta will, to some extent, offset the decrease in Nova Scotia due to the protracted strike there.

Canada has become less and less dependent on foreign smelters and refiners. The Granby copper smelter in British Columbia is now the largest in the British Empire. Important work is being done in the refinery at Trail, while the plants erected during the last few years in Ontario—at Copper Cliff, Deloro and Thorold —have greatly advanced metallurgical work in this province.

The Dominion Mint at Ottawa is gradually increasing its usefulness. Heretofore it has been turning out copper and silver coins and British sovereigns. Now it is to mint Canadian gold as well. It is to be hoped that ere long Canada will have a pure nickel coin, since this metal has been proved by several countries in Europe to be well adapted for use in coinage. Surely the country that supplies most of the metal to commerce can afford to make use of it in coinage!

Of the four great industries in Canada, agriculture, mining, forestry and fisheries, that deal with natural resources, mining stands second only to agriculture in value of annual production. The value of the output of our minerals is greater than that of forestry and fisheries combined.

Railways.

It is said that about 65 per cent of the freight carried by the railways of the United States consists of minerals or of mineral products. This is absolute evidence that the mineral industry is very important from the railway point of view and vice versa. Hence it is encouraging to the industry in Canada to find such extensive railway construction being carried on. It is rumoured that the three greatest railways of the country will expend sixty million dollars or more in the building of new lines or in double tracking during the present year.

The building of these new lines is making a vast territory accessible to the prospector and miner. For instance, the National Transcontinental, in its course through the northern parts of the provinces of Ontario and Quebec, is doubling the accessible territory in both provinces. The Grand Trunk Pacific has about the same effect on northern British Columbia. Other lines are opening up, or will open up within a few years, vast areas in British Columbia and the other provinces.

The Dominion Government, it appears, has definitely decided to have a railway built to Nelson Harbour on Hudson Bay. The primary object in building this road is the shipment of grain, but even if the road never carries grain it is well worthy of construction. When one looks at the enormous coast line of Hudson Bay with the tributary rivers and considers the promising character of the rocks from the mineral point of view that are accessible to the coast, he must feel that there is likelihood of a very large mining industry being established by the construction of this railway. When the road is built one will be able to reach Port Nelson in a day or so from Winnipeg and there will be steamers running from this port to various points on the bay. This will give a comparatively long season for prospecting and exploring. Fisheries in these northern waters are also promising.

Still another railroad that in all probability will be constructed will run from Edmonton to Fort McMurray on the Mackenzie River waters. This will make the vast northern interior of Canada easily accessible. The great territory along the Mackenzie and tributaries in the vicinity of the Great Slave and Great Bear Lakes is known to possess promising mineral deposits, but, under present conditions, it is almost impossible to explore this territory satisfactorily.

From the brief consideration of the railroad building now in progress I think that we may feel confident that there will be an immense extension of our mineral industry within comparatively few years, the readily accessible areas being more than doubled.

Water Powers.

In many parts of Canada, and especially in the great central region, the presence of water powers has an important bearing on the mineral industry. This is shown by the use that has already been made of these powers in the greatest metallic areas that have as yet been developed, the Boundary district of British Columbia and the Sudbury and Cobalt districts of Ontario. In British Columbia the plant at Bonnington Falls supplies power to the mines at Rossland, Phoenix and Greenwood and to the smelters at Trail, Grand Forks, Greenwood and Boundary Falls. In Ontario the Canadian Copper Company has developed a water power which supplies with electric energy its large mines at Creighton and Crean Hill and the plant at Copper Cliff. Other mining companies in the Sudbury district Victoria mines, North Nickel range, and Moose Mountain are using or are preparing to use electric power generated by water falls.

Power is now being delivered at Cobalt from the Montreal River and in a short time the camp will have an abundant supply from this river and from the Matabitchuan. The benefits that are being conferred on these great metal camps by water powers illustrate the value of this source of energy to our industry. Without the results that have been accomplished by our fellow engineers, electrical and mechanical, during recent years, this employment of power would not have been possible. Twenty-five years ago our industry in many parts of the country could not have made the advance it has during recent years simply because electrical and mechanical engineers could not have supplied the power.

But when one thinks of what electricity has accomplished in other branches of the mineral industry during comparatively recent years, the consideration of water power for merely mechanical purposes seems prosaic. The inventions of Hall, Acheson, Willson and others in the production of metals and artificial minerals have made this age famous. Fifty years ago aluminium was little more than a scientific curiosity. It sold for two dollars an ounce. During the last year it has sold as low as fifteen cents a pound, and it is now one of the common metals of commerce and the arts. The production of carborundum and other artificial abrasives has done much to assist the manufacturers of machinery. Artificial graphite has become an important article of commerce. Artificial rubies are produced on a commercial scale. The manufacture of various alloys, that are now considered necessary in metallurgical work, is due to the advances in electrical knowledge in recent years. Calcium carbide, a product of the electrical furnace, is used as a source of light. Electricity is employed also in the refining of several metals and in the concentration of certain ores. But the most recent commercial achievement of electro-chemical engineers, the fixation of the nitrogen of the air, is the one that appeals most strongly to the imagination and may have vast, and at present unseen, beneficent results to our race. Certain compounds of nitrogen are essential as plant food. A few plants possess the power of abstracting free nitrogen from the air but the majority are dependent on extraneous nitrogenous compounds for their food supply. The store of mineral nitrates, which have long been in demand as fertilizers, is limited Recently the electric current has come to the rescue of agriculture and nitrogen is taken from the air and made into various compounds. Fifteen million dollars are already invested in the works in little Norway, where water powers are as abundant as they are in our own country.

While what I have said may be commonplace, still it shows the important influence that water powers have on our industry, both as a source of energy for purely mechanical purposes and in the refining of metals and the manufacture of mineral products. Canada is well situated to take advantage of the great development along modern lines, and it is encouraging to see the keen spirit evinced in this country in connection with the proper utilization of our water powers.

Forestry.

While water powers have a very important bearing on our industry, forestry is scarcely of less importance. Mining men are sometimes accused of taking little interest in the preservation and the proper utilization of the forest. The accusation is seen to fail when it is tried simply by the test of self interest. Since little mining can be carried on if forest products at reasonable cost are not available, mining men generally are interested in seeing that forests are protected. The present general movement in Canada for the protection of forests will receive the support of those associated with the mineral industry.

Mining Legislation.

Our secretary is to present a paper at this meeting dealing with mining laws and regulations. The paper will deal with the regulations of various countries for the sale and development of government lands. Ideal regulations will probably never be framed by any state, but a little discussion now and then does no harm. In all mining legislation two classes have to be considered, namely, the poor man or prospector, and the capitalist. If only the development of an industry in a country is considered, without the encouragement of individuals, the mining laws of Mexico, for example, are almost ideal. Briefly, individuals or companies in Mexico can acquire areas from the government, and so long as they keep up the annual acreage tax they control the lands. Of course, this acreage tax, under conditions obtaining in Canada, would often work a hardship on the poor man, and would make it difficult for anyone but a wealthy individual or company to hold land. The tendency is, when laws are made with the object of preserving both the rights of the prospector and the rights of the capitalist, for confusion to arise. The weaknesses in the mining laws of the various provinces of Canada are due to this. If only one class of persons had to be considered, the laws could be made much simpler. For instance, in some of the provinces of Canada, and in some of the states of the Union, working conditions are imposed upon the holders of mineral lands instead of an annual tax as in Mexico. It is considered to be easier for the man without capital to do a certain amount of work yearly than to pay an annual tax. Working conditions are also thought to tend to the more rapid development of an industry, but it is the writer's belief that working conditions have never been very successful in any state or province in North America. In fact, the insistance on work frequently leads to fraud.

The mining laws of British Columbia and Ontario have, owing to the development of the metallic industry during recent years, attracted more attention than those of the other provinces. It has been found that, in both provinces, one of the great weaknesses is blanketing. This is due largely to permission to stake by proxy. A man is not only permitted to stake two, three

or more claims on his own license, but, by getting licenses in the names of his sisters, aunts and other individuals, he may stake ad infinitum. One would think that if a man succeeded in staking, say, three good claims in a year, he should be satisfied. Some people, however, seem to think that a prospector is capable of staking many more good claims in one season, hence he has been given great latitude. Moreover, staking by proxy often reacts against the interests of legitimate prospectors. So many claims are offered for sale that prices are lowered and there is difficulty in separating the wheat from the chaff. British Columbia has an acreage tax which is good so far as it goes, and Ontario imposes a nominal tax on claims in unorganized territory; but the results achieved by this acreage tax in these two provinces are not nearly so important as that achieved by the larger one of Mexico. An acreage tax is the best preventive of blanketing and tying up of mineral lands.

Another point that is often discussed is the question as to whether governments should dispose of lands in fee simple or on lease. In Mexico and Nova Scotia, for instance, the leasing system is practically universal, and it does not seem to have had any bad effects on the industry. Large foreign companies are constantly starting undertakings in Mexico. In some of the provinces of Canada, however, great objection has been raised to leases. It has been claimed that it is often impossible to raise money on property that is not held in fee simple.

The Quebec law was changed about a year ago, and its enactments came into full force at the beginning of this year. These Quebec regulations seem to me to be well adapted to the conditions existing in that province. Of course, the regulations may not be ideal, but, if one or two slight changes are made, they would be about as good as can be expected. The price per acre, running from $10 to $20, depending on distance from railway, is higher than that charged in any other country. In fact, it seems to me to be too high, for the reason that the government will receive less revenue than it would if the price were lower, and to some extent it will have a tendency to discourage poor men. Then, since it is not the intention, as I understand it, of the Quebec authorities to inspect "discoveries," it seems to me that "discovery" should be left out of the requirements in making application for mineral lands. This requirement will serve no useful purpose, and may lead to trouble in certain cases.

As to the change in the Quebec law, I may say, and I feel that I am expressing the opinion of all the mining men who know of him or of his work, that Mr. Denis' recent appointment as Superintendent of Mines for Quebec has given great satisfaction. The government is to be congratulated upon its choice.

Dominion Legislation.

During the last year the Dominion Government has done much to encourage the industry. The appointment of the Select Standing Committee on Mines and Minerals was a move in the right direction. Hereafter the mineral industry will no doubt receive still greater recognition. As a result of their last session's labours the committee recommended that the government enact a code of mining regulations applicable to Dominion lands. The committee was strongly of the opinion that the present method of dealing with these lands by orders-in-council should be done away with. It is to be hoped that this recommendation of the committee will be acted on in the near future. All mining men will agree that a code of mining laws for the Dominion lands is urgently needed. The committee further recommended that the management of the Dominion mining lands should be transferred from the Department of the Interior to the Department of Mines.

During the past year the Dominion Government has appointed a National Conservation Commission. This commission should have a wide field of usefulness. Unfortunately, when new subjects come up, or old subjects under new names, such as that of conservation, faddists sometimes become active, and it takes time to get on a solid foundation. This has been to some extent the case with forestry and with our own industry. This Institute, and organizations of like character in other countries, have, it seems to me, been dealing effectively with conservation problems in the past, and, in so far as the mineral industry is concerned, the Institute will continue to be the organization in this country that is the most competent to give advice on such problems. The membership of the Institute embraces many men to whom the prevention of accidents, the refining of ores so as to prevent waste, and all the other problems connected with the industry, have been subjects of life-long study. There are some subjects with which governments can give assistance, and their assistance is always welcomed. But the mineral industry is one that does not flourish under paternalism, and advice such as has sometimes been offered in this country is not welcomed.

"How small a part of all that we endure
Is that which governments can cause or cure."

The prevention of mine accidents is a subject that has received careful attention in Canada. With regard to the inspection of the metal mines of Ontario, with which I happen to be familiar, I may say that I do not know of any metal-mining state in the Union where the inspection has been more systematic. Accidents will always be more numerous where there are many small mines or prospects than where the same number of men are employed in a few large mines. Inspection, including analyses and other tests of explosives, is a subject with which mine managers cannot be expected to deal. It offers a field of work for the government.

Changes are needed in connection with sanitary regulations for new mining camps. Many mining men feel that these new camps should not at first be organized on municipal lines, but that they should be governed by commission. Sanitary precautions could be taken from the beginning, and money raised by taxation could be expended with better results than it usually is by municipal officers in the hurly-burly period of a camp's existence.

As regards the prevention of waste in the handling and refining of ores, I think it can be said without fear of contradiction that Canadian metallurgists are fully alive to the subject. I do not think that a government can lead the way for private metallurgists.

The Dominion Government has apparently decided to appoint a commission to deal with technical education. This subject all mining men will admit has a very important bearing on their industry. The government is to be congratulated on its decision. It has been suggested for some years that technical education, being so closely connected with trade and commerce, should be dealt with by the Dominion Government, although education is, by the British North America Act, left to the various provinces. It is to be hoped that the broader view will prevail, and that the Dominion Government will see its way to assist very materially in the work of technical education.

There has been a great change in the views regarding education in Canada during the last twenty years or so. Most of us will remember that in our college days the type of education prescribed was that which had proved acceptable in the past, especially in Great Britain. This educational system was transplanted bodily to Canada, and was supposed to be adapted to the needs of a country entirely different from Britain. Fortunately, during the last two decades scientific and technical education has received much more attention, and it is now considered by many that a man with technical knowledge can be of as much service to his country as can one who has pursued merely one of the older courses of learning. Former ages have excelled the present in art and literature; but the present stands pre-eminent in the utilization of the forces of nature for the comfort and happiness of mankind.

Mining Taxation.

I have referred under mining laws to one kind of mining taxation, namely, the acreage tax. Most mining men will agree that this form of taxation has beneficial results on the industry, in that it tends to keep titles clear and to prevent the tying up of lands by speculators. It can, I think, be said to be a unique tax, since I never heard of another that was welcomed by those who had to pay it!

While those engaged in the mineral industry are desirous of bearing their fair share of the expenses of government, they frequently feel that they are unjustly discriminated against. If a mine or metallurgical works has a large equipment, or if the profits are even moderately large, the cupidity of those not connected with the industry is aroused, and there is a tendency to levy disproportionate taxes on the mine or works.

There are, broadly, two methods of taxing output, viz., on the gross or on the net profits. A tax on the gross is rarely fair. No consideration is given to costs of production. A tax on profits is much more equitable.

But the point in connection with mine taxation that needs most consideration is that which concerns the capital itself. If the net earnings of a mine are taxed at the same rate as ordinary income, the tax can be shown to be unfair to the mine owners, since the net earnings of a mine represent to a large extent capital. As ore is taken from a mine from year to year the property becomes constantly less valuable, until finally, when the ore has all been mined, the property is valueless. It is easy, therefore, to show that the net income from a mine should not be taxed on the same basis as income derived from other sources. This phase of taxation of mines is now receiving considerable attention in certain parts of the United States.

Our Mines Abroad.

No country has larger undeveloped promising mineral fields than Canada. It is important, therefore, if the mineral industry in this country is to make the progress it should, that capital be available. Heretofore most of the capital invested in mining enterprises has been furnished by Canadians themselves or by the people of the United States. If one reads the mining journals and the transactions of technical societies in Great Britain, he cannot but be struck with the small amount of attention the Canadian mineral industry attracts in the mother country. Pages are devoted to the industry of Australia and Africa, while paragraphs or sentences are given to that of Canada.

It was chiefly with the object of making the mineral resources of this country better known in Britain and on the Continent that the Canadian Mining Institute, with the assistance of the Dominion and the Provincial Governments, organized the trans-Canada excursion of 1908. Sufficient time has now elapsed to determine some of the results of the excursion. Not to enter into details, I may say that the results have been all that could be desired. Some important investments of capital have been made, and several Canadian mining engineers have been asked by British investors to make reports on properties. During the excursion leading mining engineers from abroad had the opportunity of visiting our mining camps and becoming acquainted with our mining men. Very cordial relations now exist between a number of mining societies in Britain, notably the Institution of Mining and Metallurgy, and the Canadian Mining Institute.

It seems to me that no more important work can be done by this Institute than that of making the mineral resources of the country better known in Great Britain and of encouraging the exchange of views between the technical men on the two sides of the Atlantic.

The Future of the Institute.

When we consider the work that the Institute has been able to accomplish in the past we have hope for its usefulness in the future. It can be said, I think, that the Institute's influence has been exerted on broad lines with the view of developing the industry in our own country, and of advancing the science and art of mining generally.

The members have been encouraged in their work by the recognition that has been extended to the Institute. One recognition that we have had is the acceptance of invitations to our annual meetings by distinguished fellow-workers in the United States. I can assure those gentlemen from the great Republic who have honoured us by attending this annual meeting that their presence is most highly appreciated, and that it affords us much encouragement.

As my presidency of the Institute ends with this annual meeting, I may be permitted to say that I hope the policy of the Institute will be the same in the future as it has been in the past. The field of work is vast. One-third of a continent awaits development.

For my successor in the presidency I can hope for nothing better than that his term of office will be as pleasant as mine has been.

According to A. A. Steele, writing in the bulletin of the American Institute of Mining Engineers, the Washington County, Missouri, barite is dug mostly from the residual clay. The common plan is to sink a pit, 3 feet in diameter, to a depth of from 6 to 9 feet, to the first lean clay below the upper barite layer. The miner then selects the richest side of the shaft, which he digs out beneath the upper clay, which is somewhat barren for from 3 to 6 feet below the surface. In this way he "drifts" as far as he thinks is safe, usually from 4 to 8 feet. Up to this stage all of the clay, flint and barite loosened is hoisted in a small bucket by a primitive hand windlass; but the miner usually sorts out the barite, which he recognizes from flint only by its greater weight, since it is completely covered with tough red clay. When the first drift is finished, all the waste from the new drifts is shovelled into it, and the miner digs other drifts wherever the ground looks good, so that the working soon resembles an inverted mushroom.

PRELIMINARY REPORT OF THE MINERAL PRODUCTION OF CANADA DURING THE CALENDAR YEAR, 1909.

Prepared by John McLeish, B.A.,

Chief of the Division of Mineral Resources and Statistics.

THE MINERAL PRODUCTION OF CANADA IN 1908.

(Revised).

Product		Quantity. (a)	Value. (b)
METALLIC			
Antimony ore (exports)	Tons.	148	5,443
Copper (c)	Lbs.	63,702,873	8,413,876
Gold	Ozs.	476,112	9,842,105
Pig iron from Canadian ore (d)	Tons.	99,420	1,664,302
Lead (e)	Lbs.	43,195,733	1,814,221
Nickel (f)	"	19,143,111	8,231,538
Cobalt			113,423
Silver (g)	Ozs.	22,106,233	11,686,239
Zinc ore	Tons.	452	3,215
Total			41,774,362
NON-METALLIC.			
Arsenic			58,566
Asbestos	Tons.	66,548	2,555,361
Asbestic	"	24,225	17,974
Calcium carbide	"	6,864	417,150
Chromite	"	7,225	82,008
Coal	"	10,886,311	25,194,573
Corundum	"	1,089	100,398
Feldspar	"	7,877	21,099
Graphite	"	251	5,565
" artificial	"	214	
Grindstones	"	3,843	48,128
Gypsum	"	340,964	575,701
Limestone for flux in iron furnaces	"	418,661	289,705
Magnesite	"	120	840
Mica	"	436	139,871
Mineral pigments—Barytes	"	4,312	19,021
" Ochres	"	4,746	30,440
Mineral water			151,953
Natural gas (h)			1,012,660
Peat	Tons.	60	180
Petroleum (i)	Brls.	527,987	747,102
Phosphate	Tons.	1,596	14,794
Pyrites	"	47,336	224,824
Quartz	"	44,741	52,830
Salt	"	79,975	378,798
Talc	"	1,016	3,048
Tripolite	"	30	195
Total			32,142,784

(a) Quantity of product sold or shipped.
(b) The metals, copper, lead, nickel and silver are for statistical and comparative purposes valued at the final average value of the refined metal in New York. Pig iron is valued at the furnace and non-metallic products at the mine or point of shipment.
(c) Copper contents of ore, matte, etc., at 13·208 cents per pound.
(d) The total production of pig iron in Canada in 1908 was 630,835 short tons valued at $8,111,194, of which it is estimated about 99,420 tons valued at $1,664,302 should be attributed to Canadian ore and 531,415 tons valued at $6,446,892 to the ore imported.
(e) Lead contents of ore, matte, etc., at 4·200 cents per lb.
(f) Nickel contents of matte shipped at 43 cents per lb.
(g) Silver contents of ore, etc., at 52·864 cents per lb.
(h) Gross return from sale of gas.
(i) Deduced from the amount paid in bounties and valued at $1.41½ per barrel.

4

THE MINERAL PRODUCTION OF CANADA IN 1908—*Concluded.*

(Revised.)

Product.		Quantity. (a)	Value. (b)
STRUCTURAL MATERIAL AND CLAY PRODUCTS.			$
Cement, natural	Brls.	1,044	815
" Portland	"	2,665,289	3,709,139
Clay Products—			
Bricks, Common	No.	408,305,768	2,982,255
" Pressed	"	53,480,764	517,180
" Paving	"	3,719,961	59,456
" Moulded and ornamental			18,535
Fireclay and fireclay products			110,302
Fire-proofing and architectural terra-cotta			170,211
Pottery			200,541
Sewer pipe			514,362
Tiles, drain	No.	20,100,261	298,561
Lime	Bush.	3,601,468	712,947
Stone—			
Building stone			1,800,0[illegible]
Flagstones	No.	61,200	6,293
Granite	Tons.		282,320
Slate	Squares.	2,950	13,496
Sand lime-brick	No.	17,288,260	152,856
Sand and gravel (exports)	Tons.	298,954	161,387
Total, structural material, etc.			11,710,656
" all other non-metallic			32,142,784
Total, non-metallic			43,853,440
" metallic			41,774,362
Estimated value of mineral products not reported			300,000
Total value, 1908			85,927,802

PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1909.

(Subject to revision.)

Product.		Quantity. (a)	Value. (b)
METALLIC.			$
Copper (c)	Lbs.	54,061,106	7,018,213
Gold			9,790,000
Pig iron from Canadian ore (d)	Tons.	149,444	2,222,215
Iron ore (exports)	"	21,956	61,965
Lead (e)	Lbs.	45,857,424	1,959,488
Nickel (f)	"	26,282,991	9,461,877
Cobalt			* 66,319
Silver (g)	Ozs.	27,878,590	14,358,310
Zinc			250,000
Total value, metallic			45,188,387
NON-METALLIC.			
Arsenic	Tons.	1,129	64,100
Asbestos	"	63,349	2,284,587
Asbestic and asbestic sand	"	23,951	17,188
Chromite (exports)	"	1,794	20,858
Coal	"	10,411,955	24,431,351
Corundum	"	1,491	157,398
Feldspar	"	10,286	35,694
Graphite	"	730	37,624
Grindstones	"	3,965	50,944
Gypsum	"	468,551	667,816
Magnesite	"	830	2,508
Mica			164,106
Mineral pigments—			
Ochres and Barytes	"	4,119	29,213
Mineral waters			177,304
Natural gas (h)			1,205,943
Petroleum (i)	Brls.	420,755	559,604
Phosphate (apatite)	Tons.	597	4,618
Pyrites	"	57,038	196,312
Quartz	"	50,541	63,032
Salt	"	84,037	415,219
Talc	"	4,506	12,172
Total value, non-metallic			30,587,591

(a) Quantity of product sold or shipped.
(b) The metals, copper, lead, nickel and silver are for statistical and comparative purposes valued at the final average value of the refined metal in New York. Pig iron is valued at the furnace and non-metallic products at the mine or point of shipment.
(c) Copper contents of smelter products and ores exported, at 12·982 cents per pound.
(d) The total production of pig iron in Canada in 1909 was 757,162 tons valued at $9,581,864, of which it is estimated 607,718 tons valued at $7,359,649 should be credited to imported ores.
(e) Refined lead and lead contained in base bullion exported at 4·273 cents per pound.
(f) Nickel contents of matte produced, at 36 cents per pound (the lowest quotation for nickel in New York less 10 per cent). The value of the nickel contained in matte was, as returned by the operators, $2,810,748 or an average per pound of 10.7 cents.
(g) Estimated recoverable silver at 51.503 cents per ounce.
(h) Gross returns for sale of gas.
(i) Quantity on which bounty was paid and valued at $1.33 per barrel.

* Additional returns increase this item to $90,950.

PRELIMINARY REPORT ON THE MINERAL PRODUCTION OF CANADA IN 1909—*Concluded.*

(Subject to revision.)

Product.		Quantity. (a)	Value (b)
STRUCTURAL MATERIAL AND CLAY PRODUCTS.			$
Cement, Portland	Brls	4,010,180	5,266,008
Clay products—			
Brick			4,200,000
Sewer pipe, fireclay, drain tile, etc.			1,300,000
Lime	Bush.	5,163,874	1,049,473
Sand and gravel (exports)	Tons.	481,584	256,166
Stone—			
Granite			340,047
Limestone for flux in blast furnaces			328,091
Marble, limestone and sandstone			1,600,000
Total structural material and clay products			14,339,785
All other non-metallic			30,587,591
Total value, non-metallic			44,927,376
Total value, metallic			45,188,387
Estimated value of mineral products not reported			300,000
Total value, 1909			90,415,763

Annual Mineral Production in Canada since 1886.

886	$ 10,221,255	1898	$ 38,412,431
887	10,321,331	1899	49,234,005
888	12,518,894	1900	64,420,983
889	14,013,113	1901	65,804,611
890	16,763,353	1902	63,211,634
891	18,976,616	1903	61,740,513
892	16,623,415	1904	60,073,897
893	20,035,082	1905	69,525,170
894	19,931,158	1906	79,057,308
895	20,505,917	1907	86,865,202
896	22,474,256	1908	85,927,802
897	28,485,023		

The preliminary table of mineral production in Canada given herewith, shows the total value of the production in 1909 to have been in excess of $90,000,000. Compared with the total value for 1908, which was $85,927,002, the production of 1909 shows an increase of a little over 5 per cent. The actual increase in the mining industry in 1909, was however, somewhat greater than is indicated by this comparison. Owing to a slight increase in the method of compiling statistics of the quantities of metals produced the values for 1909 are less than they would otherwise have been.

Of the total production in 1909, $45,188,387—or 49.9 per cent. of the total—is credited to the metals, and $44,927,376—or 49.7 per cent.—to non-metallic products; a small allowance being made for mineral products not reported. Amongst the individual products coal is still the most important, its value constituting 17 per cent. of the total; silver occupies second place with 15.9 per cent.; gold and nickel come next with 10.8 and 10.5 per cent. respectively; copper contributes 7.8 per cent.; cement 5.8 per cent.; clay products 6.1 per cent.; asbestos 2.5 per cent.

The metals nearly all showed an increased output compared with 1908. The average prices remained fairly steady throughout the year, differing but slightly from those of the year before: copper, nickel and silver, being lower in price, while lead, spelter and tin were higher.

Average monthly prices of metals, 1906-09.

—	1906.	1907.	1908.	1909.
	Cts.	Cts.	Cts.	Cts.
Copper	19·278	20·004	13 208	12·982
Lead	5·657	5·325	4·200	4·273
Nickel	41·64	45·000	43·000	40·000
Silver	66·791	65·327	52·864	51·503
Spelter	6·193	5·962	4·720	5·503
Tin	39·819	38·166	29·465	29·725

In the non-metallic class there is a larger number of products showing increases than those showing decreases. The coal production was seriously reduced by the labour troubles in Nova Scotia. The asbestos shipments were slightly less and petroleum production shows a considerable falling off. In nearly all of the other items, however, there were important increases: particularly in corundum, gypsum, natural gas, salt, and in the structural materials, cement, clay products, lime and stone.

Smelter Production.—General statistics of smelter production were collected by this Branch for the first time in 1908 and the aggregate results of these operations during the past two years are shown in the accompanying table. It should be explained also that the figures include the results of the operations at the smelter at Northport, Wash.,—treating chiefly Canadian ores.

Smelter and Refinery Production in Canada, 1908 and 1909.

—		1908		1909	
		Refined Products.	Metals contained in matte, blister, base bullion, and speiss exported.	Refined Products.	Metals contained in matte, blister, base bullion, and speiss exported.
Gold	Ozs.	15,436	203,300	18,241	200,129
Silver	"	11,168,689	3,271,899	14,242,545	4,845,920
Lead	Lbs.	36,549,274	1,116,792	41,883,614	3,973,810
Copper	"	.....	51,965,289	.....	53,328,583
Copper sulphate	"	203,379	.....	51,405	.....
Nickel	"	.....	19,506,251	.....	27,041,857
Cobalt	"	.....	692,170	.....	1,721,083
White arsenic	"	1,431,052	.....	2,258,087	.....
Arsenic	"	.....	436,787	.....	1,074,516

The total ore charged to the furnaces in 1909 was 2,377,780 tons, of which slightly over 40,000 tons were imported. The smelter products exported for refining included, in 1908, copper matte, 7,649 tons; blister copper, 15,418 tons; Bessemer nickel-copper matte, 21,210 tons, and silver-cobalt-nickel speiss 1,326 tons. In 1909 these smelter products were base bullion 2,010 tons; copper matte 11,597 tons; blister copper 14,239 tons; Bessemer nickel-copper matte 25,845 tons; silver-cobalt-nickel speiss 2,660 tons.

Gold.—A preliminary estimate shows a slight decrease in gold production in 1909. The total production in 1908 was $9,842,105, to which the Yukon district contributed $3,600,000; British Columbia, $5,929,880; Nova Scotia, $244,799. In 1909 the Yukon shows a further increase, the value of the gold being estimated at $3,960,000. The total gold exports on which royalty was paid, were, according to the records of the Interior Department, during the calendar year, 239,766.35 ounces.

Complete statistics are not yet available as to the gold production in British Columbia, but the returns received appear to indicate a reduced output. The production in Nova Scotia will not differ much from that of the previous year.

Silver.—The rapid growth of Canada's silver production which has taken place during the past few years, continued during 1909. Increased production is reported from both British Columbia and Ontario. In the first mentioned province the silver is recovered with the lead from the galena ores of that province, of which there was an increased production in 1909. The metal also constitutes an important value in the gold-copper-silver ores smelted.

In British Columbia silver is recovered as fine metal at Trail and is contained in the matte and blister exported. In Ontario, where the production is practically all from the Cobalt district, a portion of the ores (8,384 tons in 1909) is treated in Canadian metallurgical works producing silver bullion, white arsenic, and a speiss containing silver, cobalt, nickel, etc.; the balance of the ore being exported for treatment abroad. The total production of recoverable silver in Canada is estimated at 27,878,590 ounces, valued at $14,358,310, the average price of silver for the year being 51.503 cents.

The price of refined silver varied between a maximum of 53⅞ cents per ounce on May 5, and a minimum of 50¼ on March 3.

The production from the Cobalt district again shows a considerable increase over the previous year, but not so large an advance as was made in 1908 over 1907. According to returns received from 31 shipping mines, there were shipped during 1909 about 28,042 tons of ore and 2,967 tons of concentrates, a total tonnage of

31,000. The silver contents of ore shipped are returned as 22,581,788 ounces, or an average of 805.284 ounces per ton, and for the concentrates shipped 3,639,475 ounces, or an average of 1,226.651 ounces per ton. Bullion shipped from the mines contained 143,440 fine ounces of silver.

The total silver contents of ore, concentrates and bullion shipped from the mines was 26,364,703 ounces. The mine owners receive payment for only 93 to 98 per cent. of the silver contents; and in valuing the production a deduction of 5 per cent. is made from silver contained in ore and concentrates to cover losses in smelting and refining. On this basis the silver recovery is estimated at 25,128,590 ounces, and valued at $12,941,978. Payments for cobalt contents were reported as $90,750, and the total value of the year's output was a little over $13,000,000 without deduction for freight and treatment charges.

The number of men employed in shipping mines was reported as 2,768, and wages paid $2,396,742. Incomplete returns of concentration showed 127,271 tons of ore treated, producing 3,213 tons of concentrates.

In 1908 the shipments were 25,682 tons of ore and concentrates containing 19,398,545 ounces of silver, or an average of 755 ounces per ton.

The exports of silver in 1909, for the whole of Canada, as reported by the Customs Department, were 31,126,504 ounces, valued at $15,719,909.

Copper.—Although refined copper is not produced in Canada, the copper ores are mostly reduced to matte or blister copper carrying additional values in the precious and other metals. Some copper pyrites ore is mined in Quebec province, from which the copper is recovered after the ore has been used as a source of sulphur, and a small quantity of copper ore is exported from British Columbia coast mines to United States smelters for treatment.

Statistics are not available at the present time to show the total quantity of copper contained in ores shipped from the mines. The total production of copper, however, contained in blister and matte produced and estimated as recoverable from ores exported, was in 1909 approximately 54,061,106 pounds. In 1908 the production of copper estimated on the same basis was 52,928,386 pounds, an increased production of about 2 per cent. being, therefore, shown in 1909.

Of the production in 1909, Ontario is credited with 15,746,699 pounds, and British Columbia with 37,314,407 pounds. The latter figure may be subject to more or less variation as complete returns had not been received of all ore exported.

The New York price of electrolytic copper varied between the limits of 12 cents and 14⅝ cents per pound, the average monthly price being 12.982, as compared with an average monthly price of 13.208 cents in 1908.

The total exports of copper contained in ore matte and blister, according to Customs Department returns, were 54,447,750 pounds, valued at $5,832,246.

Lead.—The total production in 1909 of pig and manufactured lead and lead contained in base bullion exported was 45,857,424 pounds, valued at the average price of refined lead in New York at $1,959,488.

It is possible that there was also some lead ore or lead concentrates exported, of which no record has yet been received. Customs Department statistics indicate such an export of upwards of 2,000,000 pounds.

The production of refined lead, and lead contained in base bullion exported in 1908, was 37,666,066.

Customs Department statistics in this year also indicate an export of lead ore or concentrates, and the total production in 1908, of lead available for consumption was estimated at 40,891,448 pounds, an increased production in 1909 is, therefore, shown of from 5,000,000 to 7,000,000 pounds. This production in both years was all from the province of British Columbia.

The total amount of bounty paid during the twelve months ending December 31, 1909, on account of lead production, was $346,527.98.

The exports of lead in ore, concentration, base bullion, etc., during the year, were 3,116 tons, and of pig lead 5,650 tons, or a total of 8,766 tons. From 14,000 tons to 15,000 tons of domestic production were, therefore, available for home consumption.

The price of lead in New York during 1909 averaged 4.273 cents per pound, varying between 3.95 cents in March and 4.70 cents in December. In 1908 the average was 4.200 cents per pound. The London price per long ton varied between £ 12 10s. and £ 13 16s., averaging £13.049.

Nickel.—The nickel industry was particularly active during 1909, the largest production on record being shown. Although important quantities of nickel are contained in the cobalt silver ores of Coleman township, the Sudbury district continues to be the chief source of nickel production. The same companies are carrying on active operations: the Mond Nickel Co., at Victoria Mines, and the Canadian Copper Co., at Copper Cliff. The ore is first roasted and then smelted to a Bessemer matte containing from 77 to 82 per cent. of the combined metals, copper and nickel; the matte being shipped to the United States and Great Britain for refining.

The total production of matte in 1909 was 25,845 tons, valued at the furnaces at $3,913,012. The metallic contents were copper 15,746,699 pounds, nickel 26,282,991 pounds.

The aggregate results of the operations on the Sudbury district nickel-copper ores during the past four years are as follows:—

	1906. Tons of 2,000 lbs.	1907. Tons of 2,000 lbs.	1908. Tons of 2,000 lbs.	1909. Tons of 2,000 lbs.
Ore mined	343,814	351,916	409,551	451,892
Ore smelted	340,059	359,076	360,180	462,336
Bessemer matte produced	20,364	22,041	21,197	25,845
Bessemer matte shipped	20,310	22,025	21,210	.....
Copper contents of matte shipped	5,265	6,996	7,503	7,873
Nickel "	10,745	10,595	9,572	13,141
Spot value of matte shipped	$4,628,011	$3,289,382	$2,930,989	$3,913,012
Wages paid	1,117,420	1,278,694	1,286,265	1,234,903
Men employed	1,417	1,660	1,690	1,735

Exports of nickel contained in ore, matte, etc., as complied from Customs reports were for the twelve months ending December 31, as follows:—

	1906. Pounds.	1907. Pounds.	1908. Pounds.	1909. Pounds.
To Great Britain	2,716,892	2,518,338	2,554,486	3,843,763
To United States	17,936,953	16,857,997	16,865,407	21,772,635
	20,653,845	19,376,335	19,419,893	25,616,398

Nickel contained in silver cobalt ores:—The mine owners received no payment for nickel contents and complete statistics are not available as to the total quantity of nickel contained in these ores, of which about 31,009 tons were shipped during 1909. Of the total shipments, 8,384 tons were treated in Canadian metallurgical works at Copper Cliff, Deloro and Thorold, producing silver bullion and white arsenic, the remaining speiss or residues amounted to 2,660 tons and contained silver, cobalt, nickel and arsenic, the nickel con-

tents totalling 758,966 pounds and the cobalt contents 1,721,083 pounds.

The price of refined nickel in New York was quoted at from 40 to 50 cents per pound, the quotations in December being "large lots, contract business 40 to 45 cents per pound. Retail spot from 50 cents for 2,000 pound lots up to 55 cents for 500 pound lots. The price for electrolytic is 5 cents higher."

Nickel is quoted on the London market at prices equivalent to, or slightly in excess of those in New York.

Iron Ore.—The total shipments of iron ore from mines in Canada in 1909 were 268,043 short tons, valued at $659,120, as compared with 238,082 tons, valued at $568,189 in 1908. The shipments in 1909 may be classified as magnetites, 73,420 tons; hematite, 190,473 tons; bog ore, 3,330 tons; titaniferous magnetite (sand) for experimental purposes, 820 tons. In 1908 the ores shipped included magnetite 49,946 tons; hematite 173,164 tons; carbonate ore, 4,869 tons; bog ore, 10,103 tons.

Exports of ore from Canada during 1909, as recorded by the Customs Department, were 21,956 tons, valued at $61,965.

Although not a portion of the Dominion of Canada, it may be of interest to state the iron ore shipments from Newfoundland during 1909. The two Canadian companies operating the Wabana mines shipped during the year 991,115 gross tons, or 1,110,049 short tons, of which 697,068 tons were shipped to Sydney and 412,981 tons to the United States and Europe.

Pig Iron.—An increase of 20 per cent. is shown in the production of pig iron in Canada in 1909 as compared with 1908, despite the fact that the Londonderry furnace was out of commission during the whole year. The total production during 1909 was 757,162 short tons, valued at $9,581,864 as compared with 630,835 tons, valued at $8,111,194, in 1908. These figures do not include the output from electric furnace plants, making ferro products, which are situated at Welland and Sault Ste. Marie, Ontario, and Buckingham, Que.

Of the total output of pig iron during 1909, 17,003 tons, valued at $371,368, or $21.84 per ton, were made with charcoal as fuel, and 740,159 tons, valued at $9,210,496, or $12.44 per ton, with coke. The amount of charcoal iron made in 1908 was 6,709 tons, and iron made with coke 624,126 tons. The classification of the production in 1909, according to the purpose for which it was intended, was as follows:—Bessemer, 222,931 tons; basic, 400,921 tons; foundry, including miscellaneous, 116,307 tons.

The amount of Canadian ore used during 1909 was 231,994 tons, imported ore, 1,234,990 tons; mill cinder, etc., 25,508 tons. The amount of coke used during the year was 919,271 tons, comprising 412,016 tons from Canadian coal and 507,255 tons imported coke or coke made from imported coal. The consumption of charcoal was 1,782,258 bushels. Limestone flux was used to the extent of 526,076 tons. In connection with blast furnace operations there were employed 1,486 men and $879,426 were paid in wages.

The total daily capacity of 16 completed furnaces was, according to returns received, 2,735 tons. The number of furnaces in blast on December 31, 1909, was 11.

The production of pig iron by provinces in 1908 and 1909 was as follows:—

Province	1908.			1909		
	Tons.	Value	Per ton.	Tons	Value	Per ton.
		$	$ cts.		$	$ cts.
Nova Scotia	352,642	3,554,540	10,08	345,380	3,453,800	10 00
Quebec	6,709	171,383	25 55	4,770	125,623	26 34
Ontario	271,484	4,385,271	16 15	407,012	6,002,441	14 75
Total	630,835	8,111,194	12 86	757,162	9,581,864	12 65

Steel.—Returns were received from eight steel plants at which 2,073 men were employed and $1,284,940 paid in wages during 1909. The total production of ingots and castings was 754,719 short tons, with an estimated value of $14,359,710, as compared with 588,763 tons, valued at $10,916,602, in 1908.

Details of production during the two years are as follows:—

	1908.		1909.	
	Tons.	$	Tons	$
Ingots—Open hearth (basic)	443,442	7,684,277	535,988	9,372,615
Bessemer (acid)	135,557	2,535,287	203,715	3,829,012
Castings—Open hearth	9,051	617,126	14,013	1,043,370
Other steels	713	79,912	1,003	114,713
Total	588,763	10,916,602	754,719	14,359,710

Iron and Steel Bounties.—Following is a statement of the bounties paid on iron and steel during the calendar years 1908 and 1909, as kindly furnished by the Trade and Commerce Department. As no bounty is paid on iron made from mill cinder or ingredients other than ore, the figures do not show the total output of the furnaces but only those quantities on which bounty was paid.

	1908.		1909	
	Quantity on which Bounty was paid.	Bounty.	Quantity on which Bounty was paid.	Bounty
	Tons,	$ cts.	Tons.	$ cts.
Pig iron made from Canadian ore	101,647	213,458 34	126,297 55	214,705 80
Pig iron made from imported ore	517,427	569,166 93	607,718 09	425,402 64
Total, pig iron	619,074	782,628 27	734,015 64	640,108 44
Steel ingots	556,289	917,876 63	729,189 37	766,470 41
Steel wire rods	49,630	297,778 68	81,405 42	488,432 70
Total bounty paid on iron and steel		1,998,283 58		1,895,011 55

White Arsenic.—The total output of white arsenic as reported by three firms making this product was 2,258,187 pounds, valued at $64,100. In addition the residues or speiss from these works exported contained 1,074,511 pounds of arsenic. This is all obtained from that portion of the Cobalt ores treated in Canada. No record is available of the total arsenical contents of these ores. The exports of arsenic are reported as 3,111,249 pounds, valued at $119,673. The production of white arsenic in 1908 was 1,431,000 pounds, valued at $41,060, and of arsenical ore and concentrates 986 tons, valued at $17,506.

Asbestos.—A feature of special interest in connection with the asbestos industry during 1909 has been the consolidation of interests amongst a number of the larger producers, resulting in the formation of the Amalgamated Asbestos Corporation, Limited.

While the actual shipments of asbestos were somewhat less in 1909 than in 1908 the stocks on hand at the end of the year are reported considerably larger than on December 31, 1908.

The total shipments of crude and mill stock in 1909 were 63,349 tons, valued at $2,284,587, as compared with shipments of 66,548 tons, valued at $2,555,361, in

1908, the decrease being 3,199 tons, or 4.8 per cent. The stocks on hand December 31, 1909, were about 20,920 tons, valued approximately at $1,179,679, as compared with stocks on hand December 31, 1908, of 8,669 tons, valued at $596,095.

The total shipments, showing details of crude and mill stock were in 1908 and 1909, as follows:—

	1908			1909		
	Short Tons	Value	Per ton.	Short Tons.	Value	Per ton.
		$	$ cts.		$	$ cts.
Crude, No 1	857½	257,752	300 59	912·3	246,655	270 37
" 2	2,488	411,480	165 38	2,162	328,855	152 11
Mill Stock, No 1	5,282½	425,448	80 54	14,776	785,731	53 18
" 2	45,545½	1,345,750	29 33	32,417	800,728	24 70
" 3	12,374½	114,931	9 29	13,082	122,618	9 37
Total asbestos	66,548	2,555,361	38 40	63,349·3	2,284,857	36 06
Total asbestic	24,225	17,974	0 74	23,951	17,188	0 72
Grand total	90,773	2,573,335		87,300·3	2,301,775	

Exports of asbestos according to Customs returns were:—

	Tons.	Value.
		$
Twelve months ending December, 1907	56,753	1,669,299
1908	61,210	1,842,763
1909	56,971	1,729,857

Corundum.—The quantity of corundum ore treated during the year was 35,894 tons, from which was produced 1,579 tons of grain corundum. The total shipments were 1,491 tons, valued at $157,398, or an average of a little over 5 cents per pound.

Coal and Coke.—The total coal production in Canada, in 1909, comprising sales and shipments, colliery consumption and coal used in making coke, is estimated at 10,411,955 short tons, valued at $24,431,351. This is a smaller production than in either of the two preceding years, though the total may be slightly increased when more complete returns are received. The western provinces each show an increased production of coal in 1909, but not sufficient to counteract the reduced output in Nova Scotia, which resulted from the coal miners' strike. The aggregate decrease for the whole of Canada was about 474,356 tons, or 4.36 per cent., while Nova Scotia alone showed a falling off of 968,789 short tons, or 14.56 per cent.; the aggregate increase in the western provinces being 505,404 tons, or 12.11 per cent.

Of the total production Nova Scotia contributed 54.5 per cent., Saskatchewan and Alberta 20.5 per cent. and British Columbia 24.3 per cent.

The production by provinces was approximately as follows, the figures for 1907 and 1908 being also given:—

Province.	1907		1908.		1909.	
	Tons.	Value.	Tons.	Value.	Tons.	Value.
		$		$		$
Nova Scotia	6,354,133	12,764,999	6,652,539	13,364,476	5,683,750	11,418,249
British Columbia	2,364,898	7,390,306	2,333,708	7,292,838	2,538,004	7,931,263
Alberta	1,591,579	3,836,286	1,685,661	4,127,311	1,978,843	4,730,270
Saskatchewan	151,232	252,437	150,556	253,790	163,329	253,073
New Brunswick	34,584	77,814	60,000	135,000	49,029	98,496
Yukon Territory	15,000	60,000	3,847	21,158	.....	.....
Total	10,511,426	24,381,842	10,886,311	25,194,573	10,411,955	24,431,351

The total production of oven coke in 1909 was about 875,080 short tons, valued at $3,557,147, being a slight increase over the production in 1908. At the ovens of the Dominion Iron and Steel Co. at Sydney a quantity of imported coal was used, the supply of domestic coal being insufficient on account of the strike. The Atikokan Iron Company at Port Arthur uses imported coal exclusively. At all other ovens Canadian coal is used. At the end of the year there were in Nova Scotia 670 ovens in operation, 64 idle and 120 building. In Alberta 226 were in operation and 40 idle, and in British Columbia 767 in operation and 753 idle. The ovens of the Dominion Iron and Steel Co. are of the Otto Hoffman by-product type and there were recovered as by-products 4,016,824 gallons of tar and 3,351 short tons of sulphate of ammonia.

Feldspar.—Total shipments are reported as 10,286 tons, valued at $35,694. This includes a quantity of high grade "dental spar" shipped from the Villeneuve mine, Quebec, and valued at from $16 to $20 per ton at Buckingham.

Petroleum and Natural Gas.—The production of crude petroleum was as usual nearly all derived from the Ontario peninsula. Direct returns from the producers have not been obtained, but the production upon which bounty was paid, ascertained by the Trade and Commerce Department, was 14,726,433 gallons, of which 3,328 gallons were produced in New Brunswick. This is equivalent to 420,755 barrels, and at an average price of $1.33 per barrel was valued at $559,604. The production in 1908 was 527,987 barrels, valued at $747,102, an average per barrel of $1.34, showing a decrease of about 20 per cent. in the quantity produced. The total bounty paid in 1909 was $220,896.50 as compared with $227,193.21 in 1908 and $414,157.89 in 1907.

While the production of petroleum has been falling off the receipts from natural gas sold have been increasing. The producing gas wells are located in the counties of Welland, Haldimand, Norfolk, Kent, Essex, and Bruce, in Ontario, and at Medicine Hat and vicinity in Alberta. The total receipts from gas sold in 1909 were about $1,205,943, the figures representing, with one or two exceptions, the total values paid by the consumers.

The quantity of gas sold or used during the year was over 6,000,000 M. feet. Of the total value about 95 per cent. is to be credited to Ontario. The total receipts in 1908 were $1,012,660.

Phosphate.—The price of this mineral has been increasing. There is a growing demand for it and a revival of phosphate mining appears to be imminent.

Salt.—Complete returns of salt production received show total sales of 84,037 tons, valued at $415,219 for the salt alone. Packages used were valued at $175,612; stock on hand at the end of the year was reported as 2,671 tons; 185 men were employed, and $96,116 paid in wages.

Lime.—Fairly complete statistics of lime production have been received for 1909. The total sales and shipments are reported as 5,163,874 bushels, valued at $1,049,473, or by provinces as follows: Nova Scotia and New Brunswick, 747,696 bushels, valued at $179,380; Quebec, 1,155,167 bushels, valued at $277,253; Ontario, 2,434,686 bushels, valued at $404,782; Western Provinces, 826,325 bushels, valued at $188,058.

Portland Cement.—Complete statistics have been received from all but two cement manufacturers in 1909. These, however, will not increase the totals by more than 2 or 3 per cent. Subject to this correction the total quantity of cement made during the year was 4,089,191 barrels as compared with 3,495,961 barrels in 1908, an increase of 593,230 barrels, or 17 per cent.

The total quantity of Canadian Portland Cement

sold during the year was 4,010,180 barrels, as compared with 2,665,289 barrels in 1908, an increase of 1,344,891 barrels, or 50 per cent.

The total consumption of Portland cement in 1909 including Canadian and imported cement, was 4,152,374 barrels, as compared with 3,134,338 barrels in 1908, an increase of 1,018,036 barrels, or 32 per cent.

Detailed statistics of production during the past three years have been as follows:—

	1907.	1908.	1909
	Barrels.	Barrels	Barrels
Portland cement sold	2,436,093	2,665,289	4,010,180
" manufactured	2,491,513	3,495,961	4,089,191
Stock on hand January 1	299,015	383,349	1,093,493
" December 31	354,435	1,214,011	1,172,504
Value of cement sold	$3,777,328	$3,709,063	$5,266,008
Wages paid	956,080	1,274,638	1,182,090
Men employed	1,786	3,029	2,411

The average price per barrel at the works in 1909 was $1.31, as compared with $1.39 in 1908.

The imports of Portland cement into Canada during the twelve months ending December 31, 1909, were 497,678 cwt., valued at $166,669. This is equivalent to 142,194 barrels of 350 pounds, at an average price per barrel of $1.17. The imports in 1908 were 469,049 barrels, valued at $531,045, or an average price per barrel of $1.13. The duty is 12½ cents per hundred pounds.

As there is very little cement exported from Canada, the consumption is practically represented by the Canadian sales together with the imports.

Following is an estimate of the Canadian consumption of Portland cement for the past five years:—

Calendar Years.	Canadian		Imported		Total	
	Barrels.	Per cent	Barrels	Per cent.	Barrels.	Per cent
1905	1,346,548	59	918,701	41	2,285,249	
1906	2,119,764	76	665,845	24	2,785,609	
1907	2,436,093	78	672,630	22	3,108,723	
1908	2,665,289	85	469,049	15	3,134,338	
1909	4,010,180	97	142,194	3	4,152,374	

CONSERVATION WORK OF THE GEOLOGICAL SURVEY FOR THE YEAR ENDING MARCH 4, 1910.

During the last twelve months the conservation work of the United States Geological Survey has included investigations relating to coal, oil, and phosphate deposits, and to water-power sites on the public domain.

Public Coal Lands.

Coal land withdrawals were made covering 7,675,000 acres not previously withdrawn, and the form of withdrawal affecting an additional 9,000,000 acres was changed to cover all forms of entry instead of coal entry alone. The new regulations of April 10, 1909, for the classification and valuation of coal lands, materially increased the sale price of these lands and fixed more definitely the standards of coal classification. Thus, for example, under the old regulations, in eight widely separated townships the total area classed as coal land was 66,320 acres, and the sale price was fixed at $2,088,600, whereas, under the new regulations, the area in the same eight townships classed as coal land is 126,663 acres, and the sale price is $15,777,668—an increase in area of over 100 per cent., and in price over 600 per cent.

Under the old regulations the maximum price per acre for coal land was fixed at $75; under the new regulations the maximum price per acre thus far fixed for any particular area is $465. The maximum valuation of a single township under the old regulations was $949,600; under the new regulations it is $9,206,894. Special efforts have been made to release from existing withdrawals all noncoal areas, and of the total area classified during the year, amounting to 17,200,000 acres, much the larger part, or about 14,000,000 acres, has been classed as noncoal land. The sale price of the 3,436,000 acres classed as coal land has been fixed at $191,490,000. The same land, if sold at the minimum price fixed by law, would have yielded $62,477,000.

Public Phosphate Lands in Wyoming, Idaho, and Utah.

Phosphate land withdrawals in force March 4, 1909, covered all vacant public lands in an area comprising 4,493,551 acres in Wyoming, Utah, and Idaho. During the year areas covering 2,389,141 acres were restored to entry, for the field work showed that they contained no phosphate. Additional withdrawals including 399,693 acres have been made, and the form of withdrawal has been changed so as to cover entered as well as vacant lands. All unpatented lands in an area of 2,504,103 acres are now affected by phosphate withdrawals.

Western Public Oil Lands.

The California oil-land withdrawals made prior to March, 1909, aggregating 2,313,482 acres, prevented the acquisition as oil or as mineral lands as well as for agricultural land laws. All lands covered by these withdrawals could be legally exploited for oil or other minerals. During the year these lands were excepted from acquisition as oil or as mineral lands as well as for agricultural use. New withdrawals were made in the States of California, Colorado, Oregon, Utah, and Wyoming of a total area of 2,130,510 acres. In California there were restored to entry 956,916 acres that field examination had shown to be nonoil land. The area now covered by oil withdrawals is 3,487,076 acres.

Public Power-Site Withdrawals.

On March 4, 1909, power-site withdrawals were in force covering vacant public lands on twenty-nine rivers in nine states. These withdrawals have since been reviewed by the Geological Survey, the form of withdrawal has been changed to include all entered as well as all vacant lands, and the lands that were found to be not valuable for the purpose for which the withdrawal was made have been restored to entry. New withdrawals have been made along ninety-seven rivers covering land not involved in previous withdrawals and increasing the total number of states affected to eleven. These power-site withdrawals now cover about 1,300,000 acres of vacant public land and 200,000 acres of entered land.

PRELIMINARY STATEMENT OF THE MINERAL PRODUCTION OF THE PROVINCE OF QUEBEC DURING THE YEAR 1909.

By Theo. C. Denis, Superintendent of Mines.

Preliminary statement of the mineral production in the province of Quebec during the calendar year 1909.

(Subject to revision.)

The total value of the mineral production of the Province of Quebec for the calendar year ending December 31st, 1909, according to the returns received by the Bureau of Mines of the Province, amounted to $5,424,808. This is a slight decrease as compared with the previous year, the figures for which are given in an adjoining column.

Asbestos.—The total shipments of asbestos and asbestic during the year totalled 88,315 tons, 2,000 lbs., valued at $2,315,816, as follows:—

Crude asbestos, tons	3,298	$ 581,618
Mill stock, tons	60,556	1,713,876
	63,854	2,295,494
Asbestic, tons	24,461	20,322
	88,315	$2,315,816

This is a slight decrease as compared with the shipments of the previous year, but this is not to be taken as a decrease of activity of the industry. In fact, one of the main causes of this lower figure has been that preparations were being made for a higher production in 1910. Several mills either curtailed their production, or even stopped operations, during more or less extensive alterations and improvements for greater activity. There are at the present time four new large mills being erected.

(Subject to revision)

	Quantity.	Value 1909 $	Value 1908 $
1 Bog Iron Ore.....Tons	2,900	3,200	30,757
2 Ochres..... "	3,940	28,093	19,940
3 Chromite..... "	5,000	55,000	83,740
4 Copper ore..... "	35,000	130,000	159,588
5 Asbestos..... "	88,315	2,295,494	2,551,596
6 Asbestic..... "		20,322	
7 Mica..... lbs.	62,516	26,834	95,311
8 Phosphate.....Tons	45	445	1,610
9 Graphite..... lbs.	193,320	8,699	165
10 Mineral Waters.....galls	32,537	17,246	....
11 Slate.....	.....	24,000	20,056
12 Cement.....barrels	1,011.194	1,314,551	1,127,335
13 Magnesite.....Tons	330	2,508	520
14 Marble.....	.....	130,000	....
15 Flagstone.....	.....	8,500	3,600
16 Granite.....	.....	149,064	250,000
17 Lime.....	.....	98,989	96,000
18 Limestone.....M.	.....	114,942	223,580
19 Bricks.....	89,091	512,521	525,000
20 Tiles and Pottery of Canadian clay, (partly estimated).....	.....	100,000	270,000
* Estimated value of products not returned...	84,409	84,400	....
		5,424,808	5,458,998

* Made up of 5 % of value of products Nos. 16-17-18 and 10 % of value of No. 19.

It sounds already like ancient history to mention that the great feature of the asbestos industry during the year 1909 has been the consolidation of various companies into two large companies, viz.: the Amalgamated Asbestos Corporation, Ltd., and the Black Lake Consolidated Asbestos Co., Limited. The Amalgamated Asbestos Corporation was formed with a capital of $25,000,000, to take over and operate the mines and mills of the following companies: King's Asbestos Mines, Ltd., of Thetford; Beaver Asbestos Company, of Thetford; British Canadian Asbestos Co., of Black Lake; Standard Asbestos Company, Ltd., of Black Lake; Dominion Asbestos Company, of Black Lake.

The Black Lake Consolidated Asbestos Company, Limited, was formed with a capital of $5,000,000 to take over the properties of the Union Asbestos Mine, Black Lake; the Black Lake Chrome and Asbestos Company, of Black Lake; the Dominion Chrome Company, of Black Lake; the Imperial Asbestos Company, of Black Lake. This amalgamation did not produce any asbestos during the year 1909, but it is at present erecting one of the largest mills of the district, which is expected to start operations in May.

The following companies made returns of production for the year 1909:—

Amalgamated Asbestos Corporation, Ltd., Thetford and Black Lake.

Asbestos and Asbestic Company, Ltd., Danville.

Bell Asbestos Mines, Thetford.

Broughton Asbestos Fibre Co., East Broughton.

Eastern Townships Asbestos Co., Thetford.

Jacobs Asbestos Mining Co., Thetford.

Johnson's Asbestos Company, Thetford and Black Lake.

Ling Asbestos Company, East Broughton.

Robertson Asbestos Mining Co., Robertsville.

Mica.—The mica industry was very inactive during 1909, and the market for this product was unsatisfactory. At the prices offered by buyers the producers could not make ends meet, and as a result the figures of production are considerably below last year's.

Cement.—The production of cement in the Province of Quebec in 1909 shows a substantial increase as compared with 1908. This industry was also characterized by a consolidation of interests, national in scope. The Canada Cement Company took over the three largest plants in the Province of Quebec, as well as others in Ontario and in the western provinces. It is said that very substantial savings in freight and in management can be effected by the amalgamation, and the company claims that the consumer will derive benefit from such savings.

Other Building Materials.—These comprise building stones, lime, marble, bricks, tile and pottery manufactured from Canadian clay. It is, of course, very difficult to gather complete figures of production of these materials. In past years it has been the custom of the Quebec Bureau of Mines to adopt the figures given by the last Dominion census, but this year we made an attempt to get returns direct from the producers. The figures for 1909 are not, therefore, comparable with the production of the previous year. The results of our endeavour have been very gratifying, as will be seen by glancing over the table for 1909, which is compiled from direct returns. I must say, however, that our work in this respect has been considerably lessened by the use which we freely made of the lists of producers of stone, bricks, lime and pottery given in the Report on the Mining and Metallurgical industries issued by the Mines Branch of Ottawa, and of the lists compiled by Mr. McLeish, which are printed in leaflets.

Mining for wood is the rather unusual industry found at Mongtze, Upper Tonkin, by the French Consul. At some time a pine forest was swallowed up, and the trees—lying in a slantingg direction and some of them a yard in diameter—are covered by eight or ten yards of sandy soil. The perfect preservation of the tops indicates that the trees were buried at a comparatively recent period. The timber supplied seems to be imperishable, and is especially prized by the Chinese as coffin-making material.

NOTES ON PROSPECTING IN ONTARIO.

Written for the Canadian Mining Journal by W. M. Goodwin.

The Director of the Geological Survey has pointed out in one of his reports that what is probably the greatest remaining region in the world unexplored by the prospector lies in Canada. A considerable part of this area, a part comparatively easy of access, lies in Ontario, and consists of pre-Cambrian rocks, a geological horizon considered to be specially favourable for mineral deposits of economic importance.

The National Transcontinental Railway runs from end to end of New Ontario through a stretch of country that is unprospected, except in a few special localities, and along the banks of the main rivers. All the territory north of this line is marked on maps as unprospected; but even south of it the country down as far as the C. P. R. has been very little explored in the manner that has brought to light deposits such as Cobalt, Gowganda, and Porcupine. Except for the first accidental discovery at Cobalt, these discoveries have been the result of patient, careful, and systematic prospecting, a style of prospecting that is even yet not followed by any great number of men outside of certain camps.

Up to the present far too great a proportion of prospectors have done their "work" from their canoes, along the banks of the rivers, on the shores of the lakes, and along the old portage trails of the Indians and Hudson Bay Company's trappers. The probability is that every traveller interested in rocks and minerals, since the time of the earliest explorer, has examined these self-same spots. Thus the prospector, though he may indeed be following in the footsteps of the pioneer, is not likely to "find a mine" unless he sidesteps a little and gets on new ground.

To do really effective prospecting, one must get off the principal routes of travel and well-used trails, and dive right into the bush. Wise prospectors adopt this method of finding a place to work, leaving the nice rocky shores of our beautiful lakes to the appreciative attention of the man who is taking a summer outing.

To strike out into the green bush without a map—for there are no maps of our unsurveyed lands that show more than the main topographical features—is not nearly so hazardous an undertaking as one not accustomed to it might imagine. By using a fair amount of common sense and providing himself with a proper and adequate outfit, an ordinary man, even though his experience in the bush may not have been very extensive, can travel quite comfortably and explore localities that have never been looked at before. Common sense every man has to provide for himself; but a few hints about methods of working and outfit may prove useful to those prospectors or prospective prospectors who have not found something better for themselves.

To make a trip a long distance away from a railroad means a lot of food to use on the road to and from. Consequently, as the capacity of one's canoe and one's back is limited, the length of time spent in actual prospecting diminishes as the distance from the railroad increases. This necessarily makes smaller the chances of finding a mineral deposit. Besides, it is only occasionally that deposits of ore at any considerable distance from a railroad or easily navigable water route are of immediate value; and it is ordinarily only large corporations that can afford to hold such distant deposits until a railroad is built to them.

Hence it behooves the prospector to take advantage of the numerous openings on "good ground" not too far from railroads already built, in process of construction, or about to be built. A man who has not looked into the matter will be surprised to find how much promising ground near the railroads has not been touched by the prospector. The townships of Whitney and Tisdale were surveyed before the T. & N. O. R. had reached Cobalt, and were even then considered to be not so very far from a source of supplies. Yet it is only now, several years after the railroad has been in operation only a comparatively few miles from Porcupine Lake, that careful searching has revealed the presence of gold deposits there. The National Transcontinental Railway and the C. N. R. from Sudbury to Port Arthur will make accessible for prospecting areas that will keep great numbers of men busy for many years.

Considering the matter in a broad way, it may be said that the same conditions of topography, climate, and accessories such as flies, exist throughout that part of Northern Ontario accessible to the prospector. Hence the outfit found best in one district will probably be best in the others. The canoe is usually the most important item; but if a man is working near a railroad he may not have a great deal of use for one. Canvas-covered canoes, as manufactured by the Chestnut Canoe Co., are much used now, and have many points of superiority over basswood or cedar. The tough, well-filled canvas resists abrasion to a remarkable extent, and the wide cedar ribs make the bottom the next thing to puncture-proof. The good wearing qualities have been demonstrated beyond a doubt, and offset the higher price. By leaving a canvas canoe out in the sun, water absorbed by the cedar sheathing and ribs is evaporated, and its weight can be kept about the same as when it left the factory, a thing that is impossible with the ordinary wooden canoe. Patching is very easy with shoemaker's tacks and pitch or spruce gum. A 16-foot canoe is the one most commonly used, and, if of a good stout model, is in ordinary waters about as safe as a canoe can be. The writer has used for a whole season a 12-foot canvas, and although it proved rather too short for rapids, the ease with which it was packed through the bush without cutting portages—a thing that is next to impossible with a 16-foot canoe—bears great weight in his opinion of its usefulness to the prospector. On one trip this canoe carried two men and a 300-lb. load without being overloaded. Of course, no canoe is safe in inexperienced hands, and the smaller the canoe the greater is the risk, if one is not thoroughly familiar with the use of canoes of every sort.

The prospector generally uses a small canvas tent, in which he rolls up his blankets, dunnage, cooking utensils and grub when on the march. An outfit that is more conducive to comfort than this one, though more expensive, is a silk tent and oiled canvas tarpaulin. The tarpaulin is just as serviceable and handy a receptacle for dunnage as the canvas tent, and with the silk tent weighs no more than the canvas outfit. The advantage of its use is that it will keep the blankets dry even if the ground or brush bed over which it be spread be quite wet. This will give a man a dry and comfortable bed even when he has made camp in a rainstorm.

A necessary addition to the tent of the prospector in Ontario who wants to spend the fly season (the latter

part of June, July and the first part of August) at his work, is a fly net. This is best made of cheese cloth or some other porous material with mesh smaller than mosquito netting, which latter lets the black flies through. If made so full at the bottom that it can be lifted up over the head to enter, it will be found most satisfactory. A sod-cloth round the bottom edge of the tent, on which rocks, poles, or the blankets can be spread on the inside, is another adjunct of the completely provided tent. Some prefer a complete little tent of cheese-cloth, to be hung up inside the other tent. With a safe and sure place of retreat of this sort and a liberal supply of a good fly oil, a man with a very ordinary amount of restraint over his tongue can pass the whole season in the bush without rendering himself liable to eternal damnation. A very effective as well as pleasant fly oil is made from 2 parts of olive oil with 1 part of oil of citronella. This mixture is the best the writer has found among dozens tried.

The prime necessity for the prospector, as for everybody else, is food. A very liberal allowance is 100 lbs. per man per month; usually two-thirds of this will do. The old rule is one-third pork, one-third flour and the rest beans, rice, dried apples, oatmeal, tea, sugar, salt, and baking powder. With the addition of desiccated potatoes, concentrated soup tablets, butter, condensed cream, dried eggs, and cocoa, an almost luxurious bill of fare can be prepared. Such supplies as flour and fruit are best put up in small cotton bags with tie strings attached. It is a good practice to carry this grub in a stout water-proofed canvas bag.

For cooking, one uses a frying-pan, a nest of four or five small tin pails with covers, and perhaps a reflector or Dutch oven for baking beans and bread. A spoon per man is necessary, and a fork each is handy, but a table-knife is superfluous, as each man carries a good jack-knife. A tin plate and bowl each completes this part of the outfit. An extra frying-pan is easily made by putting a split stick an inch or so in diameter of handy length for a handle on the edge of a plate. The culinary art is learned only by experience, and a man soon becomes proud of his flapjacks, bacon, and baked beans.

If a trip is not to be of more than a few weeks' duration, a change of underclothing, three or four pairs of socks (one usually burns a few), a pair of short oiled moccasins for "house slippers," and a sweater or short jacket should be taken extra. The ordinary clothing is woollen underwear, thick woollen socks, high boots or shoe-packs, stout canvas or cloth trousers, a flannel shirt, and slouch hat. All-important to the man who goes off the beaten trails is his pocket compass. The writer keeps his compass tied to his trousers, and never parts with the former unless the latter go too. The sun gives you your direction when not directly overhead; but the compass is a sure guide, fair weather or foul, except in rare cases when influenced by a large magnetic ore body. A water-proof matchsafe and a pocket lens are very useful.

A handy outfit for repairs is found in the old-fashioned "house-wife." This is a little cloth or leather roll with pockets containing needles, pins, thread, yarn and buttons. If you add a roll bandage, adhesive plaster, a few assorted pills, a brad-awl, a small file, tacks of various sizes, wax-end and cobbler's thread, you have the essentials of a tailor and a shoemaker, and with axe and knife, a carpenter's outfit, so far as needs in the bush are concerned, all in a little bundle weighing between one and two pounds.

With an outfit as indicated above, two men can start off with four or five weeks' grub and have the whole outfit made up into canoe and three bundles of 75 to 85 lbs. each. This means two trips on the portages until most of the grub is eaten, unless the man with the canoe can take a little load besides, and the other man stiffens up his neck so that he can carry a good heavy pack on his tump-line.

For portaging, the tump-line is far better than anything else, and it pays the novice to endure for a few days the sufferings from a squashed neck rather than to be forever tied down to shoulder-straps. The tump-line is very easily changed from one pack to another, and it is easy to get the pack in position on your back. If you stumble you don't need to wear yourself out trying to get up again without disengaging those much-qualified straps; and if you fall into a creek you are not drowned; for the tump-line drops off automatically as you fall.

If our two men are wise, they won't waste much time in the immediate vicinity of Porcupine this spring. They may go there for a few days to study the occurrence of the gold-bearing quartz; then they will strike off into the bush, outside of the winter-staked area, and travel from one small lake to another, either using the little streams to guide them or following an overland course by compass. It is necessary for them to pitch camp on a stream or lake sufficiently large or well marked to be sure of finding it again if they intend to wander far from it. They will take a look at whatever exposures of rock they see. If it is intrusive granite, they may keep an eye open for tinstone. If the post-Huronian diabase intrudes, they may hope for silver. If the old Keewatin rocks appear, gold quartz, magnetite and hosts of other minerals may reasonably be expected. By means of associations of this sort the man who has studied the occurrence of ore bodies can save a lot of time and energy; he won't search crevices in a big patch of even-grained granite for a cobalt-silver vein, nor will he climb along the face of a big diabase cliff prepared to find a mica deposit.

Our men will probably meet few others, if they are in a good place; for, as noticed before, it is sad but true that most so-called prospectors prefer to ornament the banks of the rivers and lakes used as highways, or to add to the populations of the numberless little "rush" camps, rather than do patient, persevering, independent work, the kind that will give the best results in the long run.

The recent conclusion that all boiler corrosion is a result of galvanic action is being questioned, and another cause has been brought to the notice of the Society of Chemical Industry by K. N. Huntley. In this case sulphur appears to have produced the pitting of a boiler. Increase in the caustic soda used had no effect, and the water was slightly alkaline, but blisters formed —especially near the water-line—proved to contain ferrous sulphate with a slight excess of sulphuric acid. The investigation has suggested an explanation of the curious acid corrosion in alkaline water. The sulphur contained in the water seems to be first oxidized to sulphuric acid, and this attacks the metal about it, depositing oxides that form a membrane permeable to oxygen, but not to alkali. Thus the acid continues its work of corrosion, while protected against neutralization by a shield of its own construction.

OUR EUROPEAN LETTER.

Coal-cutting Machines in Scotch Collieries—A New Electrically-driven Cutter—Internal Combustion Engines for Haulage Work in Mines—Tardy Use in England—Experts' papers at Institution of Mining and Metallurgy—Vacuum Process in Cornish Tin Mines—Belgian Limitation of Coal Miners' Hours.

Exclusive Correspondence of the Canadian Mining Journal.

London, February 17th, 1910.

Mining engineers are continually urging coal-cutting machines upon our colliery owners. In a number of Scottish collieries working the long-wall system of mining such machines are now working on an inclination of 27 degrees, cutting uphill and downhill for 390 feet per shift. These machines on the Continent are working on even steeper seams. I would like to see British colliery owners go in for a larger number of coal-cutting machines, as therein is believed to lie the remedy of the Eight Hours Act. The output of coal is increased by fewer men at a lower cost.

A new machine on the market is the Simplex Bar coal-cutting machine, electrically driven and built at Wolverhampton. In this the cutter-bar is coupled direct to the motor shaft without gearing, and the machine can cut both ways without alteration in the position of a main frame. By tilting the machine a cut can be made practically at floor level, while by raising it on elevated brackets, which are made in various sizes, the type which has its motor suspended below the frame can work at heights up to 2 feet 6 inches, while that in which the motor is above the frame can be used up to a height of 5 feet or even 6 feet in certain cases.

The absence of gear wheels gives increased mechanical efficiency with reduction of current consumed and a saving in maintenance charges. The machine is advanced to a new face in a few minutes by means of a simple arrangement, which consists of four special axle pins formed on the elevating slides at right angles to the ordinary rail-wheel pins. The elevating slides are raised one by one by means of the screws, and the rail-wheels are then changed onto the special axle-pins. When all four wheels have thus been changed, the complete machine is moved along cross rails until it is in position for cutting the newly exposed wall of coal. The cutting-bar is of best forged wrought-iron, and the cutters are pick-shaped, with shanks tapered to correspond with the holes, so as to fit tightly when driven in. The electric equipment consists of motor, control switch, resistance and interconnecting cables.

The use of internal combustion engines for haulage work in mines is very slow in maturing here, and it has been left to various mining companies in Germany and Austria to give the lead. There has been just placed on the market here the New Century internal combustion locomotive, and its producers have endeavoured to give it all the features that are desirable for mining service. I refer to such things as compactness, small wheel base, and the property of being apparently safe when used in gaseous mines. These locomotives can be secured in various sizes ranging from 6 to 30 h.p., with one, two, or three speeds, according to requirements.

The makers direct attention to the fact that the centre of gravity of the motor is lower than is possible with a vertical engine, a point of considerable importance when the gauge is narrow and has curves of 15 ft. radius. The engine works on the ordinary Otto cycle, and its fuel may be petrol, benzine, or benzol, the latter being a coal tar product and even cheaper than tar, and hence the reason for its use in a number of mines. Against the use of benzol, however, are the disadvantages that the combustion is not so complete as that obtained with benzine or petrol, and it is also liable to attack the cylinder walls and valve seats.

Low-tension magneto ignition is fitted, and a feature worthy of note about this is that the circuit is not earthed, as is customary on motor cars. The return path to the magneto is provided by means of a separate insulated lead. This arrangement has been adopted in order to comply with the new Austrian Mining Regulations, since the locomotive is being used extensively in that country. The cables are metal woven on the outside, thus reducing the chances of fraying to a minimum. The engine has no carburetter; the petrol, after having passed through a filter, has free access to the inlet valve, a jet of petrol and another of water and the requisite supply of air being introduced into the cylinder. The incoming air mixes with the petrol vapour inside the cylinder, after passing through a double-gauze chamber, which, it is claimed, ensures a perfect mixture and also prevents any flame passing into the inlet pipe.

The double-gauze chamber is fixed to the inlet valve, and moves with it. The injection of water naturally assists in cooling the cylinder. The cooling water in the jacket circulates on the thermo-syphon system. Water is also ejected from the lower face of the exhaust valve, in order to keep the latter cool and also to condense the exhaust gases. This arrangement, it is claimed, renders it impossible for any flame to pass into the exhaust box. As an additional precaution wire gauze is placed in the latter.

With regard to the method of transmitting the power from the engine to the driving wheels, on each of the parallel shafts at the extreme right there is a chain pinion which can be set free or caused to revolve with the shafts by means of a clutch. A Renolds driving chain passes over these in opposite directions, and also over the sprockets on the axles. Forward and backward movements of the locomotive are obtained by clutching in either the top or bottom pinion. This form of transmission, it is claimed, is both efficient and reliable. The transmission shafts are on the same frame as the main engine. Sanding boxes are provided, and they can be operated from the cab in the usual manner.

On account of the special arrangements above referred to, a 12 horsepower locomotive of this type has a total length of only 12 ft. 6 in., a height of 4 ft. 9 in., and a width of about 3 ft., which enables it to be used in the narrowest and lowest mine roads. As regards fuel consumption I am informed that this has been found to be about two-thirds of a pint per horsepower hour at full load. It has been found from practical experience that a 12 horsepower locomotive working at its full output only uses five gallons of fuel on a ten-hour shift. It is claimed that this form of haulage, when everything is taken into account, such as maintenance, interest and capital, and so forth, has proved to be from 30 to 50 per cent. cheaper than horse haulage.

Interesting papers were read at the last meeting of the Institution of Mining and Metallurgy here. A. T. French reviewed in his paper on "Copper Blast Fur-

nace Slags and the Determination of Their Melting Points'' the work on record which has been done with double and ternary silicates recently, and augmented these by the results of his investigations with slags made in the actual practice of copper smelting. The determinations of the melting points were accomplished by comparison with a series of Seger cones of standard melting temperatures, and from tables quoted it appeared that the slag of highest melting point contained least silica and highest alumina of the series, whilst another with least alumina was the most fusible. The ''oxygen-ration'' was shown to be a valuable factor in considering the slag to be aimed at, and debating the part played by alumina, the author considered there was a fairly wide range through which the slag composition might vary, with very little change occurring in the melting point.

Arthur R. Andrew contributed in a paper on ''The Detection of Minute Traces of Gold in Country Rock'' the results of his research for a reliable method of determining the presence of gold in the shales and greenstones of the auriferous district of Merionethshire, North Wales. The usual method includes the use of large charges and the measurement of the gold bed got by a powerful microscope, which can detect as little as .0007 grain of gold per ton. The chief point of difficulty was in obtaining fluxes of sufficient purity, and he in particular found that the litharge on reduction when fused with soda and borax often yielded as much gold as the stone was supposed to contain. The result of his working after repeated failures to purify the lead led him to doubt the present possibility of getting any salt of lead so free from gold and silver as to warrant its use in the assay of country rock.

An interesting process in operation upon the famous Dolcoath tin mine of Cornwall is the Elmore vacuum process. In certain parts of the mine the ordinary tin ore of Cornwall is found, but impregnated with varying proportions of sulphides, principally copper. This ore is crushed in the usual crushing stamp battery and then passed to one unit of Elmore plant. Almost the whole of the sulphides are floated out and recovered as a high-grade copper concentrate, saleable as such.

This copper concentrate contains a remarkably small proportion of tin, probably not more than two or three pounds per ton of concentrates on the average. Subsequently the whole of the tin oxide is left in the tailings from the Elmore plant. These tailings are afterwards treated by Frue vanners, etc., in the ordinary way for the recovery of the tin oxide. Many mines in other parts of the world contain ore similar to the Dolcoath, so that the process will probably soon extend beyond England.

The recent adoption by the Belgian Senate of the law limiting the hours of work in coal mines to nine a day, counting from the time when the first men of a gang go down to the time when the first men of the same gang come up to the surface again, has considerably altered the technical conditions of the work in the pits, and an extended use of machinery will be necessary to compensate for the loss of effective work by the men.

At present more than 50 per cent. of the companies have no underground power, except for the emptying of the trucks. But the new law changes the aspect of affairs, and for several companies the adoption of mechanical appliances will be a matter of life or death. The solution of the problem will be difficult. Existing types of machines are mostly designed for use in rich seams on a large scale, but in Belgium the coal mining industry is divided up between a large number of little independent concerns, whose capital is small and whose resources do not permit of large expenditure.

Moreover, the nature and composition of the seams are not favourable to the employment of machinery. Their formation is peculiar in that they are split and wrinkled everywhere—here almost flat, there sloping steeply, as if they had been subjected to a series of powerful pushes. These folds and wrinkles are most numerous in the southern portions of the coal-bearing area, but, while they are still well marked in the centre, they become less noticeable towards the north, in the low parts of the country. These conditions present obstacles to the utilization of coal-cutting machines which in that part of the Belgian coal-field known as the Couchant de Mons will be impracticable on account of the twisted and crooked character of the deposits.

In a report on the technical consequences of the loss of one or two working hours imposed by the law, a leading mining engineer, Mr. Denoel, states that it will be impossible to avoid a falling off in the production in regions where the miners work exclusively on poor, thin, or difficult seams, and that the only remedy for the blow which the new legislation strikes at the mining industry is amalgamation in order to secure more efficient working. The only hope for some of the smaller concerns is absorption by the larger, as it will be impossible for them to stand alone.

LEGAL COLUMN.

On Selling Mining Stock at a Discount.

Ontario is the only Province of the Dominion in which mining companies are in a class by themselves, free from one vulgar bond that fetters ordinary commercial companies. Ontario mining companies are the only companies of Canadian origin that enjoy the right of issuing shares at a discount. This boon is created by Sections 139 and 140 of the Ontario Companies Act:

> ''S. 139. A mining company heretofore incorporated or hereinafter incorporated under this Act and made by the Letters Patent subject to the provisions of this part of the Act, may issue its shares at a discount or at any other rate in the manner herein provided.
>
> ''S. 140. No shareholder of such company holding shares issued as herein provided shall be personally liable for nonpayment of any calls made upon his shares beyond the amount agreed to be paid therefor.''

This provision first appeared in a Mines Act passed in 1894. I have not discovered where the Legislature of 1894 got the idea.

Mining companies of Ontario also have the right in the event of a purchaser making default in calls on stock of selling such stock at public auctions to the highest bidder for cash (S. 144).

One may be permitted to wonder just how advisable this legislation is.

It is laid down very clearly in England that companies there cannot issue their stock at a discount. The leading case on the subject in the House of Lords is, by coincidence, regarding a mining company, the Ooregum Gold Mining Company of India, Limited, vs. Roper, 1892 Appeal Cases, p. 125. There Lord Halsbury said: ''I think that the question which your Lordships have to solve is one which may be answered by reference to an inquiry: What is the nature of an agreement to take a share in a limited company? And that question may be answered by saying that it is an agreement to

pay the company the amount for which the share has been created. That agreement is one which the company itself has no authority to alter or qualify, and I am therefore of opinion that the company were prohibited by law from doing that which is compendiously described as issuing shares at a discount."

And this is the general law regarding all companies, except Ontario Mining Companies. Applying this principle, it has been held that the issue of stock at a bonus is illegal, or the issue at a discount of debentures which contain the provision allowing them to be exchanged for stock. (The one exception to this principle is the provision under which payment for shares may be made otherwise than by cash—for services or for the assets or good-will of an existing business. To this, reference will be made again.) The principle of the Ontario law, except for mining companies, is shown in the memorandum of agreement required to be signed by the original shareholders of the company, "And we do hereby severally and not one for the other subscribe for and agree to take the respective amounts of the capital stock of the said company set opposite our respective names as hereunder and hereafter written, and to become shareholders in such company to the said amounts."

A fundamental principle of the law is violated by the privilege of issuing shares at a discount. The capital stock of an industrial company indicates, or is supposed to indicate, the value of the assets of the company. In a mining company it has no significance whatever. The very word "Limited" itself was hit upon to indicate that the liability of shareholders was limited by the amount of the stock subscribed. For our mining companies we should change this phrase to "Obliterated."

A share at a discount is a legalized illusion. Selling shares at a discount is the old coin trick where you put three coins on the table, make a few mystic passes, turn over the coins and announce that there are now four coins. The other fellow says there are only three. "Oh, indeed," you say. "Well, I'll bet you the odd coin that I'm wrong." So he bets, and then there are four coins, for of course you're wrong.

Seriously, what possible advantage can there be in this privilege, except the gulling of the public? Presumably, the argument is, that mining stocks are a gamble anyhow, and couldn't be sold at par. That was the argument in the Ooregum case above cited. The company's 20 shilling shares were selling in the market at 2s 6d, and the new stock was issued at 5s fully paid, with a 10 per cent. preference. It was argued that no one would pay 20s for a stock selling at two and six. But the judges pointed out that the same result could be obtained by selling the shares at 20s. with a 40 per cent. preference. There is not a single problem apparently solved by the discount method that cannot be really solved without it. For it is simply a question of arithmetic. As said before, a share at a discount is an illusion. A share is not so much money. It is a thousandth—or whatever fraction you choose—share in the company's assets. If the set assets are $500, the share is worth 50 cents; if they are $100,000, the share is worth $100.

A share at a discount is an illusion. An illusion is something that deceives. We are all deceived. The stock of the Oleaginous Mining Company (capital $1,000,000) is offered this week at 50 cents, positively going to 60 cents next week, and 75 cents the 1st of April, and we buy, thinking we are getting a dollar's worth at half price. If the capital were $500,000 and were offered at par, next week 20 per cent. premium, next month 50 per cent. premium, we wouldn't think of buying unless it were a bank or a golf club—the mirrors are down and you see through the maze.

Here, I am confident, is a source of more evil than is prevented by prospectuses and licenses to do business and annual summaries and the other complicated paraphernalia of the Companies Act, themselves a maze. Here is a chance to simplify and improve at the same time.

THE LEONARD PRIZE.

The committee selected to award the Leonard Prize of $100 for the best collection of Ontario minerals has decided that the collection sent in by Mr. Frederick Ransom, B.Sc., of Deloro, Ont., is worthy of the prize.

Three collections were submitted, the winning one, collected largely in Eastern Ontario, the second collected from the region north of North Bay, and the third from the Lake Superior region.

Owing to the limitations in connection with the competition, viz., that the specimens must have been personally collected in Ontario during the year 1909 by the competitor, the collections were necessarily restricted in the number of specimens.

The members of the committee congratulate Mr. Ransom on the superiority of his collection.

Signed T. L. WALKER,
University of Toronto.
Signed WM. NICOL,
School of Mining, Kingston

RICHARDS.

Ore dressing is a big field. When one begins to consider the details of its varied ramifications it appears a vast region. The beaten paths are few and by most mining engineers they are trodden in haste.

We have had with us a pioneer who not only has explored and mapped new routes, but who has shown us very much that we had overlooked along the beaten paths. Richards has conducted more experiments in ore dressing than any other man, he has written on the subject more, and he has devised and constructed a greater variety of ore dressing devices than any other man. He has devoted his life to the study and the teaching of dressing. He is the Master in research.

He came to discuss with us "Some Directions in Which Improvements in Concentration May be Looked For." For two hours he gave us in wonderful succinctness an outline of the beaten paths and of some of his new paths—two hours of preface, thought-clearing, idea-crystallizing, inspiring discord—and then we went to lunch without question or discussion. Too bad! But such is the tyranny of local conditions. And we were left with only such answers as we could find in the preface.

The meeting was an excellent one, good in many ways, possibly an epoch-marking occasion, but it would have been well worth while if we had had nothing but Richards, and it is to our disgrace that we did not reap to the full the benefits to be bestowed. L'embarras de richesse—there were too many good things—we could not take care of them—we must remodel our methods for the future.

His books are good, are enduring monuments, and truly show the work and the research of the man, but Richards himself is a different proposition. He is

greater than his books. He inspires. His personality compels and it is delightful. His earnestness, his modesty, his enthusiasm, his thoroughness, his originality, his outspoken delight in his results which he describes so impersonally as "gift from the gods"—these explain somewhat the control over students and assistants that has compelled to long, tedious, wearisome gathering of data. It is hard to tell what his chief monument will be. By manner, by method, by activities, he is still young, really only on the start of his pioneer work. It may be, it promises to be, that his name will be to the ordinary millman as Wilfley or Frue (and such is their position that we almost spell them without capitals). Up to the present he is more known to the student, and his guiding work has been in his methods of research. His milling devices are the product of cold, calculating analysis. They have not yet clinched themselves into the every-day mill design, as have Wilfley's, but they are getting there.

What were the answers to the question in the title of his paper?

One doubtless was—"In the perfection and the adoption of linderal settling classifiers." What are the other answers? It is our misfortune that time did not permit of these answers. May we hope to have them embodied in complete printed form at an early date.

Is the question an important one? Is there room for much improvement? The room for improvement appears in the losses incurred in ore dressing operations. Richards did not tell us to what they amounted. In most cases—in almost all cases on this continent outside of Cobalt—the losses in the mill are greater than the dividends of the company. In no part of the operations of the company is there greater room for improvement. The room for improvement is represented by more than a hundred million of dollars annually poured into creeks and rivers and lakes in the form of ore that has been mined, and transported and crushed and treated and thrown away. The room for improvement is great, the need of the man is great. That Richards inspires others to work with him may be not the least of his characteristics.

H. E. T. HAULTAIN.

A PROCESS FOR SMELTING NICKEL-COBALT-SILVER-ARSENIC ORES.

For smelting ores carrying from 300 to 10,000 ounces of silver per ton, 10 to 30 per cent. nickel and cobalt, and 3 to 40 per cent. arsenic, Mr. C. C. Cito, Irvington, N.Y., has patented a process. A percentage of copper, not less in total amount than the silver contained in the ore, and equal to two-thirds of the nickel and cobalt, and, further, not less than the amount of arsenic, is added to the ore. On smelting, a copper alloy is obtained, containing all the silver, nickel, and cobalt, and nearly all the arsenic. The slag contains very small amounts of silver, nickel, and cobalt. The alloy is next separated by electrolysis, and the slag is used as flux in the furnace.

Calcium cyanamide, the new artificial "lime saltpetre," has serious drawbacks in its causticity and the emission of ammonia and hydrocyanic vapours. An Italian method of making it inoffensive consists in making it slightly acid with dilute sulphuric acid, then drying and pulverizing.

AN ARGUMENTATIVE OUTFIT.

By John Ravenor Bullen.

I will tell you a tale of an outfit
That drilled fer old Giggle McGree;
A gang as consisted of "Jail John,"
"Knock-'em-down Jimmy" and me;
Three of the all-firedest experts
That ever took swigs of cold tea!
Three of the ding-dangedest drillers
As never could ever agree.

We was plunking her down fer old Giggle,
And things was a-going quite slick.
The last as we said to old Giggle
Was, "Week more'll finish the trick."
Last words as we heard from old Giggle
Was, "Boys, but that's drilling her quick."
And then he druv home, did old Giggle,
To his farm in the township of Zick.

Now "Jail John" was up in the scaffold
Whistling a "Glory Be" song;
And "Knock'em-down Jimmy" was stoking,
Coaxing the engine along;
While I was a-blowing the bellows,
Heating a weld that went wrong,
When there started the all-firedest mix-up
That ever I joined in among.

'Twas "Jail John," he comed down the ladder
And started in telling a tale
Of the time that he helped drill a duster
In the yard of Coop-'em-'up Jail;
When they struck—a big flowing bonanza?—
Well, no, 'twas a showing of shale;
And about as much oil in the sand-pump
As 'ud pay for a tenpenny nail.

Well, I never knowed how the thing started,
Or who 'twas as said 'twas a lie,
But inside a couple of minutes
John biffed me a bang in the eye.
Then the things in that little old shanty
Growed wings, and just started to fly.
Oh, you bet we was elegant fighters
When we once fixed our minds fer to try.

'Twas a week that the fight must have lasted,
And that I will swear by old Nick;
For we still was a-fighting ferocious
When there comed from the township of Zick
The man we was plunking her down fer,
Old "Boys-but-that's-drilling-her-quick,"
And he looked at the ruins around him,
And he said: "Gosh, that's finished the trick!"

And that is the tale of the outfit
That drilled fer old Giggle McGree;
The gay gang consisting of "Jail John,"
"Knock-'em-down Jimmy" and me;
Three of the all-firedest experts
That ever took swigs of cold tea!
Three of the dingdangedest drillers
As never could ever egree.

PERSONAL AND GENERAL.

Mr. G. L. Fraser, formerly of Phoenix, who opened up and operated the International Coal & Coke Co.'s property at Coleman, Alberta, has been engaged as manager by the Columbia Coal & Coke Co., which recently acquired the coal deposits stretching from Granite Creek to Coleman's Gulch. He is accompanied by Mr. W. G. Norrie, who served with him at the International and was later engaged as engineer by the McGilvray Creek Coal & Coke Co. The work of developing the property into a productive mine will be pushed forward with all possible speed, inasmuch as Granite Creek will soon have railway connection with Princeton and the Boundary country.

Mr. S. S. Rosenstamm has been elected a director of the Kerr Lake Mining Co., and also of the Wettlaufer Co., both Lewissohn enterprises.

The Cobalt branch of the Canadian Mining Institute has elected officers for 1910 as follows: Mr. T. R. Jones, Chairman; Mr. A. A. Cole, Secretary; Messrs. J. E. Leckie, C. O'Connell, H. Park, C. Campbell and John Macdonald, Committee.

Mr. W. J. Loring, of Messrs. Bewick, Moreing & Co., has just left London for a visit to the properties of the Burma Mines, after which he will proceed to Australia for a tour of the numerous mines in that continent in which his firm is interested.

BOOK REVIEWS.

A Text-Book of Ore Dressing. By Robert R. Richards, S.B., LL.D., assisted by Earl S. Bardwell and Edwin G. Goodwin. In one volume. Illustrated profusely with diagrams and half-tones. 702 pages. Price $5.00. McGraw-Hill Book Company, New York, 1909.

One of the most serious criticisms that can be made of Professor Richard's four volumes on ore dressing is that they are bulky—too bulky for use outside the library. Of course, it is scarcely possible to have them otherwise. But we welcome the compact volume before us. It embraces all the essentials of the four older books, and has the advantage of conforming to the size and character of the ordinary text-book.

A new and profitable chapter on coal dressing has been added. This is distinctly a gain.

The actual work of condensing was done by Messrs. Bardwell and Goodwin.

Professor Richards' Canadian admirers will find this compendium just what they need.

The Chemistry of Cyanide Solutions Resulting from the Treatment of Ores.. By J. E. Clennell, B.Sc.(Lond.). Second Edition, corrected and enlarged. Price $2.50. McGraw-Hlil Book Company, New York, 1910.

Modern laboratory tests for determining the constituents of cyanide solutions are fully described and discussed in this treatise. The second edition, just off the press, is brought up to date and former omissions and inaccuracies are rectified.

In view of the growing importance of cyanidation, Mr. Clennell's book calls for renewed notice. A synopsis of its contents will best serve to shew the reader the ground covered.

In the order named, the following subjects are taken up:—

1. Active Cyanogen Compounds.
2. Alkaline Constituents.
3. Reducing Agents.
4. Auxiliary Agents.
5. Inactive Bodies.
6. Noble Metals.
7. Base Metals.
8. Suspended matter.
9. An Examination of Various Methods for the estimation of Ferrocyanide.

Lengthy appendices are subjoined. These treat of alternative methods of estimating free cyanide, protective alkali, etc.

As a laboratory guide for the competent chemist the "Chemistry of Cyanide Solutions" is indispensable. The writer's object has been to meet all probable combinations of circumstances. A cursory perusal of the book gives one the impression that the cyanide chemist is not likely to run up against any working complications for which he cannot find here a key.

EXCHANGES.

Metallurgical and Chemical Engineering, March, 1910.—Our contemporary gives Connellsville coke operators a sound scolding. After accusing them of entire ignorance of the developments in retort coking and the use of the by-products, it goes on to tell of their disastrous attempt to keep prices up.

Last September the price of furnace coke was pushed up to $3 per net ton at the ovens. Now prices have tumbled and much stock is accumulating. "The pushing of the price to $3 merely on the supposition that blast furnaces would have to pay the price or not make pig iron, was a command to the industry to seek other fuel. When another fuel has been found, the customer does not return to Connellsville. . . . They [the producers] have failed utterly to realize that the day of by-product coking is fully arrived. . . . They are killing their own business and writing an enormous depreciation upon their coal reserves."

The Engineering and Mining Journal, January 29, 1910.—To this number Mr. E. M. Weston contributes the second of a series of articles entitled "Analysis of Mine and Mill Practice on the Rand." Mr. Weston refers to the Holman pneumatic stamp as the only serious competitor of the gravity stamp on the Rand to-day. One Holman stamp is crushing 80 tons per day. Its total cost of installation is said to be half that of ten gravity stamps.

ELECTROLYTIC AMALGAMATION.

A recent patent covers the electrolytic amalgamation of finely divided gold. The apparatus is essentially a sluice box whose bottom is a continuous amalgamating plate, with pockets occurring at intervals. Amalgamating plates extending across the sluice box are anodes. Swinging carbon anodes are also supplied. The bottom plate is the cathode. The finely divided ore is fed in with a suitable quantity of water along with small amounts of solutions of potassium cyanide and mercuric chloride. It is claimed that savings of 95 per cent. can be made, and that the process is decidedly cheaper than cyanide treatment.

The ruling New York price for iron pyrites is from 12¼ to 12½ cents per unit, according to point of delivery.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—The output from the mines of the Dominion Coal Company during February was approximately 200,000 tons, which is practically the same as obtained last February. Towards the end of the month the output improved in an encouraging manner, and for several days together exceeded 10,000 tons.

At the time of writing, a very commendable effort is being made by the clergymen of the mining districts to bring about a cessation of the useless struggle which has been going on here since last July, and an appeal is being made to the men on strike to return to work. Whether the well-meant efforts of these reverend gentlemen will bring about this much to be desired event is not at the moment possible to forecast, but there is a decided optimism in evidence in this regard. The strike has been a huge mistake. It was called with a wanton disregard of the probabilities, and it has never been effective. In an open letter written by president Plummer to Mr. T. L. Lewis, the president of the United Mine Workers, Mr. Plummer states that the conditions of work at the mines of the coal company "are in any case, acceptable to the large number of men who are now at work, and they are the outcome of years of experience and negotiation." With reference to a return of the strikers to their work, Mr. Plummer writes: "I can only suggest that when a line of action has been adopted which is found to be mistaken, the really honourable way is to begin afresh." Many of the strikers are taking Mr. Plummer's advice, and the number of men at work is steadily augmenting, as the increased outputs show.

Just at the moment when the counsels of peace and prudence are beginning to be listened to around the mining towns, it is a little unfortunate that Prof. McGill—if he is correctly reported—should have seen fit to strike a jarring note. The Montreal Star has the following: "They told us to go to the Devil," said Prof. McGill, speaking of the treatment the Nova Scotian Royal Commission received at the hands of many employers, who were against all kinds of state interference on matters of hours, etc. There is at least one large corporation in Nova Scotia, and we could name many others also, at whose hands Prof. McGill received nothing but courtesy and reasonableness. The coal-owners of the British Isles, and the coal miners also, could say a few things about the effects of state interference in the matter of hours, etc. The aftermath of the Eight Hours Bill for Mines in England is proving more menacing than even the strongest opponents of the bill dared to prophesy. At the very moment when trade is showing a decided revival, the British coal exporters are being hindered and embarrassed. The "Colliery Guardian" in an article on the "Folly of the Eight Hours Act," summarizes the result of this Act so far, as a "reduction in output, a rise in prices, and an impairment of competitive power abroad." German and American coal is being sold as a result of this Act in markets which were regarded as belonging to South Wales; the Rhenish-Westphalian Syndicate is raising its tonnages, English exporters are losing ground in France and the Mediterranean, and, to again quote the "Colliery Guardian," "all these troubles coming on the brink of what appears to be a genuine revival in trade, must accelerate all the miseries and difficulties that are the undoubted offspring of this Act." This indictment, coming from the recognized mouthpiece of the English coal trade cannot be lightly esteemed, and it is not to be wondered that Nova Scotian coal operators do not always receive with open arms the gentlemen who propose "state interference in matters relating to hours, etc." Prof. McGill is also stated to have said that "amazing ignorance of the industrial problems of the day, prevailed among the employers he had met." Such sweeping indictments of our Nova Scotian industrialism are unfair and ill-considered, because, actually, the condition of the working classes of Nova Scotia is infinitely better than in the large industrial centres of the United States and the Old World, and nowhere perhaps in the globe, can one find so many workingmen who own their own freeholds and have money in the savings bank, or who are so democratically independent as the men of Nova Scotia. A great many of the captains of Nova Scotian industry are men of the people, risen from the ranks of the "common people," and instinct with the sympathies of their origin, and there is no reason why they and their workmen cannot work harmoniously together. Prof. McGill sees the greatest industrial conflict that Eastern Canada has yet witnessed, looming ahead. If Nova Scotians would, for a little period refrain from "knocking" their own province and their own industries, and would concentrate their energies on the advancement of these same, there is in view the greatest industrial development that Eastern Canada has yet seen.

EAST VS. WEST.

Recently a party of German and Belgian miners were refused entrance into Canada through the port of Halifax because they did not possess the sum of $25.00 in cash. These men were all physically fit experienced miners, holding a through ticket to their destination, possessed of baggage and sums of money up to ten dollars per man. They were held in the Detension Hospital in Halifax for deportation by the next available steamer. In the meantime, however, application was made for writs of habeas corpus, and an order was granted by the Courts releasing these men, who thereupon proceeded to their destination in Cape Breton. Every man had a guarantee of work and possessed the qualifications which should admit any emigrant into Canada, namely ability to work, freedom from disease and an industry requiring his services. Had these men been farm labourers, they would have been allowed to proceed, but being merely miners, it was not thought the country had need of them. The farming industry of Canada and the needs of the Great West are being insisted upon a little too monotonously to please the people of Nova Scotia. That the whole emigration policy of the Government should be framed from the Western and Upper Canadian standpoint is distinctly unfair to Nova Scotia. Happenings of this kind but serve to further show the desirability of adequate representation of our mining industries in Canada. The coal mining industry of the Dominion is but in the first stages of infancy. The number of men now employed in coal mining is barely adequate for present needs. The present generation of miners are not bringing up their sons to work in the pit, and the only possible source of supply is from Europe, because the United States mines are in a similar position to those of Canada. There are many reasons why a strict supervision should be kept over immigrants intended to work in the mines. Such diseases as miners' opthalmia, ankylostomiasis, and various other parasitical diseases incidental to European coal-mining, should not be allowed to gain a footing in Canada. But the possession of a set sum of money is not the true basis of qualification for fitness to enter the Dominion. If free from disease, the experienced coal miner should be welcomed to Canada, because he is needed quite as much as the farm-labourer. We are probably correct in saying that when the West asks for coal miners they will get them. It is a little strange that the agents of Nova Scotia should flood the British Isles with alluring prospects for the agriculturist, and apparently forget the mining industry from which it gathers the bulk of its revenue.

At the February term of the Supreme Court in Sydney, some heavy sentences were meted out to strikers who have disturbed

the peace in the mining districts. Seven men were given two-year terms in the penitentiary, and some thirty others were fined sums varying from $20.00 to $30.00, with the option of from one to three months in jail. The aggregate fines of these men amounted to one thousand dollars. The offences mostly arose out of the intimidatory tactics which have been followed by the U. M. W. leaders, the charges being such as assault, unlawful assembly, etc. The foolish men on whom the punishment was inflicted thought that the great and powerful U. M. W. would pay the fines and save them from imprisonment. However, this was not done, and the offenders will be required to serve their jail terms. When the late Vice-President of the U. M. W., Mr. E. S. McCullough, was exhorting the miners during the summer to stay out on strike, he published a letter in the local newspapers in which he set forth the enormous resources of the American union, and stated that they could without difficulty raise from six to eight million dollars, and that every cent of this sum would be used, if necessary, to fight the battles of the U. M. W. in Nova Scotia. The men who are now serving their terms in prison will have time to reflect on the hollowness of Mr. McCollough's promises, but there is a glaring injustice about the law which allows the originators of the Glace Bay trouble to go free while their tools and dupes suffer for the things to which the leaders incited them. Just before the recent municipal elections in Glace Bay many of the strikers were saved from disfranchisement by the action of the U. M. W. in paying their poll taxes but when the last strike pittance was doled out, the strikers found that 25c of the regulation $2.00 per week had been deducted, leaving them with the meagre sum of $1.75 with which to face the necessities of the winter. Ever since the beginning of last year, various officers of the U. M. W. have been living at the Glace Bay Hotel, faring on the best that the town affords. And yet the irony of the situation does not appear to have been appreciated by the dupes of these men. It has been an interesting study to watch the issuing of the successive lies by which the courage of the strikers has been maintained. As fast as the untruthfulness of one false report has become apparent, another fabrication has been set afloat and one must really give the U. M. W. credit for a considerable ingenuity in this regard.

In the March number of McClure's Magazine is a sympathetic account of the Cherry Mine disaster, by Edith Wyatt, illustrated by photographs which convey to the mind much more vividly than the printed word the mingled heroism and horror of these too often repeated catastrophies. Miss Wyatt refers to the ozygen breathing apparatus which were used, and remarks: "A man wearing one of these helmets with their great tanks and impedimenta, is said to have about one-eighth of his strength left for other purposes." The article is so lucidly written from a non-technical standpoint, that we would not wish to be censorious, but the statement is hardly a correct one. The oxygen apparatus unfortunately does weigh more than is pleasant, but trained men can do a great deal of work with them. Indeed the amount of physical exertion which can be accomplished while wearing these apparatus is remarkable, and can only be accounted for by taking into account the stimulating effect of the oxygen which is breathed. The article ends with a recapitulation of the appalling figures relating to the loss of human life in the coal mines of the United States, as compared with other countries, and a plea for a lessening of the swollen roll of fatal accidents in the mines of the United States.

ONTARIO.

[Editor's Note.—We cannot concur with our correspondent as to the satisfactory character of the Temiskaming annual meeting. Discounting the future by paying unearned dividends out of capital is inexcusably bad business.]

Cobalt, Mar. 5, 1910.—At the annual meeting of the Temiskaming Mining Company held in Toronto a short time ago, the affairs of the company came in for a great deal of discussion. Complete explanations relative to the affairs of the company were demanded of the officials. The officials gave apparently satisfactory explanations to justify the management, showing that they had acted to the best of their judgment in the interests of the shareholders. The advisability of declaring the last dividend was fully gone into and the president gave a complete explanation of the reasons that led to its declaration. He also explained the falling off in revenue that necessitated an overdraft on the bank to pay the dividend. Although the financial statement showed a deficit of $97,000, the outlook for this year is considered very good. The manager estimates a profit from the concentrator amounting to $300,000 a year from the low grade ore; and he states that there is already enough low grade ore in sight to keep the mill running for four years. The charge that the directors of the company used their inside knowledge of the property to enable them to sell their stock before the break in prices, was also discussed, and was satisfactorily explained. Detailed information was given regarding the conditions on the lower levels of the mine, which are promising. The ore on the upper levels has, however, been disappointing, as the low grade has not been very continuous. The falling off of gross receipts is also stated to be partly due to the fact that it was considered advisable to block out ore preparatory to milling the regular veins, rather than to incur the expenditure of stoping operations to mill the comparatively small amount of high grade ore contained. The amount of high grade ore in sight is estimated at 220 tons, containing 660,000 ounces of silver. The milling ore reserves are estimated as follows:

	Tons.	Ounces of Silver.
Ore in sight	40,000	1,200,000
Ore in dump	34,000	1,438,000
	74,000	2,638,000

An important discovery was made a few days ago, when an additional round was taken out of the bottom of the main shaft. The shaft has been going down a quartz and calcite vein, which contained only milling values. The last round, however, threw out high grade ore. This ore was found at a depth of 425 feet and if the shoot is of any extent, it will have a most important bearing on the future of the property. This working is the second deepest in the camp. A station was cut at a depth of 400 feet and a cross-cut is being run to cut the No. 2 vein, which is expected to lie within twenty-five feet of the shaft.

Good reports continue to come from the Elk Lake district, where several promising properties are being systematically developed. The recent find of high grade ore on the 120-foot level of the Moosehorn, has shown the necessity for more extensive development, and as a consequence, an addition to the present plant to consist of a six-drill compressor and two 75-horsepower boilers has been decided on. The Lucky Godfrey has considerable high-grade ore on hand and a small shipment could be made at any time. The Boland Thompson has also considerable ore sacked, and it is understood will make a shipment shortly. The Hitchcock has found some silver and it is stated that the Elk Lake Cobalt and the Tee Arr have some ore sacked. The Tee Arr was formerly known as the Downey claim. The good winter roads that have been available this winter have aided materially in getting in supplies and machinery. Some good finds have also been made, and on the whole, the district is looking much better than it has for some time.

The Munro Power Company is now definitely promising power on or before the fifteenth of March. They will probably turn their machinery over in a few days, and it will take a day or two to tune it up. The company has made astonishing progress with its work, as it was only last June that it was started. As there was no railroad near their plant with the exception of the Cobalt substation, the progress made is even more astonishing. The installation of this plant represents one of the largest, if not

indeed the largest investment of capital in Northern Ontario. The entire system is practically duplicate throughout, and the chances for a shut-down through lack of power are reduced to a minimum. The electric power is generated on the Matabitchouan River from the falls of the same name. The power plant is distant twenty-four miles from Cobalt and at the latter place two substations have been built. In these substations large electrically driven compressors have been installed, with specially designed intercoolers and aftercoolers to reduce the moisture in the air to a minimum. The system has been installed with the greatest care throughout, and is expected to give excellent satisfaction. The cost of power will be materially reduced throughout the camp and many companies that are now lying idle will start work. Other companies such as the McKinley-Darragh, Nipissing and La Rose will largely increase their present equipment. The development work on the Lawson has been held back for months on account of lack of power and many other properties are in the same shape. It is expected that the Gillies limit will also be opened up to a greater extent than at present, and it is to be hoped for the future sales of the government, that more veins will be discovered than have been up to date. So far only one vein of any commercial importance has been discovered. This is the vein originally discovered on the Waldman property which was subsequently traced upon the Wyandote. There is one other vein, but it was traced from the Red Jacket, and can hardly be classed as distinctively belonging to the Gillies limit. The Waldman is now mining good ore from the east stope. In the top of the stope from the seventy-five foot level there is about seven inches of ore. There is also some ore in the west stope, but it is not as good as toward the east. The Wyandote has sunk its shaft over 100 feet, and is preparing to cross-cut to the vein which dipped from the shaft about eighteen feet below the surface. This property is equipped with a complete plant. On the Sagdola a contract has been let for a shaft 100 feet deep. Considerable work has been done on the O'Brien-Glidden property, on which a shaft was sunk on a vein showing some cobalt. A shaft has been sunk over 40 feet on the Rex Flynn property, and a small steam plant installed. A small steam plant is shortly to be installed on the Webb lot which is near the Red Jacket. A shaft is being sunk by hand on a promising lead. Work will also shortly be started on the old Ross lot, which is now incorporated in the Victor Silver Mines, Limited.

The annual report of the Cobalt Lake Mining Company shows a debit balance of $191,783.62; but during the past year a considerable quantity of high grade ore has been mined, and there is a good tonnage in sight. The manager's report states that during the past five months two new veins carrying native silver were discovered. From these veins two shipments have been made which returned to the company a profit of $40,737.38. The quantity of water that was coming into the workings decided the management to sink the winze to the 250-foot level, and drifting has been stopped until this work is finished. Test pits sunk on the veins about 100 feet apart showed the veins to be about six inches in width of high grade ore. Since the end of last July the total shipments amount to 133½ tons, which returned 111,597 ounces of silver. Three hundred tons of second-class ore were also treated in one of the custom concentrators which gave a profit of $3,696.03.

At the Colonial a winze is being sunk 50 feet below the tunnel level, which, when completed, will give a total depth of 240 feet. From this point drifts will be run on the veins and ore blocked out. At the present time the mill is being supplied by stoping above the tunnel level.

A new vein was discovered on the Hudson Bay some time ago that shows about two inches of high grade ore. All the veins that are produced in mining operations are treated in a jig and table, and so satisfactory are the results obtained, that the company has practically decided to erect a small concentrator in the spring. The ore can very easily be treated by concentration and there are about 10,000 tons at present on the dump and in the stopes. Some time ago a winze was sunk near the Nipissing boundary at the 200-foot level on a junction of the No. 2 and No. 3 veins, and when down 50 feet, a drift was run and some good values were picked up. This winze is now being continued and will be put down a total of 100 feet.

Good news still continues to come from Gowganda and the shipments that have already been made show a promising state of affairs. Up to date the Millerett Company, formerly known as the Blackburn, has shipped 94 tons, making 156 tons of high grade ore in all. Other cars will probably be despatched shortly, which will considerably augment the amount already shipped. One injustice under which the operating companies in that district labour lies in the fact that the Government exacts a royalty of fifty cents a cord for wood cut on their own property. Of course these properties are in the Timber Reserve, but, the conditions under which work is carried on are bad enough without this additional imposition.

A very important and far-reaching amendment to the Criminal Code, passed the Senate a short time ago. This amendment, which has been agitated for years, will assist materially in checking high-grading operations that have been so prevalent, particularly in Cobalt. It promises that, in the future when any person is found to have ore in his possession, he must account satisfactorily for it, or prove his right to the possession of the same. The amendment also provides that the ore must have a minimum value of seven cents a pound before any action can be taken. There have been several attempts in both the Provincial and Dominion Houses to frame a bill that would put an effectual stop to high-grading operations. There has always been opposition until the exposure of ore stealing in Cobalt, when public opinion was greatly changed. The passage of this bill was strongly advocated in this camp, a deputation having gone to Ottawa to urge its being passed.

Two more ore shoots have lately been opened upon the Crown Reserve on the 100-foot level. They were cut by a cross-cut from the Carson drift, and although narrow, contain high grade ore.

The South Lorrain Development Co. has let a contract for 200 feet of tunnel work on its property, which is situated near the Silver Centre, on the shore of Lake Temiskaming. Several promising veins showing cobalt with small assays of silver have been found on the surface, and these will be cut by the tunnel. Work will be started immediately.

At the present time the McKinley Darragh is probably treating the lowest grade ore of any mill in Cobalt, and at the lowest working costs. For the year 1909 the milling costs were $1.98½ per ton. The first few months of the year the mill had only started, and the cost was consequently higher. The latter part of the year it cost $1.62 per ton, while for the first month of 1910, the cost was only $1.48. It is estimated that when the addition to the mill is completed and running, the capacity of the mill will be increased by fifty per cent.

According to reports from Elk Lake free gold has been found in the vicinity of Fort Matachewan. This district was first staked last December, and since that time a number of outfits have gone in.

It is stated that a plant will shortly be ordered for the Wright and Forneri properties in the Porcupine, upon which some good gold showings have been made recently. There are nine claims in all and they lie just west of the boundary line of Whitney and Tisdale in Tisdale township. The plant for the Timmins is going in and in a short time will all be on the ground.

The annual report of the Otisse Mining Company shows that since work was started, a total of $86,730.37 has been spent. It has been demonstrated that the rich ore, such as was found on the surface, extends to greater depth, but unfortunately it is

very variable in quantity. The report states, however, that so far no ore of sufficient extent has been exposed to warrant stoping. The results obtained, however, are sufficiently favourable to warrant the company in continuing its operations to greater depth. Up to date, the aggregate of underground workings amounts to 1396 feet.

Some good ore has lately been found on the Bailey Cobalt, below the tunnel level. When the Cobalt Central had a lease on the Bailey, a large tonnage of milling ore was taken out, but since that time the latter company has done practically nothing. Operations will be started, however, on quite an extensive scale as soon as they get electric power to run their machinery. The shaft will be continued to a depth of 200 feet in an effort to reach the Huronian slates that have proved so productive on the Cobalt Central.

The Right of Way has declared another dividend of two per cent. on the new stock issue, payable the end of March. This company is now devoting all its energies to that part of its property which lies between the McKinley Darragh and the Silver Queen. A winze has been sunk 45 feet below the 175-foot level, and the vein shows a good width of ore. Another car of high grade ore will shortly be shipped.

In connection with the exposure of high-grading operations as they existed in Cobalt the Crown Reserve and other mines are bringing an action for the return of the money held by Dr. Wilkinson, being the balance on the payments of ore said to have been turned over to Dr. Wilkinson by the high-graders. The companies are also working hard to get the necessary evidence to obtain convictions for all those who were implicated in the stealing and disposal of ore.

The townsite lots that the Government has had surveyed in the Porcupine district are to be sold by tender. Tenders will be received up till March 15th. There are 571 lots, and the recorder's office and post office will probably be located there.

BRITISH COLUMBIA.

Rossland.—The developments of the past couple of weeks have made a marked improvement in the ore reserves of the property of the Consolidated M. & S. Co. of Canada, here. A new deposit of good shipping ore has been located on the ninth level of the War Eagle mine that it is thought may develop into an important shoot. Assays taken from this vein have given $35 per ton and over. Work on the eighth level has, it is thought, located the continuation of this vein, which would mean a large stoping area. Another strike of importance has been made on the third level of the Centre Star mine where a five-foot shoot has been opened up. Development work is now being carried on to open up the finds which were located with the diamond drill. The Centre Star group is shipping about 4500 tons of ore per week to Trail smelter and the outlook for the summer's work is bright.

The situation at the Le Roi Mine remains the same as for the past several months. Shipments of three or four hundred tons of select ore are being made per week to the Trail smelter and diamond drilling still goes on. It is said that the diamond drilling contract will be finished in ten days or two weeks, when no doubt the future plans of the company will be divulged.

The Le Roi 2, Ltd, still remains in the dividend-paying field and has now declared a dividend of two shillings per share, payable March 8th. The annual report of this concern for the year ending September 30th, 1909, shows a balance in favour of profit and loss of £49,384 2s. 11d., which is considered a very satisfactory showing. During the year the sum of £14,991 0s. 2d. was written off as depreciation on development, plant, etc., and £5,814 13s. 6d. on the Van Roi preference share account. Six shillings in dividends was paid during the year, free from income tax, which absorbed £37,700 and it has been recommended that £5,000 be added to the resere. During the reviewed period 48,421 tons of ore was mined, of which 29,874 was shipped to the Consolidated smelter at Trail. The average value of the mineral content proved to be $23.54. The mining cost per ton was $3.35; smelting, $5.70; making a total cost for mining, smelting, development, depreciation, etc., of $10.56, this figure being 29c. below the same cost for 1908. Thus a profit of $12.98 per ton is shown. Development work in the mine averaged $14.35 per ton, and 9,820 feet of diamond drilling was done, which cost $1.96 per foot. Over $267,500 was sent to the London office of the company as a result of the year's work. The outlook for 1910 is very good.

It is rumoured that the Blue Bird mine in the South belt will resume development work at an early date. The lessees of the Mayflower mine, also in the South belt, have opened up a new ledge on the hilltop above the old shaft. This ore assays about $47 per ton and it is the intention to begin small shipments within a few weeks.

The Boundary.—The British Columbia Copper Co., Ltd., made a very good record during 1909, when the shut-down and other draw-backs are taken into consideration. And even at that it is not necessary to consider those things in order to see the favourable side of the thing. During its fiscal year, ended Nov. 30th, 1909, this concern treated 373,336 tons of ore at its Greenwood smelter, making 6,325,000 lb. blister copper, 18,244 oz. gold and 64,234 oz. silver. The cost of making copper was 9.829 cents per lb, including all charges. It is shown that the profits for the period reviewed were $236,338, being $142,378 more than for the preceding year. An average of 13.08 cents per lb. was received for copper sold. The work of enlarging the smelter capacity so that the ore from the mines of the New Dominion Copper Co. may be freely treated at that plant, will shortly begin, and it is expected that the Rawhide mine of the Dominion Co. will be making preliminary shipments within a couple of weeks.

The Conciliation Board failed to reconcile affairs between the B. C. Copper Co. and its men, so that the matter still remains smouldering. A strike has been threatened, but it is the desire of all that trouble will be averted in this section, so that considerable pressure is being brought to bear to smooth matters over.

The Snowshoe mine of the Consolidated Co. quietly but steadily makes its weekly output of 4,500 to 5,000 tons of ore to Trail smelter.

The Granby Mines are being examined at the present moment by Dr. Sussman, of New York, and Mr. Wm. Yolen Williams, of Spokane, who is consulting engineer for the company. Mr. A. B. W. Hodges, the local manager, has resigned his position with the Granby Co. to take up work with a company in Peru, which has offered him the enticing figure of $50,000 per year. As to whether there will be a change in the policy of the Granby when Mr. Hodges leaves, it is doubtful, although some minor changes may be made by his successor, of course. The weekly shipments from the property are running from 26,000 to 28,000 tons and have been steady since the first of the year.

Vancouver.—The Ikeda Bay mine, on Moresby Island, of the Queen Charlotte group, has been taken over by a syndicate of Vancouver capitalists, closely related to the Nical Valley Coal & Coke Company, and of which J S. Castleman is the leading figure. It is understood that the bond is for $250,000 on which a couple of early payments have been made. Pursuant to a recent examination and report on the property by A. G. Larson, Superintendent, Le Roi mine, a campaign of diamond drilling will be started about the middle of March, and a sum near $20,000 will be expended on this work. Of all the promising showings on Moresby Island the most work has been done on the Ikeda and the new bondholders are confident that future development will make a mine of the property. It is possible that a smelter will be erected at Ikeda Bay to treat the product of this mine, and of others now being opened up on the island.

Arrangements are being made by A. E. Rand, of West-

minster, to open up the Dundee mine at Ymir, in which he is interested . The Guggenheims have started work on a $400,000 plant at Concrete, which will furnish cheap power to a very rich district on Baker River. The Sullivan group of copper claims on Moresby Island has been sold to a Vancouver syndicate for $50,000.

The Canadian Mining Institute has recently made a couple of requests of the Government, of which there can be no doubt but they are economically reasonable. These are that the Provincial Government make an annual grant toward the movement and that the Dominion Government remove the duty from life-saving apparatus for mines. The benefits of an organization that fosters an important industry are too well known to repeat, while every inducement rather than impediment, should be made to the mining men of the country, that life-saving apparatus may be found in all the mining camps of the Dominion. Of course, this particularly applies to the coal-mining industry, but deaths from powder, gas etc., are not infrequent in the metal mines. To this end it is hoped by those interested here that these two resolutions of the Mining Institute will bear fruit.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Lieut.-Gov. Fraser, in opening the House of Assembly, made the following references to mining and other cognate matters: The adjustment of difficulties between the coal and steel industries of the eastern section of the Province is a matter of profound satisfaction. The amalgamation of the conflicting interests will, I am assured, result in the continued and more extended development of these industries. The immediate realization of the full benefits to be derived therefrom has been much retarded by the continuance of an unfortunate and prolonged strike It is a matter of sincere hope that some means may shortly be found for the satisfactory settlement of this deplorable affair, which affects so large a section of our population and has so important a bearing on the industrial growth of our Province.

The output of our coal mines, owing chiefly to the results of strikes, was materially less than last year. Notwithstanding the temporary reduction in output, the work of developing our coal fields has been carried steadily on, and the same high efficiency as regards the safety to life of those engaged in mining maintained.

It is gratifying to note that there has been during the past season a vigorous development of our iron mines and gypsum quarries, and that the yield of gold shows an improvement over last year

During the past year, the Technical College was completed, and is now offering courses in Civil, Electrical, Mechanical and Mining Engineering I am pleased to observe that a satisfactory number of students is in attendance from this Province and the neighbouring province of New Brunswick. Free Scholarships have been established for every county in the Province, so that any ambitious boy may now secure the highest type of engineering training. The coal mining schools and engineering schools have retained their firmly-established position in the colliery district, and the local technical schools have enjoyed a largely increased attendance. In the public schools in coal mining districts practical courses designed to train boys for practical life in a colliery have been introduced as subjects for some of the general courses. It is a matter of gratification to learn that the Nova Scotia system of technical education has attracted wide attention and much favourable comment.

ONTARIO.

Ottawa, Ont., March 5.—Since the opening of the Royal Mint on January 1, 1908, according to a return produced yesterday, there has been a net profit to the Dominion of $63,857.86, after allowing $13,100 as interest on the cost of construction.

The profit on the coinage of silver was $172,244.79, on bronze $21.565.11 and miscellaneous, $1,148.80, giving a total gross profit of $194,958.71.

Deporting United States silver from Canada involves considerable expense. The experiment was first tried in 1906. In that year the value of coin returned to New York was $580,224.16, and the cost of removal $7,383.20. The policy then lapsed for three years.

It was started again August 30, 1908, and from then to January 19, 1910, it cost $5,197.95 to deport coin valued at $561,760.49.

Ottawa.—It is not the intention of the Government to renew iron and steel bounties which finally expire at the end of the coming fiscal year. The bounties have now been in force for fourteen years, and the Government believes that the iron and steel industries are now established on sufficiently firm basis to do without the annual subsidy from the Federal treasury. The dividends paid and the increasing outputs of the large industries that have been built up since 1896 are an evidence of this. The total amount paid in bounties last year was on pig iron, $693,423; on steel, $838,100, and on manufactures of steel, $333.091. Since 1906 the total bounties on iron and steel have amounted to over fourteen million dollars.

Cobalt.—Arrangements have been made with the Northern Customs Concentrators whereby forty tons of the dump ore from the City of Cobalt mine will be treated daily in their large mill. The City of Cobalt have some 12,000 tons running twenty-five ounces on their dumps, and it is hoped to put all this through the mill. The recovery is about 85 per cent., and the rate about twenty to one. The company has loaded the first high-grade car for the year, although three cars of screenings, running 300 ounces to the ton, have been shipped since January 1st. Manager Southworth employs four drills underground and a force of fifty men.

Cobalt.—The Little Nipissing Co. has just shipped 60 tons of medium grade ore to New York, bringing their total shipments in February up to 84 tons.

Port Arthur.—The Mining Recorder at Port Arthur is a very busy man. Many claims are being recorded, especially in the vicinity of Savant Lake. The Recorder complains that prospectors make the mistake of sending mere statements by letter as to the work done, whereas the law requires a regular report along with a sworn affidavit.

BRITISH COLUMBIA.

Fernie.—The output of the Crow's Nest Pass Coal Company for the month of January reached the total of 95,000 tons. Of this, 25,000 was mined at Coal Creek and 43,000 at Michel. This is an average of 4,100 tons daily, and is the record for these mines. The total tonnage of the Crow's Nest mines for 1909 was 899,045, of which 425,659 tons were mined at Coal Creek, and 437,317 at Michel. The Fernie coke ovens turned out during the year 131,339 tons and the Michel plant produced 118,914 tons, a total production of coke for the year of 250,254 tons. At the present rate of increase the company's mines will pass the million and a quarter mark this year. But fast as the product of its mines grows, it does not keep pace with the demand. The

Hillcrest mines began last week the delivery of 25,000 tons of Hillcrest coal to the Great Northern Railway at Michel, where it is being transferred to the tracks of the Great Northern for delivery to various points on the Hill system.

Rossland.—Shipments continue to be made each week from the Le Roi, of ore of good grade, and the proceeds derived from its sale materially aid in keeping the mine in operation. Diamond drills continue to explore the territory of the Le Roi for new bodies and the borings have reached the territory 1,000 feet below the 1650-foot level. While the results are encouraging, no very large bodies of pay ore have been encountered so far, still some medium-sized bodies of pay ore have been located.

Work on the Mayflower is making good progress and there has been found in the main ledge a foot and a half of steel galena that goes from $40 to $60 to the ton. This is being extracted, and within a few days a shipment will be made to the Trail smelter. The lessee is very much pleased with the manner in which the Mayflower is developing.

Following is the report of the Le Roi Two for the month of January, which was cabled to London by Ernest Levy, the mine manager: "Josie Mine Report for January: Shipped 2.440 tons. The receipts from smelter are $42,358 (£8.734), being payment for 2,200 tons shipped, and $1,515 (£312), being payment for 58 tons concentrates shipped. In all $43,873 (£9,040).

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The legislative programme of the Miners' Federation for the present session is to be restricted to the introduction of the Checkweighers Bill, which proposed to improve the law as affecting checkweighers by compelling the provision of adequate shelter on the pit bank for the accommodation of the checkweigher and a protection against the weather. There are also clauses designed to give the checkweigher greater freedom of action in taking part in meetings of the men off the colliery premises and as an official of the trade union. The programme is the most modest which the miners have submitted to Parliament for many years.

The Miners' Conference, representative of the South Wales coalfield, sitting at Cardiff on February 19, decided to continue the negotiations with the coal-owners for the making of a new wage agreement. It was a contest between the cautious and statesmanlike policy of the Executive, who recommended the men to resume the negotiations with the employers, and the extreme policy of the more hot-headed who desired the calling of a national conference of the Miners' Federation to take national action—in other words, a national strike. The moderate counsel of the Executive was affirmed by a majority of five to one, and the negotiations with the employers will be resumed in Cardiff on Thursday next.

RHODESIA.

The working of the full plant of the Giant Mines is giving every satisfaction.

The sinking of the main shaft on the New Found Out mine is being proceeded with, and is expected shortly to reach the fourth level.

The Exploring Land and Minerals Company has arranged with Mr. F. P. Mennell to make a complete geological survey of their large mineral properties in the Matabeleland and Mashonaland, especially with reference to the rich properties situated midway between the Globe and Phoenix and Ivanhoe mines.

The Rhodesia Gold Explorers is negotiating an option on the Juanita property in the Bulawayo neighbourhood. The assays range from 6 to 24 dwts. There are five shafts, already down a considerable depth and numerous old workings.

SOUTH AFRICA.

Before the Powers Commission recently held at Johannesburg, Mr. Ryersbach made the following statement as to the savings which would be effected by individual mines by taking power from the supply company in preference to erecting generating plant for themselves: "The saving in capital cost can best be illustrated by one or two examples. It is estimated that the City Deep, Ltd., after having spent £223,000 on plant, will require to spend a further £436,000 if power is purchased. If the company erects its own power plant, the further expenditure to be incurred is estimated at £560,000, being a difference of £124,000 in favour of the electric scheme. The estimate is based on a capacity of 65,000 tons per month; that is, the saving per 1,000 tons monthly capacity in this instance is estimated at £1,900. Similarly, in the case of the Nourse Mines, Ltd., and the Jumpers Deep, Ltd., for both of which increases in plant to deal with an additional 23,000 tons monthly have been sanctioned, it is estimated that the capital expenditure will amount to £25,100 for the former and £23,800 for the latter. It will be seen that the saving per 1,000 tons per month is considerably greater in the case of a new plant than where additions only are being made."

MEXICO.

The El Oro Mine earned a net profit of £18,158 in January, which may be regarded as quite good. Both mills are still running, but one mill may shortly be put out of service now that the tube mill plant is completed. The ventilating plant has made connection with the 1,000-foot level, and within a month or so encouraging developments at the lower levels should be reported. The Mexico Mine earned £12,558 during the past month, which is rather under the average of previous months. This has had no effect on the shares, which are now standing at 8⅝.

UNITED STATES.

Los Angeles, Cal.,—The 1910 convention of the American Mining Congress will be held in Los Angeles, beginning September 26 and continuing through the week, ending October 1, The Sierra Madre Club has already guaranteed the sum of $10,000, half of which is to be applied to furtherance of the legislative programme in Washington, and will now endeavour to increase the entire fund to $25,000. The supervision of the convention will be in the hands of an advisory board, including representation from all public bodies in Los Angeles and every important mining and oil town in Southern California, Arizona and Nevada, while the details will be in charge of an executive committee of three, with Sidney Norman acting as managing director.

Washington, D. C. Feb. 25.—An interesting light was thrown upon the Alaskan mining land situation yesterday when Delegate Wickersham told the House committee on territories that the miners hold their claims by force of firearms.

"Every acre of mining land in Alaska is held by a rope of sand," declared Wickersham. "Every claim is open to litigation."

Houghton, Mich. March 4.—It is reported that, for the double purpose of defeating the designs of the Western Federation of Miners, whose organizers have been active in this district lately, and of reducing the copper output, all mines in the Lake district are preparing to close down at once for an indefinite length of time, or until the ends aimed at by the managers can be attained.

Whether the Calumet and Hecla is included in the plan has not as yet been definitely made public, but from reliable sources it is said that they are.

If the plans are carried to their fullest execution, many thousands of men will be out of employment and a reduction of copper production effected that cannot but have an immediate effect on the price of the metal.

Coupled with the entailment at Butte on account of labour troubles, and the general tendency to reduce output in the western mines, far-reaching and immediate results are looked for in connection with the latest move of the big Lake producers.

Company Notes

The annual meeting of the shareholders of the Intercolonial Coal Mining Company took place on March 2, in Montreal.

The output of coal and coke for the year ending 31st December, 1909, amounted to 296,999 tons. The following were elected directors: Messrs. James P. Cleghorn, W. M. Ramsay, R. Mac, D. Paterson, K. W. Blackwell, E. Goff Penny, D. Forbes Angus and Duncan Robertson. At a meeting of the Board, Mr. Jas P. Cleghorn was re-elected president; Mr. D. Forbes Angus, vice-president and managing director, and Mr. C. A. Down, secretary-treasurer.

The Granby directors met in New York on March 1st, and no action on the dividend was taken. The statement was made that nothing would be done in the matter until all the new stock has been issued. In December a dividend of 2 per cent. was declared.

The Dominion Iron and Steel directors declared a dividend of 31½ per cent. on the company's preferred stock. This dividend includes 28½ per cent. of deferred payments, and 3½ per cent. for the current quarter. The entire amount of deferred dividends will consequently be wiped out when the 31½ per cent payment is made on April 1.

Ninth Annual Report of the Nova Scotia Steel & Coal Co.,

Directors' Report.

Your Directors herewith submit their Ninth Annual Report with statement of assets and liabilities, and abstract of profit and loss account for the year ended December 31st, 1909.

The profits for the year amounted to $907,949.00, as compared with $734,701.53 for 1908. In view of the depressed condition of business during the greater part of the year, this result should be regarded with satisfaction by the share-holders.

The amount at the credit of profit and loss account on January 1, 1909, was $1,219,221.07, against which the stock dividend of $1,000,000,00, declared in December, 1909, was charged.

The various amounts transferred to the reserve fund and fire insurance fund, and written off for improvements and betterments, are shown by the accounts.

A sum of $184,453.54 for premium and commission on redemption of old and issue of new bonds has been paid out of the profits of the year.

The balance carried forward to the credit of profit and loss account is $336,807.38.

The sum of $362,653.17 has been expended during the year on capital account, in the development of the submarine iron ore areas at Wabana, and for improvements, plant, etc., elsewhere.

The volume of business transacted by the company during the year shows a substantial increase, and is in excess of any previous year, and it is expected that there will be a still further increase in 1910.

The development of our submarine iron ore areas at Wabana was continued, the main stope being extended through these areas a further distance of 1,470 feet The stope is now about 1,650 feet into our own areas from their southern boundary. The development work carried on has fully confirmed the estimates previously made as to the vast quantity of ore contained in, and the great value of these areas. The plant for the operation of these submarine mines is now being installed.

Considerable extensions and improvements have been made to the mills at New Glasgow, and further extensions and improvements will be made in 1910, with a view to increasing the output of finished steel.

The re-organization of the finances of the company, authorized by the shareholders, has been carried out. A new issue of $6,000,000.00 5% First Mortgage Bonds, and an issue of $1,000,000.00 6% Debenture Stock were made; $3,500,000.00 of the bonds and the $1,000,000.00 6% Debenture Stock were sold in Canada, and the two former issues of 6% bonds were paid off and cancelled. The balance of $2,500,000.00 of the bonds remains in the treasury. No portion of the premium on the retirement of the old bonds, nor of the commission on the new issue has been charged to Property Account.

The regular dividend of 2% quarterly has been paid on the preferred shares, and on January 15th a quarterly dividend of 1% was paid on the ordinary shares, and the directors have declared further dividends of 1% on the ordinary shares, and 2% on the preferred shares, payable on April 15th, to shareholders of record on March 31st, 1910.

All of which is respectfully submitted.

February 18th, 1910. ROBERT E. HARRIS, President.

The annual meeting of the shareholders of the Western Coal and Coke Company was held at the head office of the company, 501 Power Building, Montreal, on Monday, February 14th, when the following directors were re-appointed: E. B. Greenshields, Senator Mackay, J. B. Ferguson, Charles Fergie, H. A. Lovett, J. W. McConnell, G. B. Woods, J. N. Lake and J. E. Woods. The managing director, Mr. Charles Fergie, reported that development work was making rapid progress, and that the mine would be in a position to produce 800 to 1,000 tons a day by the end of the year, also that the coal was of excellent quality and had recently been tested by the Canadian Pacific Railway Company on their engines with satisfactory results.

At the subsequent meeting of the directors, Mr. J. B. Ferguson, who had held the office of president for the past two years, resigned the office owing to ill-health and the fact that he would be somewhat out of touch with the head office as he now resided at St. Catharines, Ont. Mr. Ferguson nominated Mr. E. B. Greenshields, who is largely interested in the company, as president. Mr. Greenshields was elected by unanimous vote; and Hon. Robert Mackay and J. B. Ferguson were elected vice-presidents. Mr. Chas. Fergie was re-appointed managing director.

STATISTICS AND RETURNS

TRAIL SMELTER.

The Consolidated Mining & Smelting Company of Canada, Limited, ore receipts at Trail Smelter for week ending February 26th, and year to date, in tons:—

Company's Mines.		
Centre Star	3,623	29,471
St. Eugene (concentrates)	194	3,209
Snowshoe	4,822	31,288
Richmond-Eureka	67	861
Sullivan	278	1,183
Other mines	2,009	15,239
Total	10,993	81,251

MINERAL PRODUCTION OF ONTARIO IN 1909.

Product.	Quantity.	Value.
Metallic—		
Gold, ounces	2,042	$32,445
Silver, ounces	25,737,037	12,382,689
Cobalt, tons	1,533	94,965
Nickel, tons	13,907	2,709,798
Copper, tons	7,933	1,127,015
Iron ore, tons	263,777	645,622
Pig iron, tons	407,013	6,301,528
Zinc ore, tons	895	8,950
		$23,303,012
Less value Ontario iron ore (220,307 tons smelted into pig iron		537,549
Net metallic production		$22,765,463
Non-metallic—		
Arsenic, refined, tons	885	$61,039
Arsenic, crude, tons	4,599	.....
Brick, common, number	246,308,000	1,916,147
Tile, drain, number	27,418,000	363,550
Brick, pressed, number	53,166,941	490,571
Brick, paving, number	4,067,620	73,700
Building and crushed stone	.....	459,730
Calcium carbide, tons	2,349	151,676
Cement, Portland, bbls.	2,303,263	2,897,348
Corundum, grain, tons	1,508	140,817
Feldspar, tons	11,001	36,204
Graphite, refined, tons	730	37,624
Gypsum, crude, tons	11,488	23,604
Iron pyrites, tons	28,946	78,170
Lime, bushels	2,633,500	470,858
Mica, tons	350	73,124
Natural gas	.....	1,188,179
Peat fuel, tons	60	240
Petroleum, imp. gals.	14,723,105	559,478
Phosphate of lime, tons	272	1,904
Pottery	.....	43,214
Quartz, tons	63,172	75,329
Salt, tons	77,490	389,573
Sewer pipe	.....	311,830
Talc, tons	4,350	8,700
Non-metallic production		$9,852,600
Add net metallic production		22,765,463
Total production		$32,618,072
Total for 1908		$25,637,617

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending March 4, and those from Jan. 1, 1910, to date:—

	Week ending Mar. 4. Ore in lbs.	Since Jan. 1 Ore in lbs.
Buffalo	56,619	292,453
City of Cobalt	.....	193,970
Cobalt Central	40,900	165,286
Cobalt Lake	.....	132,000
Colonial	.....	63,660
Coniagas	51,600	295,757
Crown Reserve	146,034	951,359
Drummond	.....	664,200
Hudson Bay	.....	62,365
Kerr Lake	.....	1,074,489
King Edward	.....	93,129
La Rose	303,312	2,051,901
McKinley-Darragh	63,063	271,860
Nipissing	456,433	1,949,053
O'Brien	129,900	328,806
Peterson Lake	120,850	170,450
Right of Way	62,643	253,436
Silver Cliff	.....	66,010
Temiskaming	60,000	180,000
Trethewey	.....	127,000

Ore shipments for week ending March 4, were 1,491,354 pounds, or 745 tons.

Total shipments from Jan. 1. to March 4, were 9,387,184 pounds, or 4,693 tons.

Total shipments for 1909 were 30,098 tons.

GOWGANDA SHIPMENTS.

Following is a list of the shipments of ore from Gowganda for the present year:—

Jan. 1 Millerett	30
Jan. 14 Reeves-Dobie	30
Jan. 22 Reeves-Dobie	32
Jan. 29 Millerett	29
Feb. 12 Millerett	30
Feb. 12 Burke-Remey (test shipment)	2
Feb. 24 Millerett	26

The Buffalo Mines, Ltd. reports for January: Mill ran 558 hours and milled 2,770 tons of ore; silver recovered, 103,549 ounces; milling expenses, $6,572. The ounces of silves paid for during the month shipped previously, 97,721 ounces.

The February output of the Nova Scotia Steel & Coal Company was 61,000 tons of coal, 6,800 tons of steel and 5,000 tons of pig iron.

BRITISH COLUMBIA ORE SHIPMENTS.

Nelson, B. C., February 19.—The weekly output of the mines and the smelter ore receipts continue very satisfactory, but otherwise there has been no special mining news during the past seven days. Appended are the details:

Boundary—	Week.	Year.
Granby	25,794	181,476
Mother Lode	9,500	65,805
Oro Denoro	300	1,920
Snowshoe	3,426	26,466
Other mines	.....	120
Total	39,020	274,787
Rossland—	Week.	Year.
Centre Star	3,405	25,848
Le Roi No. 2	503	3,911
Le Roi	164	1,999
I. X. L.	5	13
Other mines	.....	220
Total	4,077	31,991
Slocan Kootenay—	Week.	Year.
St. Eugene	404	3,015
Richmond-Eureka	124	794
North Star	72	677
Blue Bell	137	677
Whitewater	80	371
Queen	25	118
Ethel	30	60
Emerald	238	670
Yankee Girl	81	1,285
Nugget	24	103
Granite-Poorman	31	94
Molly Hughes	13	116
Van Roi	31	202
Sullivan	111	905

Standard	25	153
Utica	23	37
Central	42	80
Bonanza	19	19
Monarch	114	114
Other mines	....	1,752
Total	1,624	11,245
Grand Total	44,721	318,023

SMELTER RECEIPTS.

Granby	25,794	181,596
Consolidated Co.	9,223	70,258
B. C. Copper Co.	9,800	66,725
Total	44,817	318,579

SHARE MARKET.

Courtesy of Warren, Gzowski & Co.

Miscellaneous.

	Bid.	Ask.
Amalgamated Asbestos	..	.30
Dominion Coal, common	80½	80⅞
Dominion Steel, common	68½	69
Nova Scotia Steel	88⅜	88¾
Granby	87	88
Consolidated Smelting	75	77
Crow's Nest Pass	85	94

Cobalt Stocks.

Wettlaufer	..	1.12 1-16
Amalgamated	.07	.07½
Beaver Consolidated	.34¼	.34⅜
Buffalo	2.20	2.60
Chambers-Ferland	.37¾	.38
City of Cobalt	.39¾	.41
Cobalt Central	.18¾	.19¼
Cobalt Lake	.20⅛	.20¼
Coniagas	6.00 off.	
Crown Reserve	3.70	3.73
Elkhart	.16⅞	.17⅛
Foster	.27	.29
Green-Meehan	.07¾	.08¼
Great Northern	.10½	.11
Hudson Bay	107.00	110.00
Hargraves	.36	.38
Kerr Lake	8.75	9.00
La Rose	4.53	4.55
Little Nipissing	.28	.28¼
McKinley-Darragh-Savage	.87½	.90
Nancy Helen	.10⅜	.11½
Nipissing	10.25	10.30
Nova Scotia	.36	.37½
Otisse	.07⅞	.08
Peterson Lake	.26¼	.26½
Rochester	.20⅝	.20⅞
Silver Leaf	.10	.10½
Silver Bar	.13¼	14½
Silver Queen	.19½	.21
Temiskaming	.64⅝	.65
Trethewey	1.38	1.40
Watts	.13½	.15
Ophir	.53	.64

New York Curb.

Boston Copper	20¼	20⅝
British Columbia Copper	06⅞	07⅛
Butte Coalition	26½	27¼
Chino Copper	14½	14¾
Davis Daly Copper	03⅛	03⅜
Ely Consolidated	01½	01⅝
Gila Copper	08½	08¾
Giroux Mining	10	10⅛
Goldfield Consolidated	8 7-16	8 9-16
Greene-Can.	10⅜	10⅝
Harcuvar Copper	41	44
Inspiration Copper	08⅞	08 15-16
Miami Copper	24¾	24⅞
New Baltic Copper	07½	07⅞
Nevada Con. Copper	24	24⅜
Ohio Copper	04⅜	04½
Rawhide Coalition	23	25
Ray Central	24	24⅛
Ray Consolidated	03¾	03 13-16
Union Mines	01⅞	01 15-16
Yukon Gold	04 9-16	04⅝

TORONTO MARKETS.

Metals.

Mar. 8.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 6 cents per lb.
Lead, 3.75 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 34.75 cents per lb.
Copper, casting, 14¼ cents per lb.
Electrolytic, 14¼ cents per lb.
Ingot brass, 9 to 12½ cents per lb.

Mar. 8.—Pig Iron.—(Quotations from Drummond, McCall Co.)
Summerlee, No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee, No. 2, $23.00 (fo.b. Toronto).
Midland, No. 1, off the market.
Coal, anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

Mar. 4.—Connellsville coke (f.o.b. ovens).
Furnace coke, prompt, $2.00 per ton.
Foundry coke, prompt, $2.50 to $2.75 per ton.

Mar. 4.—Tin (Straits), 32.85 cents.
Copper, prime Lake, 13.75 to 13.85 cents.
Electrolytic copper, 13.50 to 13.60 cents.
Copper wire, 15.25 cents.
Lead, 4.60 to 4.70 cents.
Spelter, 5.85 cents.
Sheet zinc, 8.25 cents.
Antimony, Cookson's, 8.50 cents.
Aluminium, 23.00 to 25.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, ordinary, $29.00 per oz.
Platinum, hard, $34.50 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $50.00 per 75-lb. flask.

Silver Prices.

		New York. Cents.	London. Pence.
February	22	..	23 15-16
"	23	52	24
"	24	52	24
"	25	50¾	23 7-16
"	26	50⅝	23⅜
"	28	50½	23 5-16
March	1	50¼	23 3-16
"	2	50½	23 5-16
"	3	50¾	23 7-16
"	4	50¾	23⅜
"	5	50¾	23⅜
"	7	50⅞	23 7-16

SAFETY = SPEED = SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" OF THE ATLANTIC

FASTEST and FINEST
in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records
between Liverpool and Canadian Ports

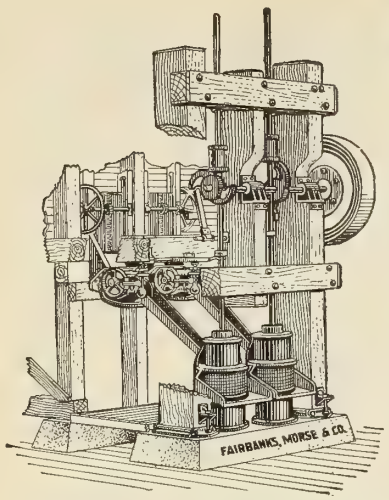
---

900 Miles on Enclosed and Sheltered Waters

LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent,
Board of Trade, - MONTREAL.



NISSEN STAMPS

THE MODERN INDEPENDENT CIRCULAR MORTAR GRAVITY STAMP.

ADVANTAGES

MAXIMUM CRUSHING CAPACITY SECURED

BECAUSE—The feeding of ore into each individual mortar is under constant control.

Immediate free discharge of pulp as produced is secured.

Freedom from interruption of operation, is secured due to the independence of units, allowing any one or more units to be "hung up" without disturbing the operation of the rest.

QUALITY OF PULP—Owing to controlled feeding and screen discharge there are much less unmanagable slimes produced than with other mills.

POWER—Owing to the great crushing efficiency secured, the power to operate is about half that of other mills of the same capacity output.

WEARING QUALITIES—The shoes and dies wear evenly. The weight of the stamps can be maintained constant, counteracting wearing away of the metal.

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines

Montreal, Toronto, St. John, N.B. Winnipeg, Calgary, Vancouver.

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

Mining and Metallurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
McGee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. Sc.
MININC ENGINEER
24 Adelaide St., West, Toronto, Can.
Cable Abmott Phone Main 5063

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N.Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers aad Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

FLAHERTY, R. H.
Examines and reports on Iron Lands. Object : Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
EXAMINING AND REPORTING ON PROPERTIES A SPECIALTY.
Box K, Sudbury Box 990, Cobalt

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAYS OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98
Porcupine Claims—Write Matheson Post Office

DOBBS & YOUNG
PROPERTIES LISTED and INVESTMENTS DIRECTED
MINING BROKERS and CLAIMS AGENTS
Wire or write us for particulars to
Box 541, COBALT, ONT.
WATCH THIS SPACE

W. D. MCPHERSON, K.C. J. M. LAING
MCPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: MCPHERSON & CO., 16 KING STREET WEST
Cable Address—Quernac, Toronto.

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

WEBB & COOKE
Mechanical and Electrical Engineers
R. L. WEBB, Ass. A. I. E. E.
THOMAS F. COOKE, Jr. A. S. M. E.
Specialty—Mine Power Plants.
338 Ellicott Square, Buffalo, N. Y.

THE SCHOOL OF MINING, Kingston, Can.

ASSISTANT PROFESSOR IN GEOLOGY.

Applications for the position of Assistant Professor of Geology will be received until March **15**th, 1910. Special knowledge of Palaeontology desirable. Session seven months. Salary $1500.

GEO. Y. CHOWN, B.A.

Coal Mine for Sale.

A coal mine in Alberta, city of 25,000, Must be sold before the first of May.

This mine was opened last April and is thoroughly equipped.

Present capacity of over 200 tons daily and coal enough to last 20 years.

Good market for output and steady trade.

The present owner is obliged to sell and no reasonable cash offer will be refused.

For full particulars, write or wire

"Alberta" care Canadian Mining Journal

Electrical and Hydraulic engineer with over 10 years' practical experience in the design, construction and supervision of Hydro Electric power plants, is open to engagement in early summer.

Special knowledge of the requirements of mines; new proposition preferred, with supervision after completion, best of references and only moderate salary required. Address

CAN. MINING JOURNAL
CONFEDERATION LIFE BUILDING

FOR SALE

Electric light plant, consisting of two 35 KW alternating Generators, 2400 volts, 133 cycles, with exciter, all Canadian General make, together with switchboard, transformers, arc lamps, etc. Generators belt driven by two 50 h. p. Leonard Peerless Engines. Capacity of plant 25 arc lamps and 1200 16 c.p. incandescents. Admirable equipment for small town or for isolated manufacturing plant. Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONT.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.

1025. Waverley Sheet.

1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.

1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.

1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.

1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.

1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.

1075. Gowganda Mining Division, 1908. W. H. Collins.

1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.

1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite,
etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL. 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address. BATHOTA. London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners

Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:

32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES

43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

When answering Advertisements please mention THE CANADIAN MINING JOURNAL

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto
FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.



An Accurate Ore Test on any metal in 10 minutes For Five Cents.

Thats what the Mining Man or Prospector can have, provided he has a Way's Pocket Smelter Outfit. Anybody can make his own tests right in his office or in the field on **any ore.** Think of what this means to a prospector "miles away from nowhere" or to the mining man who must make dozens of tests a day.

Write for folder giving full information about **Way's Process** and describing both field and laboratory outfits.

WAY'S POCKET SMELTER CO.
Box 954, South Pasadena, Cal.

NOW READY

Mining Law of Canada

BY

ALFRED B. MORINE, K. C.
(Of the Bar of Ontario, Nova Scotia and Newfoundland)

The following table of contents conveys a fair idea of the scope of the work :

CHAPTER I
Mining Terms and Phrases.

CHAPTER II
PART 1—Laws in force.
PART 2—Dominion Legislation.
PART 3—Provincial Legislation.
(*a*) Manitoba, Alberta, Quebec, Nova Scotia and New Brunswick.
(*b*) Ontario.
(*c*) British Columbia.

CHAPTER III
PART 1—Crown Lands.
(*b*) Indian Lands.
(*c*) Railway Belt.
PART 2—Railways and Highways.

CHAPTER IV
Capacity to Work, Sell, Lease or License.
PART 1—Extent of Rights.
PART 2—Capacity to Lease.
PART 3—Partnerships and Companies.

CHAPTER V.
CONTRACTS
PART 1—Making.
(*a*) Statute of Frauds.
(*b*) Part Performance.
PART 2—Enforcing.
(*a*) Statute of Limitations.
(*b*) Specific Performance.
PART 3—Terminating.
(*a*) Rescission.

CHAPTER VI.
Mining Licenses and Mining Leases.
PART 1—(*a*) Bare Licenses.
(*b*) Profits à Prendre.
(*c*) Leases.
PART 2—(*a*) Parcels.
(*b*) Term.
(*c*) Covenants.
(*d*) Forfeiture and Re-entry.
(*e*) Reservations and Exceptions.

CHAPTER VII
PART 1—Easements.
PART 2—Fixtures.

CHAPTER VIII
PART 1—Employer's Liability.

CHAPTER IX.
Wrongful Abstraction.
Criminal Offences.

CHAPTER X
PART 1—Assessment.
PART 2—Registration.

GLOSSARY
APPENDIX I.—Statutes and Regulations of the Dominion, and Statutes of Ontario British Columbia and Quebec.
APPENDIX II.—Working Forms.

HALF CALF - $7.50

Book Dept. Canadian Mining Journal - - Toronto

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ackroyd & Best, Ltd xii
Allan. Whyte & Co. v
Asbestos Mfg. Co., Ltd.....outsde B.C.
Astley, J. W. xix

B

Bateman & Brown..... xix
Beatty, M., & Sons, Ltd. ix
Baszanger, Jacques & Co.....xi
Belliss & Morcom, Ltd i
Berger, O. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply..... xxvii
Behrend Concentrators Ltd..... xi
Brown A. H. xx
Bruce Peebles..... viii

C

Canada Metal Co..... xv
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Curtis & Harvey, Ltd.....xxiii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xxiii
Canadian Fairbanks Co. Ltd ... xviii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks....xxiv
C. L. Constant Co.....xviii

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus.....iv
Dominion Coal Co., Ltd. xiv
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tahles.....iv
Davis, John & Son..... xvi
Dessau's, S. Sons.....vii
Deloro Mining & Reduction Co...xxiv

E

Evans, J. W.....xix

F

Fleck, Alex., Ltd. xii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C xx
Laurie & Lamb i
Lymans Ltd.....xii
Link Belt Co. xi
Leckie, J. Edwards xx
Ledoux & Co. xx
The Lancashire Dynamo and Motor Co., Ltd..... xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxix
Nova Scotia, Province of.....xxvi
Nissen Stamps.....xviii

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros.....vi, vii, xvi
Patterson Mfg. Co. iii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co.....xii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,. Ltd xi

V

Vandeleur & Nichols..... viii

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Separating Co.....vii

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905.
Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

WHY IS IT

THAT SALES OF

MORTON'S

"BC"

Drill Steel

ARE INCREASING EVERY DAY?
MUST BE IT IS BETTER MATERIAL,

Gives Best Satisfaction

AND THE DRILL

Lasts Longer.

COULD ANYONE EXPECT MORE?

IN STOCK WITH

E. G. PRIOR, Victoria, B.C.
CANADIAN RAND CO., Cobalt.
BAINES & PECKOVER, Toronto.
ANGEL ENGINEERING & SUPPLY Co. St. John, Nfd.

Canadian Representative

D. W. CLARK, P.O., Box 521, **Toronto.**

Newton & Treloar

Commercial & General
PRINTERS

14 Johnson Street, Toronto

WANTED

A Nickle Mine. Give full particulars, price and commission.

Address W. D. B. care of Canadian Mining Journal, Toronto.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings (Diamond —
Montreal Steel Works, Limited
Peacock Bros.

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond) —
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Peacock Bros.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

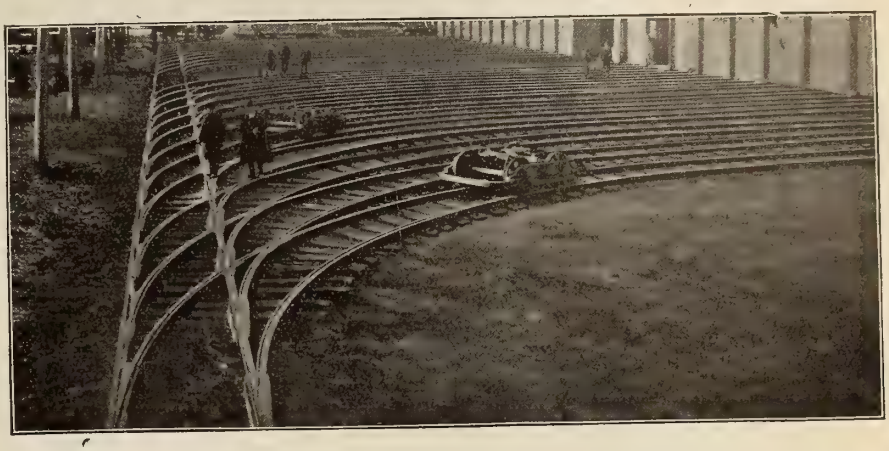
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

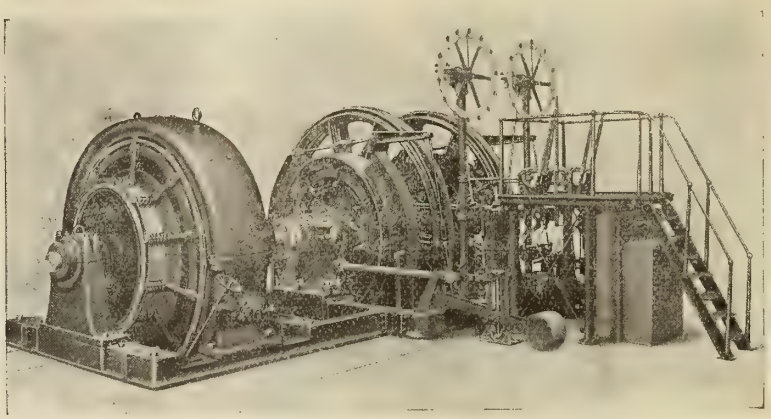
"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.



We illustrate the Hecla Mining Company's Hoisting Plant at Burke, Idaho, one of the largest of its kind and a good example of

The Westinghouse Equalizer Hoisting System

Some particulars of the installation follow:

The hoist motor is a Westinghouse 450 h. p., 600 Volt, 60 R. P. M. Direct-Current Motor, which obtains its power through a Westinghouse Fly-Wheel Motor—Generator Set, consisting of a 450 h.p., 2300 Volt. Type H. F. Induction Motor, a 30,000 lb. Fly Wheel and a 450 K. W., 600 Volt, Direct Current Generator. The normal duty of the hoist is 6,000 lbs. unbalanced load; maximum speed 2,000 R.P.M. ultimate depth of shaft 2400 feet.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
252 St. James Street, MONTREAL.
92 Hollis Street, HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

THIS TAN KHAKI DUCK SHIRT

$1.00

A great dollar's worth for Miners, Prospectors, Surveyors.



The kind of shirt that will turn a shower—you've seen them on sale time and again at $2.00, as these details will show you;—

Made from extra strong duck, double stitched throughout, with strong gussets, heavy yoke on shoulders, large long bodies, full sleeves with plenty of elbow-room, brass dome fasteners throughout, instead of buttons. Two pockets, with flaps and dome fasteners.

We've counted on a tremendous demand for this shirt and the quantities bought bring our price down to One Dollar.

N. B.—When ordering, be sure to ask for our "Dollar Invincible" shirt, and send 19 cents extra to cover postage. All sizes and half sizes from 14 to 18.

THE ROBERT **SIMPSON** COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

---

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

VOL. 31 TORONTO No. 7

NOTICE!

Cobalt Office and Warehouse

(opposite Right of Way Mine)

We have recently removed to a new office and opened a warehouse (opposite the Right of Way Mine) and can offer from stock Drill Steel, Fuse, Cars, Pumps, Picks and other lines which may be required at short notice.

We also desire to call your attention to the fact that we stock in our Montreal Warehouse a more complete range of Mining Machinery and supplies than any other firm in Canada.

It will be a recognition of your appreciation of our efforts to give prompt shipment if you will send us your enquiries and orders.

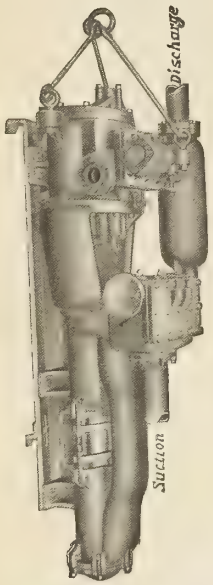
MUSSENS LIMITED

Head Office: MONTREAL

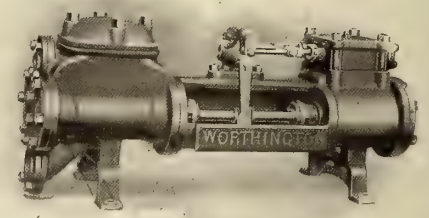
Branches TORONTO, 73 Victoria Street
COBALT, opposite Right of Way Mine
WINNIPEG, 259-261 Stanley Street
VANCOUVER, Mercantile Bldg.
CALGARY, Crown Bldg.

PUMPS FOR MINES

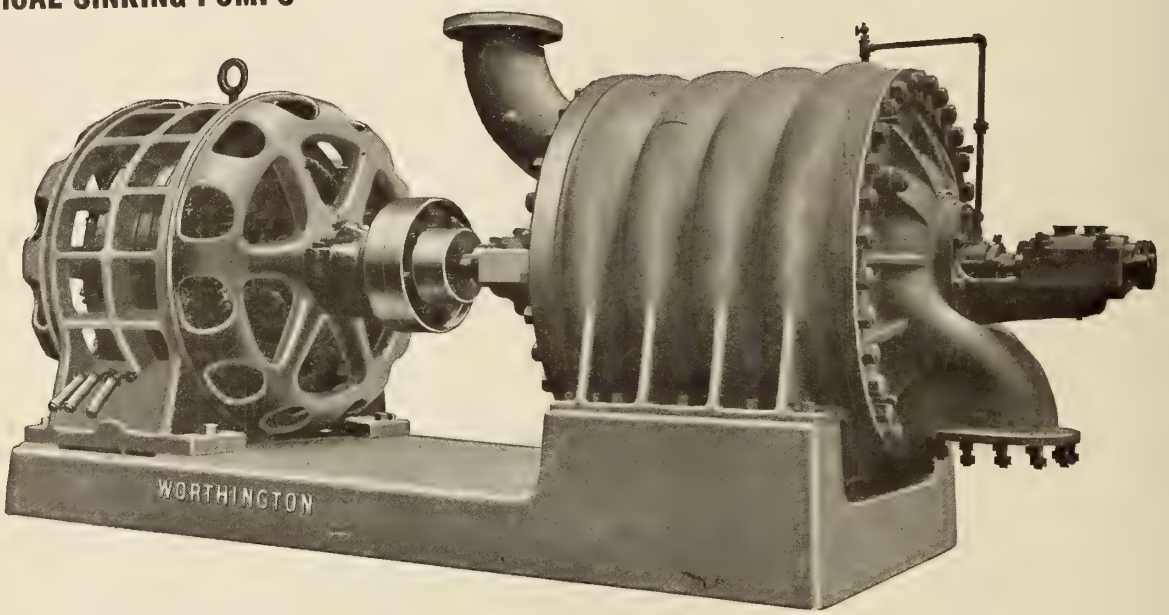
AND GENERAL SERVICE



VERTICAL SINKING PUMPS



BOILER FEED PUMPS



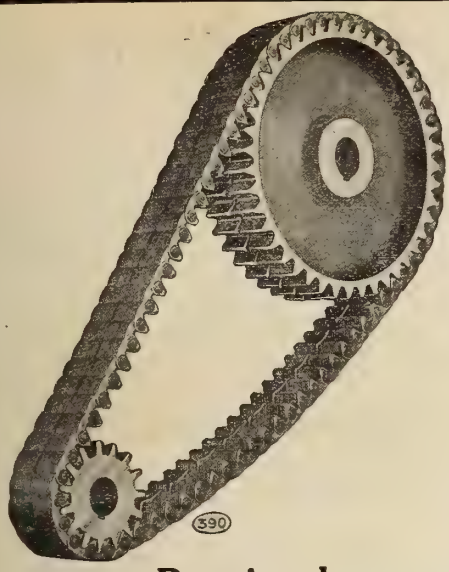
TURBINE PUMPS

The illustration shows a 4-stage 8-inch turbine pump, driven by a 300 h.p. induction motor, and having a capacity of 1200 Imperial gallons per minute against 500 ft. head. The pump is fitted with special chambers and impellers to resist the corroding effects of mine acids.

The John McDougall Caledonian Iron Works Co.

LIMITED

Works: Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.



RENOLD PATENT SILENT

MANCHESTER, ENG.

CHAINS

are

Superior to Belts.

Require less space, prevent slipping, have longer life and ensure against breakdown.

QUIET, RELIABLE, DURABLE, COMPACT.

Particularly adaptable in Mines as they are not effected by heat or moisture, and short centres are possible.

JONES & GLASSCO.,

Sole Canadian Agents, MONTREAL, Que.

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.

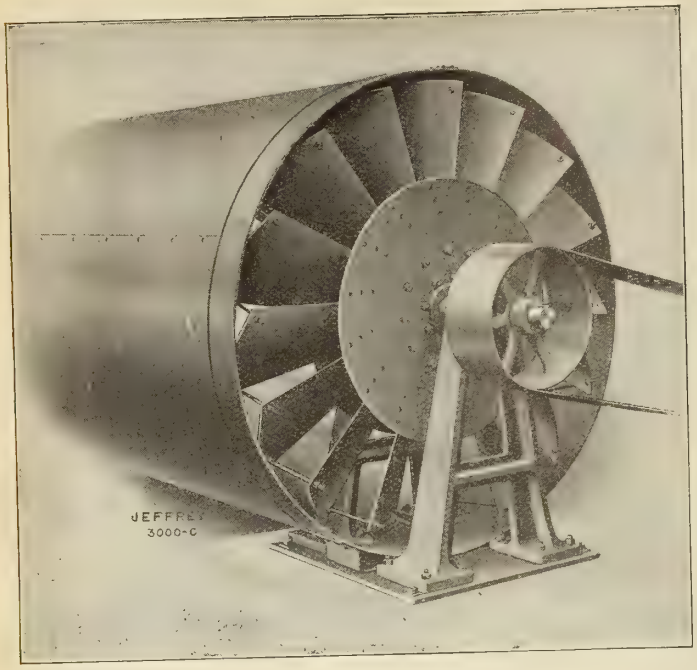


Write us for Bulletin 40-A

CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 310, Cobalt, Ontario



Jeffrey Propeller Fan
for
Mine Ventilation

This fan is highly recommended wherever the development does not justify the installation of our centrifugal fan.

It has no equal for boosting along feeble currents in large operations.

A DISTINCT IMPROVEMENT
OVER
THE ORDINARY DISC FAN

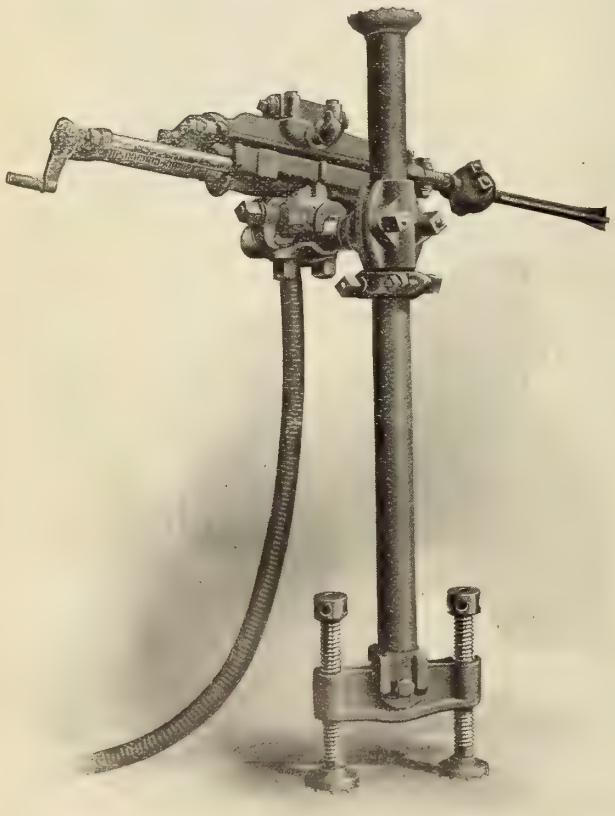
It is self contained, simple in operation and embodies many new features which are described in our Bulletin 23, mailed on request.

WE BUILD COMPLETE COAL MINE EQUIPMENTS

The Jeffrey Manufacturing Company

COLUMBUS, OHIO, U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance Street



There's a "Sullivan"

Rock Drill, or a Sullivan Hammer Drill of just the type and size to excavate rock most rapidly and at least expense under your working conditions.

May we send you catalogues?

Rock Drills, No. 660
Hammer Drills, No. 660

Air Compressors, Diamond Drills, Coal Cutters, Hoisting Plants.

Sullivan Machinery Co.

Railway Exchange, Chicago

Claremont, N. H.

Birmingham	Joplin, Mo.	Seattle
Cobalt, Ont.	Rossland, B. C.	
Denver	Knoxville	St. Louis
El Paso, Tex.	New York	Salt Lake
	Pittsburgh	San Francisco

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

Saves Labor and Money

A roofing that has to be painted every year or two is a constant care. Suppose you should neglect to paint yours in time. The chances are that when you did remember, (which would probably be when you discovered it leaking) it would be too late to paint or patch. You would need a new roof.

Now you can avoid all this bother and expense by buying Amatite, which *needs no painting or coating of any kind.*

We will send you a sample free. Write for it to-day and settle the question for yourself. It will only cost you a postal card and will save you many dollars in the end.

Amatite comes in convenient rolls ready to be laid on the roof. Anyone can do the job. Liquid cement to seal the laps and large headed nails are supplied free in centre of each roll.

We wish you knew as much about Amatite as we do; you'd buy it every time. It's the kind of ready roofing that makes satisfied customers.

Send to-day for a free sample to nearest office. That tells the story

THE PATERSON MANUFACTURING CO. LTD.,
Toronto, Montreal, Winnipeg, Vancouver, St. John, N.B. Halifax, N.S.



MC 22
TELESCOPE FEED
HAMMER DRILLS

MA 13
PLUG DRILLER



The best type of drill is the one which has the most behind it in the way of knowledge, experience and record of practical success.

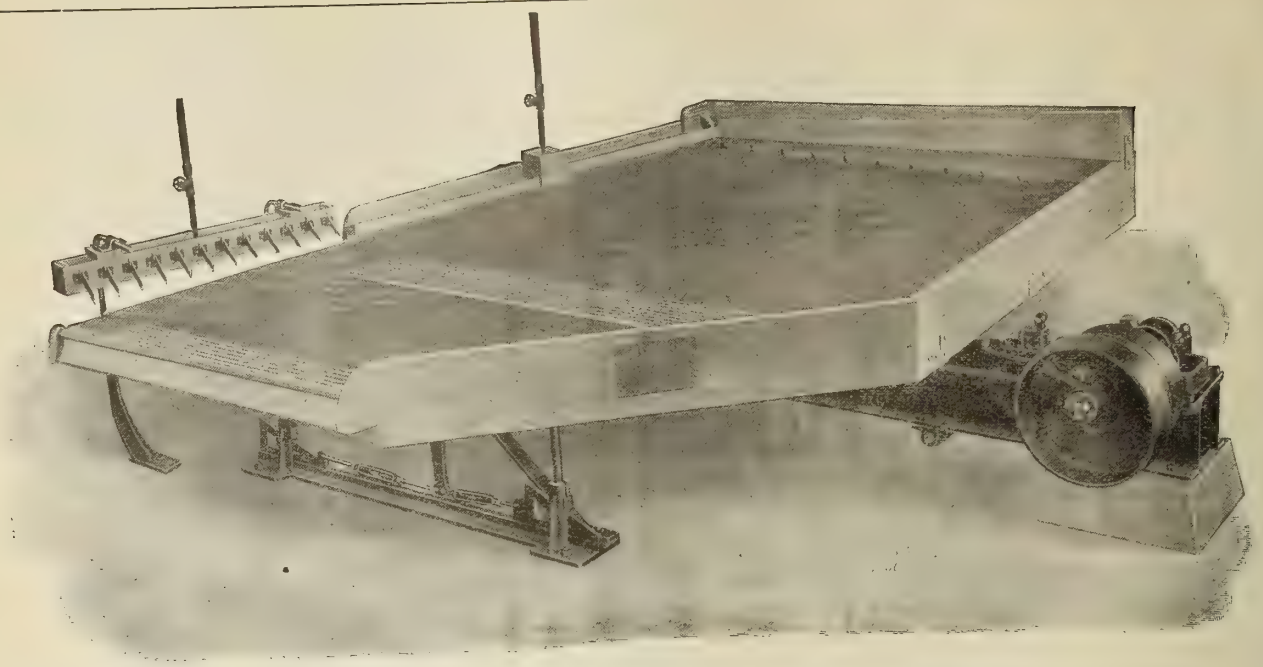
RAND DRILLS of every type represent the widest experience, the best design, the best methods of production, the longest uninterrupted record of success.

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS



Comparative Tests Show That The Improved No. 3 Diester Slime Table

makes closer savings from fines and slimes than vanners. We are installing additional tables in the Strattons Independence Mill at Victor, Colo., as the result of a trial of *one* table.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

THE CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

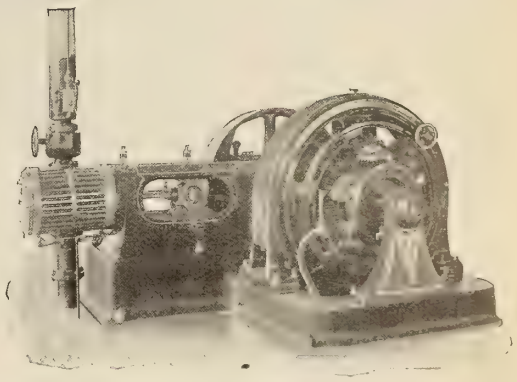
Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

Reliable Light and Power

IN MINE WORK the factor of prime importance is the production of electric light and power that is absolutely reliable.



McEWEN ENGINES

have the qualities that make them the ideal installation where steady uniform power output is necessary.

Simple control—close regulation—accessibility of parts—proper proportions—and careful workmanship are their distinctive features.

Simple and Compound units, belted and direct connected.
Sizes from 10—700 H. P.

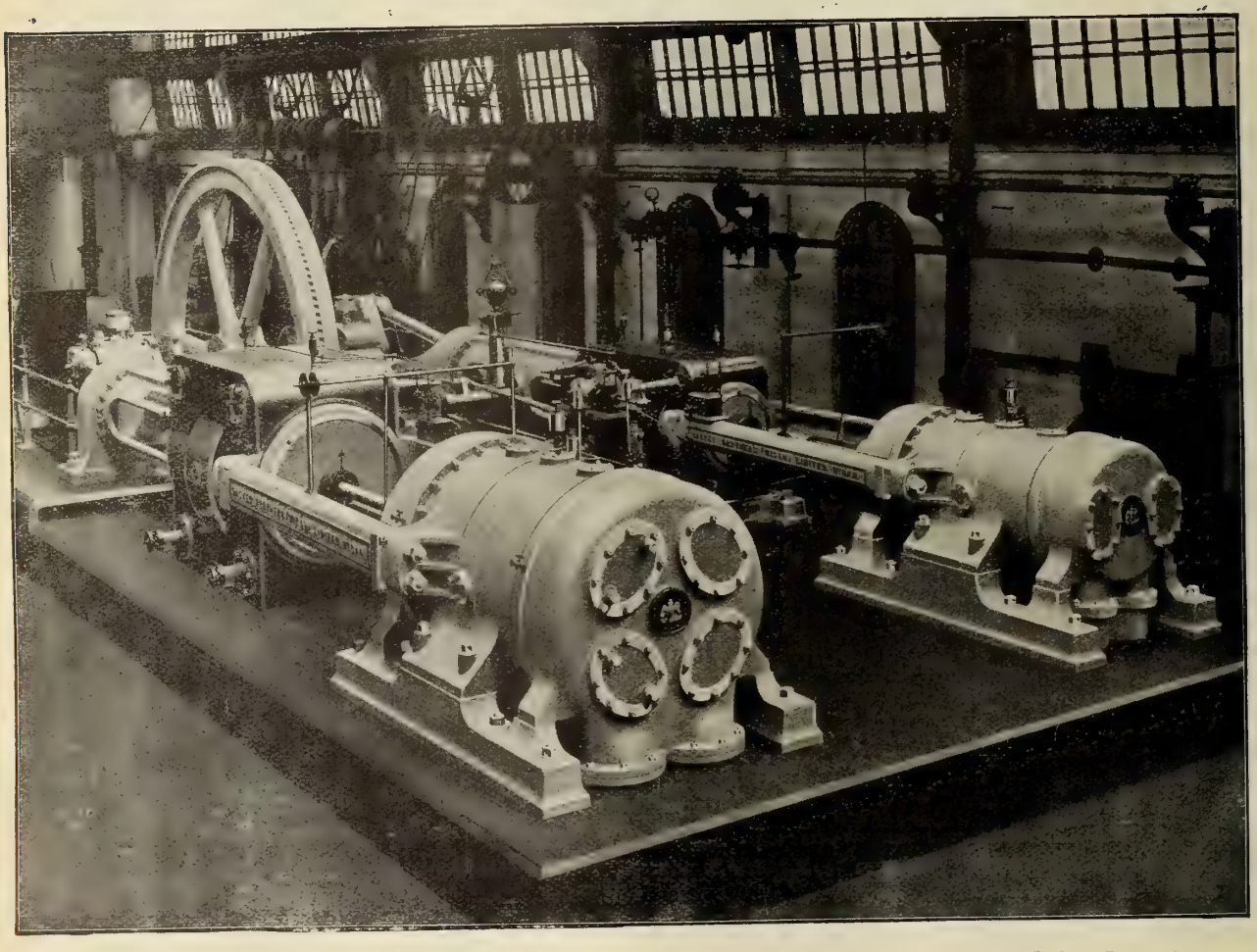
CATALOGUES AND INFORMATION ON REQUEST.

The Waterous Engine Works Co., Ltd.

Brantford, Canada

Walker Brothers (Wigan) Limited

Wigan, England



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

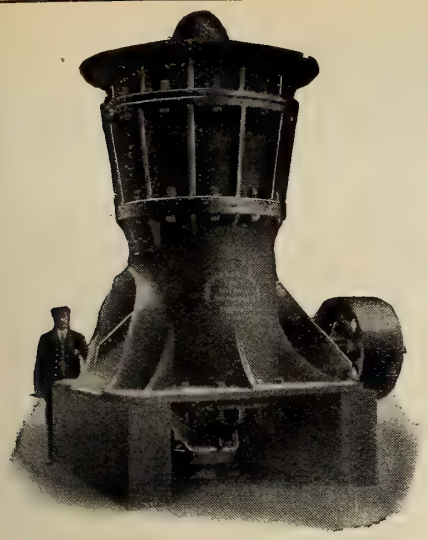
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of

CRUSHING AND GRINDING MACHINERY

of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including

WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS, ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President

C. A. MACPHERSON, Sec-Treas.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

We personally break all our carbons

Goods sent on approval for selection

CARBONS

Black Diamonds)

and BORTZ for

DIAMOND DRILLS



S. DESSAU'S SONS

Importers

180 B. Broadway,

N. Y.

Carbon for all mechanical purposes

Bortz for all mechanical purposes

GREENINGS

ROPE FITTINGS — ROPE GREASE

The safest and most reliable wire rope on the market is Greening's. The wire we use is imported directly from the world's best sources of supply and is subjected to a complete set of the several tests.
We are always prepared to ship staple sizes from our large stock. At the same time our manufacturing facilities are so well organized and complete that we can arrange unusually prompt shipment of special ropes of all kinds.

The B. GREENING WIRE CO., Limited

HAMILTON, ONT. — MONTREAL, CAN.

WIRE ROPE

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

ANNOUNCEMENT

BRUCE PEEBLES

& COMPANY, LIMITED

EDINBURGH - - SCOTLAND

are now represented in

CANADA

by

VANDELEUR AND NICHOLS

DINEEN BLDG., - - - TORONTO

SPECIALTIES:

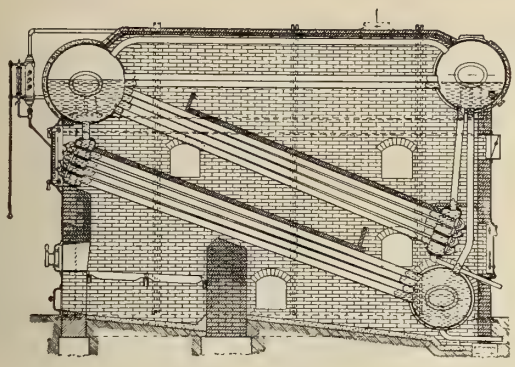
DIRECT and ALTERNATING CURRENT.
DYNAMOS and MOTORS for all Conditions of Service.
PEEBLES-LACOUR MOTOR CONVERTERS.
STEAM TURBO ALTERNATORS. TRACTION MOTORS.

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines

Robb Water Tube Boiler



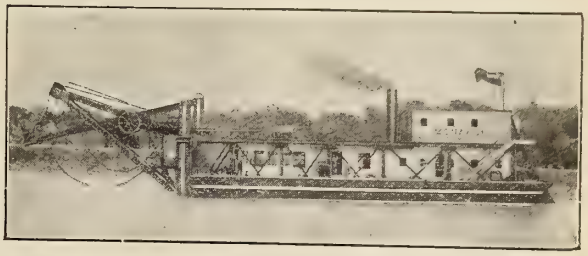
Straight tubes. Perfect water circulation.
Dry or superheated steam.
Half the usual number of handholes.

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario
MANUFACTURERS OF



Dredges, Ditchers, Derricks,

Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,

Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

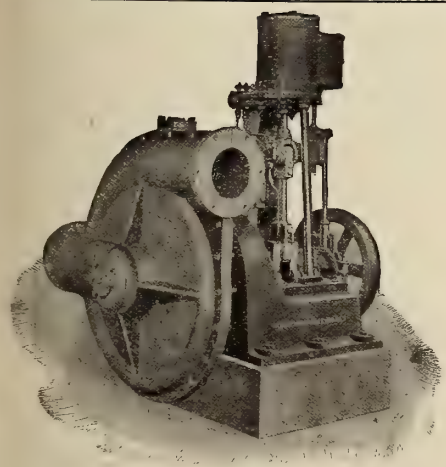
Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



Morris Machine Works
BALDWINSVILLE, N.Y.
Centrifugal Pumping Machinery for various Industrial Purposes

We are building a special solid steel lined pump for handling tailings or slimes in gold mining. Estimates furnished upon application for pumping outfits for special purposes. Write for catalogue.

New York Office—39-41 Cortland Street

AGENCIES
Henion & Hubbell, 223-231 North Jefferson St., Chicago, Ill.
Harron, Rickard & McCone, San Francisco, Cal.
Zimmerman-Wells-Brown Co., Portland, Ore.
H. W. Petrie, Toronto, Ont.

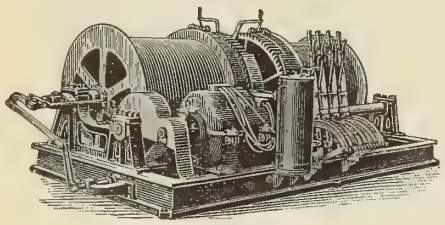
Flory Hoisting Engines

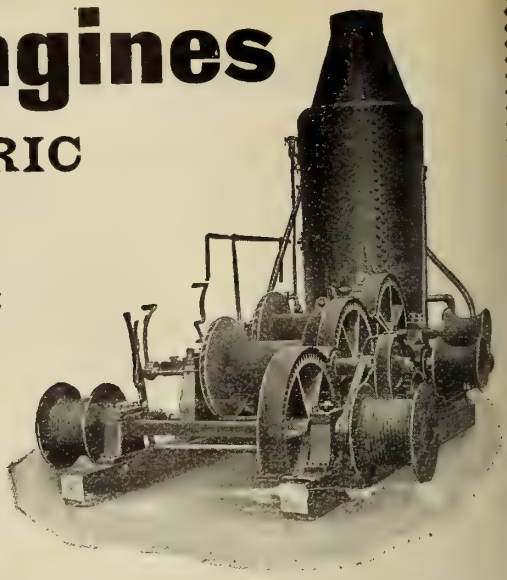
STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market

Slate Mining and Working Machinery





SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 a.m to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

CANADIAN PACIFIC

CANADA'S GREATEST RAILWAY

Peterboro
Ottawa
Montreal
Quebec
St. John
Halifax

9.02 a.m.
10.00 p.m.

CANADIAN PACIFIC RAILWAY

LEAVES TORONTO FOR

Galt
London
Chatham
Windsor
Detroit
Chicago

8.00 a.m.
4.00 p.m.
7.20 p.m.

Connections Are Made for Points on Branch Lines

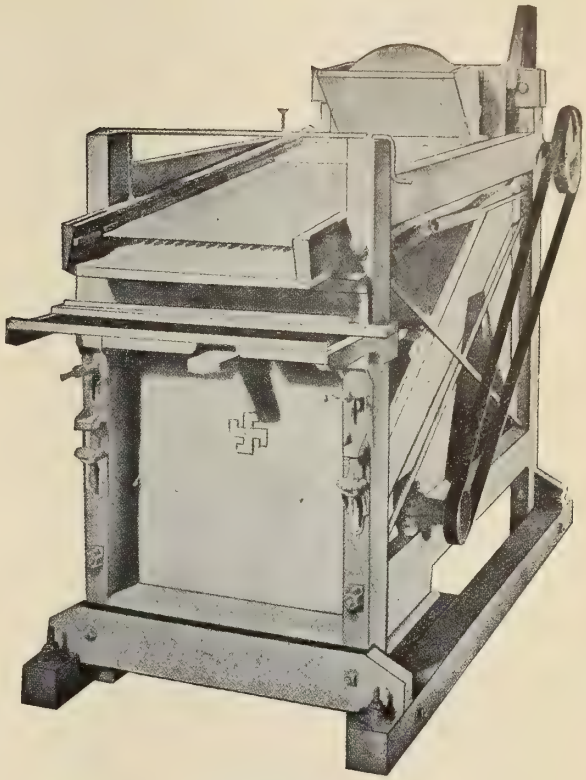
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scrantan, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

The Davis Handbook

OF THE

Cobalt Silver District

By H. P DAVIS.

ILLUSTRATED WITH PHOTOGRAPHS

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 PAPER COVER $2.00 STIFF COVER

BOOK DEPARTMENT

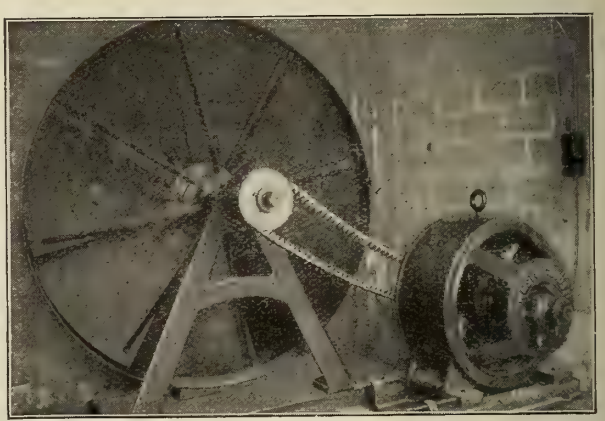
Canadian Mining Journal

TORONTO

DRIVING MINE-FAN

with

"MAXIMUM" SILENT CHAIN



The 8-ft. disc centrifugal "Sirocco" fan driven as here illustrated has a capacity of 150,000 cubic feet of air at 5" water gauge.

For further particulars of the power possible with "MAXIMUM" SILENT CHAIN Driving write for Booklet R.

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK, 299 Broadway
PITTSBURGH, 1501-2 Park Building
ST. LOUIS, Central National Bank Building
SEATTLE, 439-440 New York Block
DENVER, Lindrooth, Shubart & Co.
NEW ORLEANS, Wilmot Machinery Co.

ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F) Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

GOING PROSPECTING?

Prospectors completely equipped with the most modern and scientific appliances.

Better write us to-day.

LYMANS, Limited.

(Established 1800)

MANUFACTURING CHEMISTS

Dealers in Chemical and Assay Apparatus

MONTREAL.

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

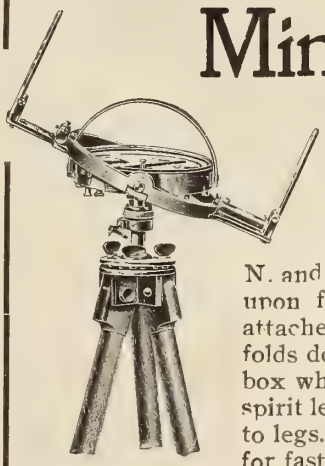
138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Casartelli's Patent Mining Dial



SIGHT limb moves on axes cast on the compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indces attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Telescope attachment if desired.

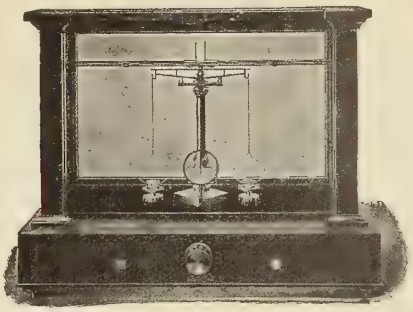
The Simplest Mining Dial made—the most efficient—most durable—quite the **best.** Proof of this in Catalogue F—free on request.

Sizes 5 inches and 6 inches.

JOSEPH CASARTELLI & SON

Scientific Instrument Makers

43 Market Street, Manchester, Eng.



TYPE D. PRECISION BALANCE

4 INCH BEAM SENSIBILITY 1/10 MILLIGRAM

This balance is used extensively by Assayers in Smelters, Mines Cyanide and Chlorination Mills having a large volume of very accurate weighing to make.

It is representative of the output of

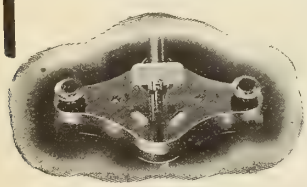
THE PRECISION FACTORY

Among its many excellent features we show below

THE UNIT BASE

which carries the level vials, center lift rod and pan rest bearings thereby maintaining their perfect alignment, regardless of the warping of the case, and by the removal of three screws the entire mechanism may be removed for cleaning.

CATALOG A-16 DESCRIBES OUR LINE



WM. AINSWORTH & SONS

Denver. Colo., U.S.A.

CANADIAN AGENTS

Lyman Sons & Company,
380 St. Paul St., Montreal.

B. C. Assay & Chemical Supply Company,
Vancouver, B. C.

Dominion Coal Company

Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

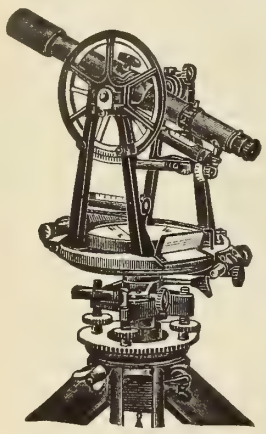
Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montrea

Address P.O. Box 196

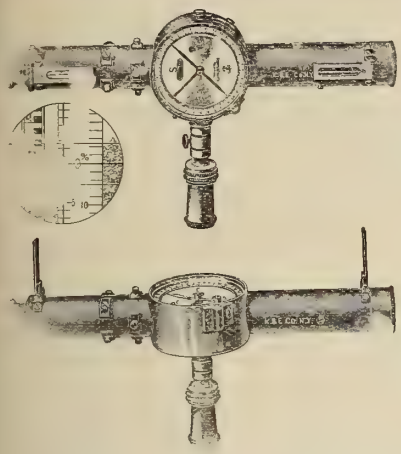
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

An Ideal Instrument
For Preliminary Surveying



THE STADIA HAND TRANSIT

The Stadia Hand Transit gives more accurate and quicker results than any similar portable instrument. It is thoroughly well made and will meet the requirements of those who are engaged on preliminary work, or on the subdivision of larger surveys made with a regular transit.

In measuring vertical angles, the sighted point and both scale readings (slopes and degrees) appear together in the field of view (see cut.)

Compass bearings can be taken by use of the telescope on level ground or by the folding sights on sloping ground.

Send for complete (550-page) Catalogue.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

General Office and Factories,

HOBOKEN, N.J.

New York, Chicago St. Louis, San Francisco

Mathematical and Surveying Instruments

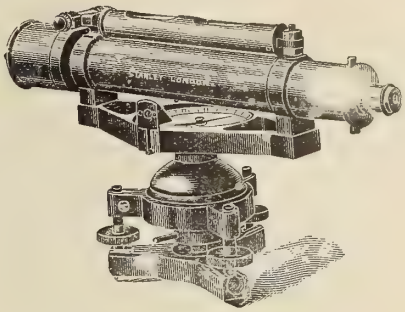
Drawing Materials Measuring Tapes

STANLEY, LONDON

The largest manufacturers of

Surveying and Drawing Instruments

in the World.



"Stanley Quick-Setting-Up Level"

Please send for our J 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

All genuine instruments bear our Trade Mark "STANLEY"

Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

W. F. Stanley & Co., Limited

Great Turnstile, London, England

THE

Bennett Fuse

Crown  Brand

MANUFACTURED BY

William Bennett, Sons & Co. Limited

CAMBORNE, CORNWALL, ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.

VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION.

WE MANUFACTURE

Brass Castings
Bronze Castings or
Aluminum Castings

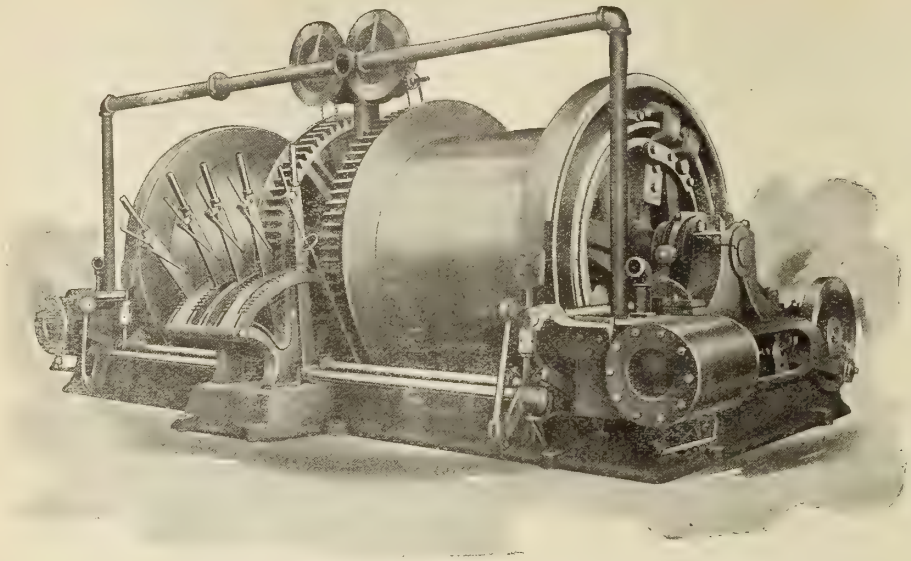
We know how to make the best.

Let us make your Castings.

Send your Patterns.

The Canada Metal Co., Ltd.

TORONTO



When desired we equip our winding Engines in the larger sizes with the Lane Friction.

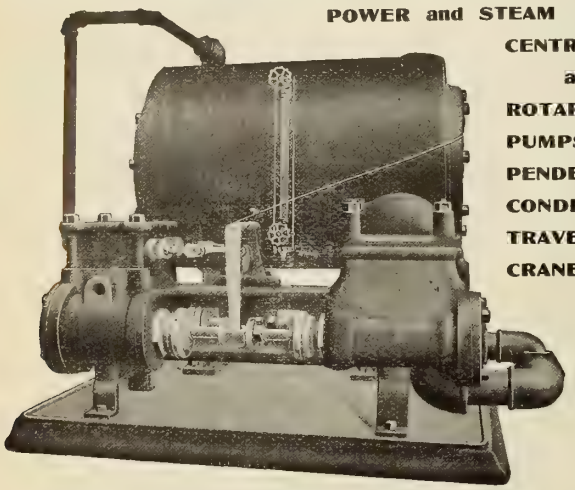
This device possesses great strength and adapts a Hoist to the heaviest class of work.

WE STOCK THE SMALL SIZES.

ARE YOU INTERESTED

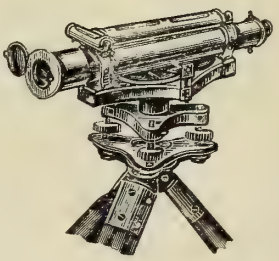
The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.



POWER and STEAM PUMPS, CENTRIFUGAL and ROTARY PUMPS, INDEPENDENT JET CONDENSERS, TRAVELLING CRANES, ETC.

THE SMART TURNER MACHINE CO., LIMITED, HAMILTON, CANADA.



DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 BEAVER HALL HILL, - MONTREAL

WANTED

Copy of Canadian Mining Review, January, 1907

STATE PRICE

CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING
TORONTO

LUDWIG NAUEN
HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF
ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, April 1, 1910 No. 7

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED.

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 193
(a) The C. M. I. Committee at Ottawa 193
(b) The Mining Society of Nova Scotia 194
(c) Tool Steel Direct from Iron Ore 194
(d) Editorial Notes 194
The Eighteenth Annual Meeting of the Mining Society of Nova Scotia, Halifax, March 15 and 16, 1910..... 195
Canadian Mining Institute—Western Branch 197
Legal Column 198
Electricity in Mines 198
Cobalt in 1910 199
Canadian Iron and Steel. By Watson Griffin..... 207
Steam-Driven Air Compressors in Cobalt. By H. V. Haight 209
Claims Assessment Work in the Province of Ontario. By James Rennie 210
The Eight Hour Day in Nova Scotia 212
Correspondence 212
Personal and General 213
Special Correspondence 213
General Mining News 218
Mining News of the World 220
Company Notes 221
Statistics and Returns 223

THE C. M. I. COMMITTEE AT OTTAWA.

Recognizing that the Select Standing Committee of the House of Commons on Mines and Minerals was on the right track in its recommendations to the Federal Government, the Canadian Mining Institute appointed a committee to wait upon the Prime Minister and urge that these recommendations be carried into effect.

To refresh the memories of our readers, we shall recapitulate the three aforementioned recommendations: "Your committee is of the opinion (1) That there should be assigned to the Federal Department of Mines, the administration of mines, including the issuing of title thereto, and of all mining laws; (2) That an Act should be passed consolidating all the laws relating to mines under Federal control; (3) That consideration should be given to a policy which will have for its objects the re-acquisition by the Crown of mining rights heretofore granted in patents of land."

The first two recommendations will meet the approval of all mining men. They apply with especial force to the distressing conditions that obtain in Alberta and the Yukon. The last recommendation we are inclined to view with doubt. Its practicability is extremely debatable.

The Institute was represented by Messrs. G. G. S. Lindsey, T. B. Caldwell, A. M. Hay, Clifford E. Smith, and H. Mortimer-Lamb. Accompanying the committee were Mr. F. T. Congdon, M.P., and Mr. Ralph Smith, M.P., both of whom are members of the Select Standing Committee. The delegation was introduced to the Prime Minister by Mr. James Conmee, M.P.

As chairman of the delegation, Mr. G. G. S. Lindsey presented the views of the Institute. Other delegates spoke to the point. These utterances were strongly supported by the Minister of Mines, the Hon. Mr. Templeman. Their reception by Sir Wilfrid Laurier was distinctly favourable. He promised specifically that the first and second recommendations would be put into effect, and he suggested that the Canadian Mining Institute take on its own shoulders the task of consolidating and codifying the laws pertaining to mining lands under Federal control. This, he assured the delegation, the Government would introduce at the next session of Parliament.

After interviewing the Prime Minister, the delegation waited upon the Minister of Mines. Arrangements were then made for appointing a sub-committee of the Select Standing Committee to draft the Act consolidating the present mining laws. It was decided that a suitable appropriation be asked for, so that the sub-committee might be enabled to secure information from every desirable quarter. The Canadian Mining Insti-

tute delegates assured the minister of the entire sympathy and support of that body.

Previous delegations to Ottawa have not been uniformly successful. Lack of harmony and want of preparedness have usually marred their interviews. This last delegation, however, appears to have been excellently handled. Superfluous debate was avoided. The speakers confined themselves to the matter in hand. And the issue was in every way excellent.

To Mr. G. G. S. Lindsey, the chairman of the delegation, much praise is due. Mr. Lindsey's clear insight into the principles involved, and his grasp of business details are as valuable as they are unusual.

. . . . .

Before the Select Standing Committee, or its subcommittee, lies a large and urgent task. The support of the Canadian Mining Institute may be counted upon. Equally certain is the gratitude of all Canadian mining investors.

THE MINING SOCIETY OF NOVA SCOTIA.

The Eighteenth Annual Meeting of the Mining Society of Nova Scotia, held recently in Halifax, N.S., was remarkable in more than one respect. In the first place, several of the papers evoked an unusual amount of discussion and general interest. More than one of these will probably incite industrial development.

Particularly inspiring was the paper read by Dr. Heinrich Ries, of Cornell University. Dr. Ries outlined the possibilities of the clay industry in Nova Scotia, and gave specific information as to the extent and workability of the principal deposits. Quite as important was Dr. Ells' paper dealing with the commercial value of the oil shales of the Maritime Provinces, and Mr. Faribault's brief presentation of the geology and potentialities of the Moose River scheelite veins was most timely. Rarely have three such significant technical pronouncements been made at such a gathering.

Whilst the papers presented by local mining men were all meritorious, they do not demand especial notice here. We feel, however, that reference to the President's annual address is called for.

The key-note of Mr. Brown's address is contained in one sentence. "To my knowledge," he declared, "not one coal seam of commercial value has been discovered in Cape Breton, nor, indeed, with perhaps one exception, in the whole Province of Nova Scotia, since the year of Confederation." With this statement as a text, Mr. Brown dilated upon the earnest, careful, deliberate character that distinguished the labours and records of the colliery engineers of fifty years ago. Contrasting modern and past practice, he alluded to the intemperate haste, the incomplete records, and the consuming commercialism that are being developed. Briefly, but most pointedly, he indicated the wastefulness of present methods, and the surprisingly small advance that has been made in fuel economy, both as regards mining and power-generation.

While it is comparatively easy to pick flaws in Mr. Brown's statements, we believe that his logic is fundamentally sound. His address will be found on another page of the Canadian Mining Journal. It deserves careful perusal.

TOOL STEEL DIRECT FROM IRON ORE.

It should be a source of gratification to Canadians that a citizen of this country, Mr. J. W. Evans, of Belleville, has been the first investigator to succeed in producing high-class tool steel in an electric furnace direct from iron ore. Further, in his small furnace of 150 lb. capacity, Mr. Evans turned out his product at a cost of 9 6-10 cents per pound. The steel was tested at Hamilton and at McGill University, and was proved to be superior to standard brands. At Belleville, where the furnace is installed, electric energy costs $50 per horsepower per year. The cost per pound mentioned above is based upon this rate for power, and includes all charges, such as depreciation, briquetting, etc., etc.

So far as we can learn, Mr. Evans is the only metallurgist to solve the problem of making tool steel direct from titaniferous iron ores in the electric furnace. This he first accomplished in 1906. Since then he has been perfecting his process, until now it appears to be commercially feasible.

As a mark of its sense of the value of Mr. Evans' work, the Canadian Mining Institute, during its recent annual meeting, passed the following resolution: "Resolved, that the Institute desires to express its appreciation of the results achieved by J. W. Evans in his electric furnace, and regrets that illness prevents his attendance at this meeting."

We need only add that Mr. Evans has never sought to advertise himself or his work.

EDITORIAL NOTES.

Under the revised French tariff, it is proposed that certain asbestos goods are to be taxed as follows, per 100 kilos: Paper, 25 francs; cut up, other than rectangular, 50 francs; threads and cords, 60 francs; plaits and tissues (mixed or not), 75 francs. So far as Canada is concerned, the tariff on these articles will probably be modified by the application of the minimum tariff.

The fire that broke out in the Albion colliery, Stellarton, N.S., was fought and suppressed by ten men wearing Draeger breathing apparatus. These men had to be brought all the way from Glace Bay, Cape Breton. Without their aid, the loss would have been enormous. There could be no better illustration of the absolute necessity of establishing rescue stations at every Canadian coal mining centre.

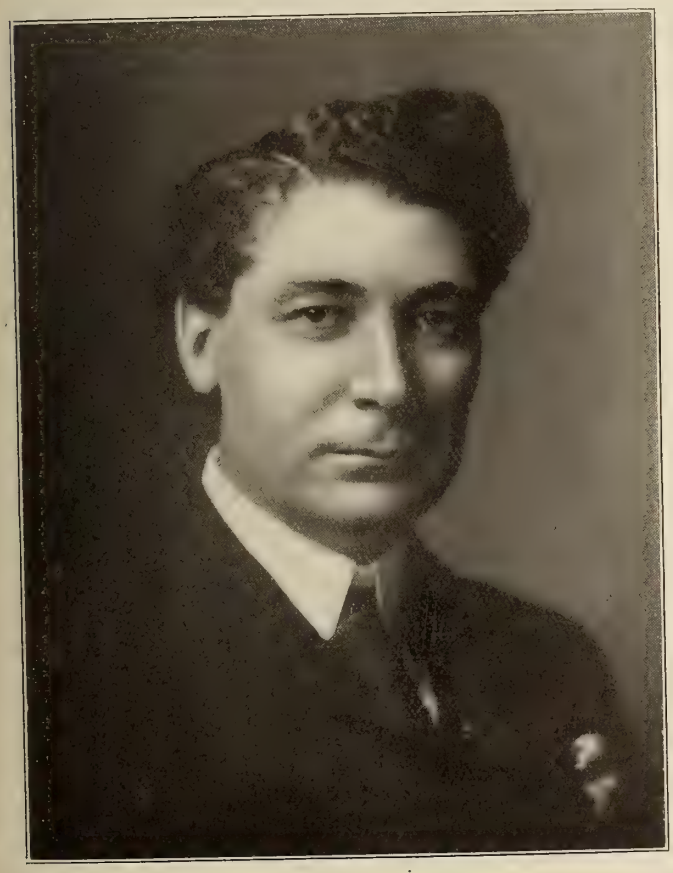
The Western Branch of the Canadian Mining Institute, at a recent meeting, placed on record its high appreciation of the journalistic work done by Mr. E. Jacobs, of Victoria, B.C. The Canadian Mining Jour-

nal has more than once had occasion to commend the careful and conscientious articles written by Mr. Jacobs. It is pleasant to notice that his own associates are alive to the importance of his labours.

The prosecution in Toronto of the men accused of high-grading in Cobalt was conducted with lamentable looseness. The prosecuting attorney, as might naturally be expected, had no grip of mining or mineralogical technicalities. Hence he could not meet the arguments adduced in defence of the accused. Better machinery is certainly needed. In cases like these, specialists should be appointed by the Crown to conduct the prosecution.

The Eighteenth Annual Meeting of the Mining Society of Nova Scotia, Halifax, March 15 and 16, 1910.

The Mining Society of Nova Scotia has taken a new grip on life. Its eighteenth annual meeting was well attended. Vigorous discussions followed the reading of papers, and the general tone of the meetings was commendably enthusiastic. Particularly noticeable was the attendance of students from the new Technical College. Moreover, a most representative lot of visitors added much to the sessions.



T. J. BROWN, President.

Proceedings opened at 10.30 o'clock on Tuesday morning, March 15. After the secretary, Mr. A. A. Hayward, had read the minutes of the preceding annual meeting, the president, Mr. T. J. Brown, delivered his address.

PRESIDENTIAL ADDRESS.

The president, instead of the conventional review of progress, harked back to the past. He compared the work of the modern coal mining engineer to that of the men of half a century ago. His address was really a sermon against the haste and bustle of to-day as compared with the substantial accomplishment of fifty years ago. Whilst his criticisms of modern practice were severe, they were tempered by the fact that he himself is of this generation. Moreover, Mr. Brown's attitude was not didactic—he was merely indicating, with an occasional gleam of humour, the need of studying and respecting the pioneers of the profession. His address was, in part, as follows:—

"To my knowledge not one seam of commercial value has been discovered in Cape Breton, or indeed, with perhaps one exception, in the Province of Nova Scotia, since the year of Confederation. Mr. Richard Brown left us in book form the story of his work in prospecting the whole of Cape Breton.

"In this book, Mr. Brown has given geological information in connection with our coal seams in Cape Breton, and nothing of much importance has been added to this information, and nothing contained therein of any importance has been found in error.

"When we come to consider that the work this man did in Cape Breton was done through the wilderness on horseback, or around the shores in a small open boat, we get an idea of the thoroughness with which the engineers of the old school did their work, and the accuracy and the method with which they left us the benefit of their experience.

"Are we to believe that there is nothing more to discover in the way of coal seams? Or, are we to believe that no geologist of his experience and knowledge has devoted the time to it since? He was unaided at the time. He was the only mining engineer—or nearly so—on the Island. What have the host of modern, so-called, mining engineers now in Nova Scotia added in any way to the knowledge of our mineral possibilities, and where can their results be found?

"I believe that coal seams, as yet unknown, will be found in Cape Breton; and in Cumberland and Pictou counties, where the coal measures are not so regular as in Cape Breton, the possibilities are even greater. We have every facility offered in the way of Government boring machines. What do we lack? Is it men? Is it capital? Or is it knowledge? Let us think it over.

"Is it possible that the present miner is but a scavenger of coal, content to make the best of what he finds already staked out for him! Is it possible that the present generation are content to take the fruits of what previous giants of the province fought for and obtained for them—responsible government, confederation, discovery of all the coal seams of the province—all previous to 1867. Nothing doing since except enjoying or depleting our legacy.

"Perhaps the life the modern mining engineer is living to-day is too strenuous, and perhaps one of the lessons that we can learn from this comparison is that we are not giving enough attention to the literature of our mining doings of to-day.

"Such men as Brown, Routledge, Gilpin, Poole, Fletcher and perhaps some others, have left us the result of their work; but, strange to say, with the possible exception of Hon. Robert Drummond, who might be called the miners' statistician, very little has been done in preserving or giving us the literature of our mining and engineering progress during recent years.

The Province of Nova Scotia has been very fortunate—or, rather, unfortunate—in having had within its borders, at all times, but principally within the last twenty-five years, the greatest aggregation of visitors with scientific or mining titles, who were able to make coal seams grow where none existed, and able to make credulous investors put money where no possible returns could be expected. These men have come and gone in an endless procession. Each one the hero of the hour—duly honoured, dined and kowtowed to. The only visible record we have of them now is the country spotted here and there, in the most unlikely places, with mounds of fire-clay, and a once promising coal mine now surrounded by an old wire rope fence. We have been left the hole in the ground. The credulous investor has got the hole in his bank account. Still the never ending show goes on.

"The successful mining engineer to-day is the one who is near the capitalist, makes estimates of the cost of plant and dreams the assumed cost. The failure is the poor devil who is called upon to fulfil his dreams and to make the actual figures agree with those of the dream artist. One lives in a brown stone front in Tickerville, the other in a wooden row in Smokey Town.

"I know of a case where one of these high-class chaps offered the manager a sum of gold if he would undertake to have a certain piece of machinery working, and to keep it working while the president visited the plant. The manager succeeded and got the gold; but, needless to say, the machinery was scrapped and never made a revolution afterwards. Who was the success? And who was the failure?

"When we come to consider that God gave us 100 units of coal; that the modern mine engineer extracts about on an average of 50 per cent. of this coal, and wastes or leaves behind him 50 per cent.; that the modern engineer with his most modern boilers and engines extracts but 10 per cent. of the power, and loses in smoke and waste heat the remaining 90 per cent., we find that of God's gift we waste 95 units and utilize but 5 units. When we think this statement over we surely find no room, either as mining or mechanical engineers, to boast of our accomplishments.

"We have not made very much progress in the way of advance in the economical mining of coal during the last 50 years. I must admit that we have made considerable progress in methods of transporting, etc., but, as to the actual mining, we have not got far away from the old "bord" and "pillar" method of our forefathers.

"There are not enough bouquets to-day for the man with the safest colliery in the province, and there are too many halos for the fellow with the largest output.

"No progress has been made in the shipping of coal. We are still building wharves and expensive approaches to enable us to take coal up a height in order to let it fall down again.

"In connection with underground coal mining, we have still got the horse employed. We are still using blasting powder, making slack coal at one end and paying for expensive mechanical arrangement at the other for removing it.

"We are still boiling water at one end of an engine plant and allowing it to escape hot at the other.

"We are still using safety lamps only slightly better than that of Sir Humphrey Davies.

"We are generating enough power at the foot of a hollow brick stack to drive a small engine, and allowing sufficient to escape at the top to drive an Atlantic liner.



A. A HAYWARD, SECRETARY.

"Our Mining Act, with its amendments, would remind one of a brick building surrounded with small, cheap, wooden out-houses, some of them connected to the main building and some of them not, and most of them added to get over the exigencies of the moment, and few of them having the architectural soundness of the original structure.

"We appear to be in an age where we have ever increasing requisitions and ever increasing scrap piles. The modern engineer searching for a spare part in a scrap pile would look as much out of place as he would in overalls.

"The predecessors of the mining engineers of yesterday had for their motto: 1st, safety; 2nd, quality; 3rd, a reasonable dividend on the money invested. We are afraid that to-day our motto has deteriorated into: 1st, quantity; 2nd, quantity; 3rd, quantity.

"Some of the coal mines of Nova Scotia to-day are unable to make a success of coal mining from a monetary point of view, owing to the fact that a large percentage of their coal is made into slack coal in mining and in handling. I will not say that this was not a

serious drawback to the mining of coal in olden times, but I do say that the fact that this coal has got to be sacrificed or left on dumps to burn or become deteriorated, owing to the fact that the mechanical engineers have not yet progressed enough so that the boiler equipment plants of all kinds in the Province of Nova Scotia are not fitted to burn this refuse instead of the best quality of coal now generally consumed under boilers.

"It is unfortunate for the industry that our politicians are all coal mining engineers, and the coal mining men are all politicians.

"I have no doubt that some of you will think that most of the foregoing remarks are somewhat exaggerated. And I must admit that to reach the point I set to make I intentionally exalted the virtues of the older engineer, and depreciated the virtues of the modern engineer, both mining and mechanical. But I do so with the idea that if these things were forcibly brought to our notice it might result in our being charitable in our criticism of others, and less blinded and more alive to our present-day weaknesses.

"As I am supposed to have been connected with both the mining and mechanical engineering of collieries all my life time, and am so engaged at the present time, and as all these criticisms are aimed at men such as myself, I do not think it can be said of me that I had taken the opportunity here afforded me at hitting at any class of men with whom I was not closely identified.

"I have to thank you, gentlemen, for your attention and forbearance, and will take my seat, wishing our society, and every individual member of it, the greatest possible amount of success."

The afternoon of Tuesday was occupied in the presentation of the following papers:—"Tungsten Deposits at Moose River, N.S.," by Mr. E. R. Faribault; "Scheelite, the Ore of Tungsten, at Moose River, N. S.," by Mr. A. A. Hayward; "The Clays of Nova Scotia," by Dr. Heinrich Ries; "Treatment of Boiler Water," by Mr. A. L. McCallum.

On Tuesday evening the annual banquet was held at the Halifax Hotel. The only two speakers were Dr. Magill, of Dalhousie University, and Mr. Arthur Hawkes, of Toronto. Only one toast was drunk and that was, of course, to the King. This curtailment of the usual appalling succession of toasts and oratory is entirely worth while. It is almost superfluous to add that the menu and music were excellent.

The Wednesday morning session was devoted largely to the reading and discussing of Dr. R. W. Ells' paper, "The Commercial Value of the Oil Shales of Eastern Canada, Based on Their Contents by Analyses in Crude Oil and Sulphate of Ammonia."

The papers read during the afternoon were as follows:—"Blast Furnace Slack Handling and Charging Apparatus," by Mr. W. H. Graham; "Practical and Economic Mining," by Mr. Neil A. Nicholson; and "The Use of Coke Oven Gas as a Fuel," by Mr. T. J. Brown.

Other papers read by title were:—"Description of Haulage System Installed to Take the Place of Horses at Nos. 3 and 4 Collieries of the N. S. Steel and Coal Company," by Mr. John Johnston; "Notes on the Use of Explosives and the Methods of Shot Firing," by Mr. C. E. Coll; "Description of Electric Endless Haulage at Colliery No. 5 of the N. S. Steel and Coal Company," by Mr. Robert Robinson; and "Use of Low Grade Fuel Under Boilers," by Mr. John Preston.

CANADIAN MINING INSTITUTE—WESTERN BRANCH.

At the recent meeting at Vancouver, Mr. Thomas Kiddie, in his address as retiring chairman of the Western Branch of the Canadian Mining Institute, stated that the total value of the mineral production of the coast district during the last ten years was rather more than $50,000,000. While this represented only about one-fourth of the value of the mineral production of the province, it was a large amount, for it showed an average yearly value of slightly more than $5,000,000.

Although the production of placer gold in the province had not shown any substantial increase in recent years, there were features to-day that warranted the expectation of considerable improvement in the near future. He need only make passing reference to the fact that in the Cariboo district there were two or three hydraulic mining enterprises on a comparatively large scale, either already established or being prepared for. In the Atlin district there was also good reason to look for an increase as operations were enlarged. Lode gold mining gave promise of yielding larger total returns both from stamp milling operations in the Hedley camp in the Similkameen district and in the Sheep Creek camp in the Nelson district. The considerable increase in the smelting of copper ores containing gold would also add to the production of the yellow metal.

"The production of silver is greater now than it was a year or two ago," continued Mr. Kiddie. "Operations in the Slocan district, Ainsworth mining division, are being extended, and the quantity of silver extracted from the ores mined in that district being added up. In this connection it is noteworthy that the Consolidated Mining and Smelting Company of Canada is producing comparatively large quantities of refined silver as well as gold at its works at Trail, West Kootenay, and is selling part of its product to the Ottawa branch of the Royal Mint, for use in coining Canadian money. The beneficial effect of the lead bounty paid by the Dominion Government on silver-lead and lead mined in Canada is seen in the continued operations of numbers of silver-lead and lead mines in both East and West Kootenay districts. At Trail, where is situated the only operating lead smelting and refining works in Western Canada, many improvements and enlargements have recently been made, these providing for the smelting of a larger tonnage of lead ores. In the increase of size of the lead blast furnaces, installation of more Huntington-Heberlein roasters and converting pots, and in the considerable extention of the electrolytic lead refinery, are evidences of substantial progress.

"The mining of copper ores on a large scale is being continued, notably in the Boundary district, where about 6,000 tons of ore a day are being mined, and the greater part of this large tonnage smelted at district smelting works. The important improvements lately completed at the Granby smeltery, bringing its total treatment capacity up to about 4,500 tons of ore a day, and its copper converting capacity to about 36,000,000 pounds of copper per annum, are indicative of the advance being made in this branch of mining and smelting. The smelting works of the B. C. Copper Co., too, are quite modern and of large capacity, while at Trail the Consolidated Mining and Smelting Co. has built the largest copper blast furnaces in Canada, and is also enlarging its copper smelting operations. On the coast important improvements have been made at the Tyee Copper Co.'s works at Ladysmith, where there has been

installed a second blast furnace of larger capacity than previously in use at those works, and other additions to plant have been made to provide for the steady increase in copper smelting that this company is bringing about."

The chairman also dealt with the prospects of iron mining and smelting on the coast and the problem of a profitable method of testing low-grade zinc ores. There had been much expansion in coal mining and the production of coke. In addition to a large output having been made from the older collieries, several new ones were now producing, so that the total output for the province would be substantially increased. In conclusion it might be said, with confidence, that there was much promise of greater progress in the near future, and that mining would become more profitable than it had been in the past.

The Secretary's report showed that the Western Branch started the year 1909 with a membership of 189 and ended it with a roll of 201.

On ballot being taken for the chairmanship, Mr. W. Fleet Robertson, the provincial mineralogist, was elected, receiving 65 ballots. Mr. E. Jacobs was re-elected Secretary.

It was decided to hold the next meeting at Grand Forks.

On motion of Mr. A. G. Langley, it was resolved to ask the Dominion Government to connect the Portland Canal with the main line of telegraph communication in Northern British Columbia. The meeting also resolved to petition the Provincial Government to establish a survey line and marks in the Portland Canal district for the convenience of surveyors there.

Mr. Trewartha-James raised the question of remitting the duty on life-saving apparatus in mines. At present there was 33 1-3 per cent. duty levied on such apparatus in Canada; but in the United States it was admitted free. The apparatus cost from $100 to $200 per unit, and several were needed in each coal mine, especially where gaseous vapour was prevalent. The remission of the duty would encourage mines to obtain such equipment, which was only manufactured in Europe. It was decided to request the Dominion Government to remit the duty, and Mr. E. Buchanan promised to induce the Vancouver Board of Trade, and Mr. W. H. Trewartha-James the Victoria Board, to support this request.

Subsequently the meeting discussed Mr. Kiddie's paper on "Cause of Variation in Ore Sampling," and Mr. S. C. Castleman read a paper on the "Classification of Nicola Valley Coals," which stimulated a great deal of discussion, Mr. Robertson remarking that the figures given showed that the coal was a low carbon bituminous. Mr. Kiddie also read a paper on "Metal Losses in Copper Slags.

LEGAL COLUMN.

The only amendments to the Mining Act of Ontario passed by the Legislature at its recent sitting relate to the performance of working conditions.

Sub-section 3 of section 78, relating to the report of performance filed by the holder is amended by requiring that "the report shall show in detail the names and residences of the men that performed the work and dates upon which they worked in its performance."

The next sub-section, sub-section 4 of section 78, is the section brought under judicial notice in the case re Perkins and Dowling, referred to in the issue of February 1st. The section formerly read, "The Recorder, if satisfied that the prescribed work has been duly performed, may grant a certificate ..... but he may first, if he deems proper, inspect or order the inspection of the work or otherwise investigate the question of its sufficiency and his decision thereon shall be final unless appeal is made to the Commissioner, whose decision shall be final." The contention was raised that the decision of the Commissioner was not final unless he had made an inspection or investigation under the foregoing provisions. The Divisional Court held that the decision of the Commissioner was final whether or not any inspection of investigation had been made by him before giving his decision.

The amendment of this section reads as follows: "Such certificate in the absence of fraud or mistake, shall be final and conclusive evidence of the due performance of the work therein certified, but where it has been issued in mistake, or obtained by fraud the Commissioner shall have power to revoke and cancel it upon the application of the Crown or an officer of the Bureau of Mines or any person interested. The question of the due performance of work shall not be appealable beyond the Commissioner."

It will be noted that there is no word "sufficient" in the original section, but it seems to be obvious that "sufficiency" is the word intended.

But apart from this the effect of the slipshod amendment is doubtful. The first part of it appears to set out that the Recorder's certificate is final except where there has been fraud or mistake—thus cutting out the appeal formerly allowed to the Mining Commissioner. The last clause of the amendment appears to give it the opposite effect. Then there are the nice questions of what "mistake" means, and what is a "person interested."

Thus the benevolent intention of the legislature to allow the cancellation of certificates where fraud or mistake is shown (the principle that the general law allows without statutory authority)) is probably quite overshadowed with the new complications the amendment introduces.

ELECTRICITY IN MINES.

In addressing the Birmingham University Mining Society last month, Mr. R. Nelson, His Majesty's Inspector of Mines, referred to the rapid growth of the employment of electrical power in mines in recent years. He stated that electricity usually yielded 80 per cent. efficiency, as compared with only about 20 per cent. by compressed air. What was required where electricity was employed underground was a gas-tight fitting of strong glass in certain places as a protection against ignition of gas or coal dust.

The Sullivan Machinery Co. reports that it is installing four of its tandem Corliss compound steam and two-stage air compressors for the Mason & Hanger Company at Cornwall, New York, where the above company has a contract for one of the siphons or tunnels for the New York Board of Water Supply. Each of the above units has a capacity of approximately 2,500 cubic feet of free air per minute, so that the completed plant will furnish 10,000 cubic feet of free air per minute. These compressors operate on the same steam consumption as Corliss cross compound condensing engines of the same stroke, and owing to their tandem construction, the cost of freight, engine room and foundations is about half of a cross compound installation of the same capacity.

COBALT IN 1910.

Abstract of Report of Arthur A. Cole, Mining Engineer, T. & N. O. R. Commission, for Cobalt District, Year 1909

The following table will illustrate the steady progress of the Cobalt District since its discovery:

TABLE I.

Year.	Tonnage.	Value.
1904	158.55	$136,217.00
1904	2,336.01	1,485,570.00
1906	5,836.59	3,573,908.00
1907	14,851.34	6,155,391.00
1908	25,362.10	9,133,378.00
1909	29,942.99	12,000,000.00 (Estimated)
	78,487.58	$32,484,464 00

It will be seen from the above table that Cobalt has produced ore valued at $32,484,464, and it is noteworthy that of this amount almost 50 per cent. has been repaid to the operators in dividends.

Cobalt now supplies about 12 per cent. of the world's silver production, being 24,000,000 ounces (estimated) for 1909, and this alone with the production from British Columbia easily places Canada in the third position as a silver producer.

Table 2 shows the silver production of the leading silver mining countries in the world for 1907, 1908 and 1909. The figures for 1907 and 1908 are taken from the Mineral Industry, and those for 1909 are estimated.

TABLE II.

Country.	1907.	1908.	1909.
	ozs.	ozs.	ozs.
Mexico	61,147,178	72,596,772	.....
United States	56,514,700	51,798,053	.....
Australasia	17,516,433	17,308,281	.....
Canada	12,779,799	22,070,212	27,700,000 (Est.)
Germany	5,088,086	5,200,000	.....
World's production	183,386,250	200,655,383	200,000,000

ORE SHIPMENTS FROM THE COBALT DISTRICT FOR THE YEARS 1904 TO 1909.

(Tons of 2,000 pounds.)

MINE.	1904	1905	1906	1907	1908	1909	Totals
1. Bailey	.....	.....	30.00	.....	88.80	36.85	155.65
2. Beaver	.....	.....	.....	.....	.....	51.38	51.38
3. Buffalo	.....	200.80	992.80	1,241.54	536.90	648.86	3,620.90
4. Casey Cobalt	.....	.....	.....	.....	10.00	8.50	18.50
5. Chambers-Ferland	.....	.....	.....	.....	223.89	517.88	741.77
6. City of Cobalt	.....	.....	.....	50.61	761.04	566.82	1,378.47
7. Cobalt Central	.....	.....	.....	77.33	187.99	339.01	604.33
8. Cobalt Lake	.....	.....	.....	.....	225.97	95.47	321.44
9. Cobalt Townsite	.....	.....	.....	143.22	177.71	27.35	348.28
10. Colonial	.....	.....	15.00	40.38	.....	.....	55.38
11. Coniagas	.....	30.60	422.02	2,447.37	610.25	806.93	4,317.17
12. Crown Reserve	.....	.....	.....	.....	657.35	3,167.52	3,824.87
13. Drummond	.50	32.15	274.70	104.13	1,161.38	1,225.47	2,798.33
14. Foster	.....	83.85	117.00	312.13	191.20	113.90	818.08
15. Green Meehan	.....	.....	37.03	98.39	.....	.....	135.42
16. Imperial Cobalt	.....	.....	.....	14.61	.....	.....	14.61
17. Kerr Lake	.....	54.95	158.35	319.76	660.24	1,173.42	2,366.72
18. King Edward (Watts)	.....	19.00	.....	31.12	338.19	146.58	534.89
19. LaRose	60.05	607 86	854.61	2,815.45	4,843.17	6,757.21	15,938.35
20. Lawson	.....	14.61	.....	61.12	.....	.....	75.73
21. McKinley-Darragh	20.00	447.09	80.45	742.42	1,808.39	1,056.49	4,154.84
22. Nancy Helen	.....	.....	.....	30.10	201.32	116.32	347.74
23. Nipissing	57.00	486.02	2,125.08	2,538.26	3,571.96	6,470.52	15,248.84
24. Nova Scotia	.....	.....	43.95	272.21	237.95	224.79	778.90
25. North Cobalt	.....	.....	.....	.....	.....	6.87	6.87
26. O'Brien	.....	26.32	114.18	1,491.61	3,459.51	1,419.11	6,510.73
27. Peterson Lake (Leases)	.....	.....	.....	.....	.....	.....	.....
" (Little Nipissing)	.....	.....	.....	.....	40.67	39.62	80.29
" (Nova Scotia)	.....	.....	.....	.....	.....	121.15	121.15
28. Provincial	.....	.....	.....	.....	75.84	.....	75.84
29. Princess	.....	.....	.....	3.93	.....	.....	3.93
30. Red Rock	.....	.....	.....	45.71	.....	.....	45.71
31. Right of Way	.....	.....	46.25	129.37	750.04	1,608.99	2,534.65
32. Silver Bar	.....	.....	.....	.....	.58	.....	.58
33. Silver Cliff	.....	.....	.....	.....	160.44	149.06	309.50
34. Silver Leaf	.....	9.00	.....	46.36	197.03	.....	252.39
35. Silver Queen	.....	44.63	130.94	478.57	885.70	316.64	1,856.58
36. Temiskaming	.....	.....	.....	204.32	795.20	852.14	1,851.66
37. Temiskaming Cobalt	.....	.....	20.47	67.98	.....	.....	88.45
38. Temiskaming & Hudson Bay	.....	.....	.....	149.53	1,094.23	743.64	1,987.40
39. Trethewey	21.00	218.58	198.48	833.58	1,408.69	1,134.50	3,814.83
40. University	.....	16.00	156.28	60.23	.....	.....	231 51
41. Victoria	.....	.....	.....	.....	.47	.....	.47
42. Violet	.....	16.00	20.00	.....	.....	.....	36.00
43. White Silver Mg. Co	.....	28.45	.....	.....	.....	.....	28.45
Totals	158.55	2,336.01	5,836.59	14,851.34	25,362.10	29,942,99	78,487.58

Of the 28 shippers for 1909, 14 paid dividends during the year amounting to about $6,150,000.

The ore produced during 1907, 1908 and 1909 was shipped to the following countries for treatment:

Country.	1907.		1908.		1909.	
	Tons.	%	Tons.	%	Tons.	%
Canada	2,585.05	17.40	7,401.14	29.18	10,230.64	34.47
Great Britain	167.13	1.13	222.08	.88	30.25	.10
United States	12,098.95	81.47	17,439.42	68.76	19,576.59	65.03
Germany	.....	.....	229.46	1.18	106 51	.35
Totals	14,851.34	100.00	25,362.10	100.00	29,942.99	100.00

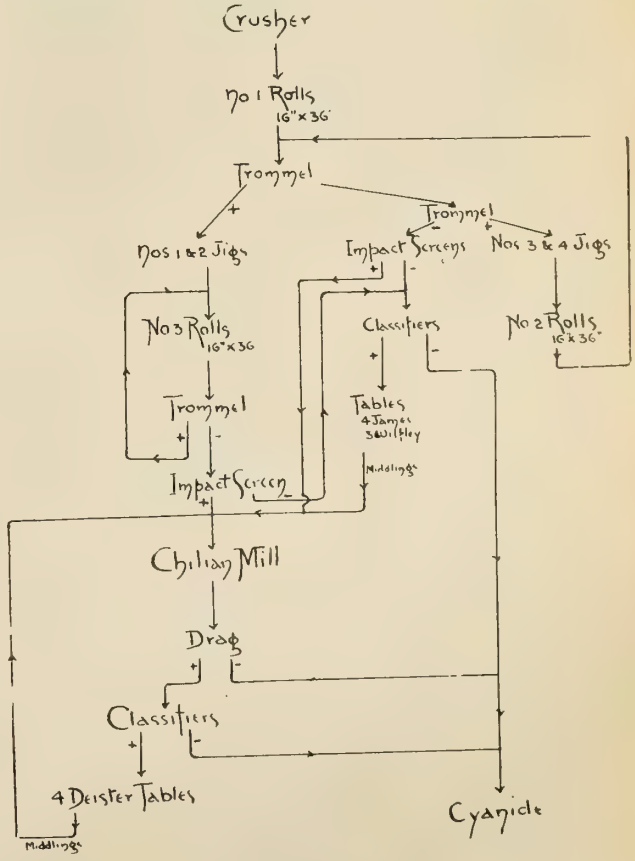
Silver.

Though the price during the year was low the fluctuations were not great, and it was continuously better than the low level reached in December of 1908.

The average price of silver for 1909 was 51.503 cents per ounce. The highest monthly average was 52.905 cents in May, and the lowest was 50.703 cents in November.

Cobalt.

Cobalt oxide is now produced in such comparatively large quantities as a by-product from the Cobalt silver ores that there has been no demand during the year for Cobalt ores solely for their cobalt contents. The market has been revolutionized. In 1907 the oxide sold for $2.50 per pound. By the 1st of April, 1908, it had dropped to $1.45 per pound, and at the close of 1909 it is being offered at 80 to 85 cents per pound.



1. FLOW SHEET, BUFFALO CONCENTRATOR.

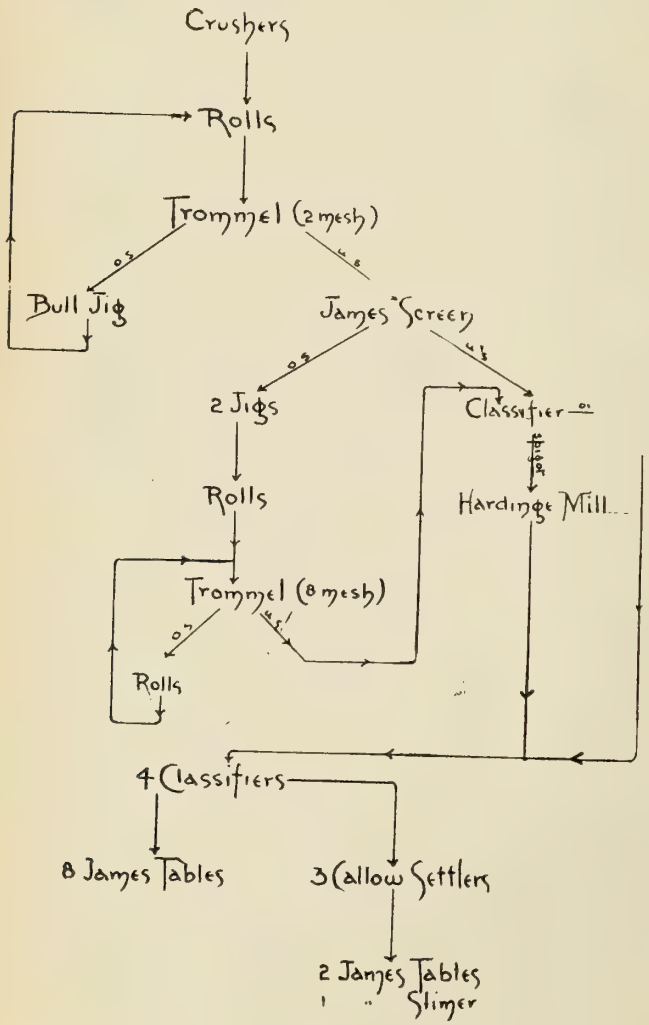
The three Canadian Smelting Companies treating high grade silver ores from cobalt pay a small amount for the cobalt contents in these ores under certain conditions, when they run over 6 per cent. metallic cobalt.

Nickel and Arsenic.

The other metals found in Cobalt ores besides the silver and cobalt, are nickel and arsenic. These are saved in part by some of the smelting companies, but are not paid for, but on the other hand they are both frequently penalized.

Sampling.

A customs sampling mill is now being erected in Cobalt by Messrs. Campbell and Deyell, of Cobalt. The mill is designed to sample both high and low grade ores, but only the high grade part is being installed at present.



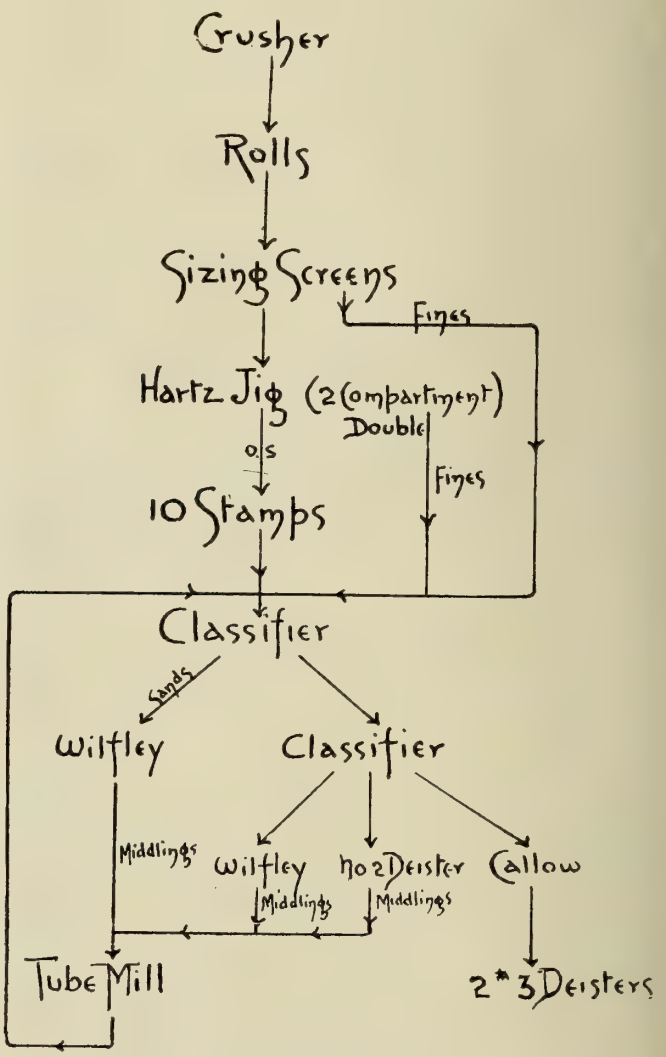
2. FLOW SHEET, COBALT CENTRAL CONCENTRATOR.

Smelting.

The ores produced in the Cobalt District were shipped for treatment during 1909 to the following smelting companies:

1. American Smelting & Refining Company, New York, U. S. A.
2. Balbach Smelting & Refining Company, Newark, N.J., U.S.A.
3. Beer, Sondheimer & Company, Frankfort-on-Main, Germany.
4. Canadian Copper Company, Copper Cliff, Ontario, Canada.
5. Coniagas Reduction Company of Canada, St. Catharines, Ont., Canada.
6. Deloro Mining & Reduction Company, Deloro, Ont., Canada.
7. Pennsylvania Smelting Company, Pittsburg, Pa., U. S. A.
8. Quirk, Barton & Company, London, England.
9. United States Metals Refining Company, New York, U. S. A.

The Montreal Reduction and Smelting Company of Canada, with works at Trout Mills, Ontario, also received some low grade ore from Cobalt, but this was treated by water-concentration, as this company has not yet commenced smelting operations.



3. FLOW SHEET, COLONIAL CONCENTRATOR.

1. AMERICAN SMELTING & REFINING COMPANY, NEW YORK, U. S. A.

This company received both high and low grade ores from Cobalt, the former being treated at the Company's works at Perth Amboy, N.J., and most of the latter at Denver, Colorado.

The following is the schedule offered:

For ores assaying 1,000 ounces or over per ton.

Silver.—Pay for 94 per cent. of the silver contents at the New York quotations.

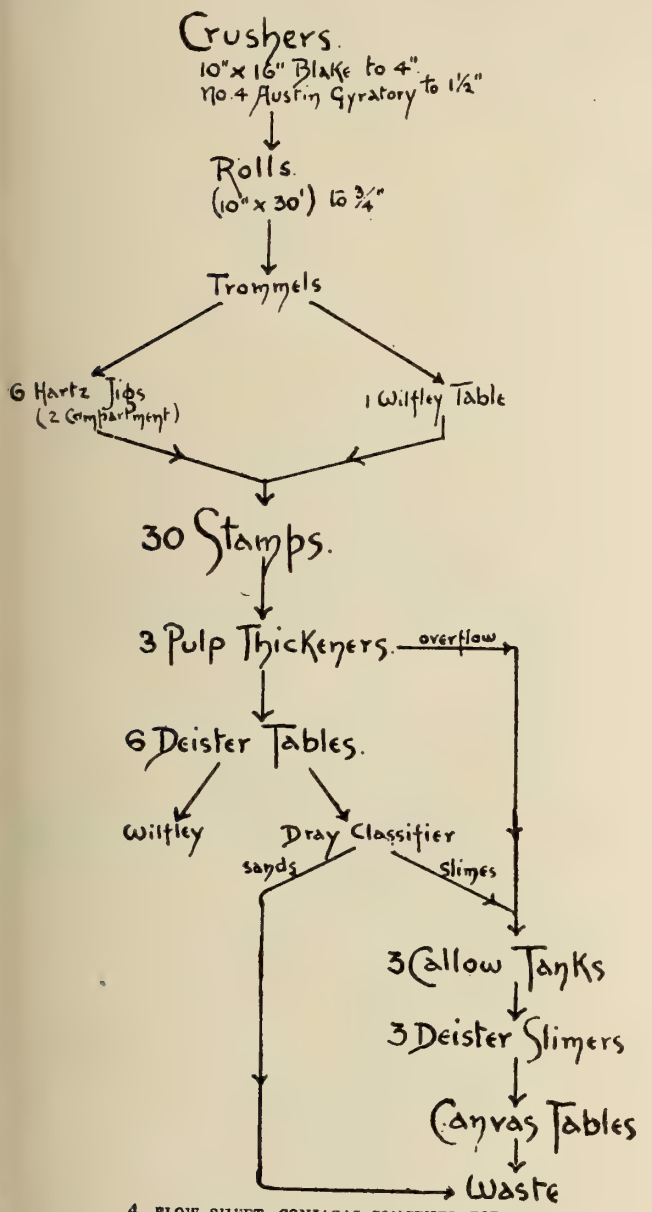
Treatment Charge.—$8 per ton of 2,000 pounds, dry weight, plus one-half cent on each ounce of silver contained.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton for each per cent. of arsenic in excess of five per cent. Sampling free.

Payment.—30 days after agreement of assays. For ore under 1,000 ounces and over 60 ounces per ton:

Silver.—Payment for 94 per cent. of the silver contents at the New York quotations.

Treatment Charge.—$8 per ton of 2,000 pounds, dry weight.



4. FLOW SHEET, CONIAGAS CONCENTRATOR.

Arsenic.—An addition to the working charge will be made at the rate of 25 cents per dry ton, for each per cent. of arsenic in excess of 5 per cent.

Payment.—Forty-five days after date of sampling.

If a mine is willing to contract for a total year's output, or 1,000 tons, the following schedule is offered:

For ores under 1,000 ounces and over 60 ounces:

Silver.—Pay for 95 per cent. of the silver contents, at the New York quotations.

Treatment Charge.—$7 per ton of 2,000 pounds, dry weight.

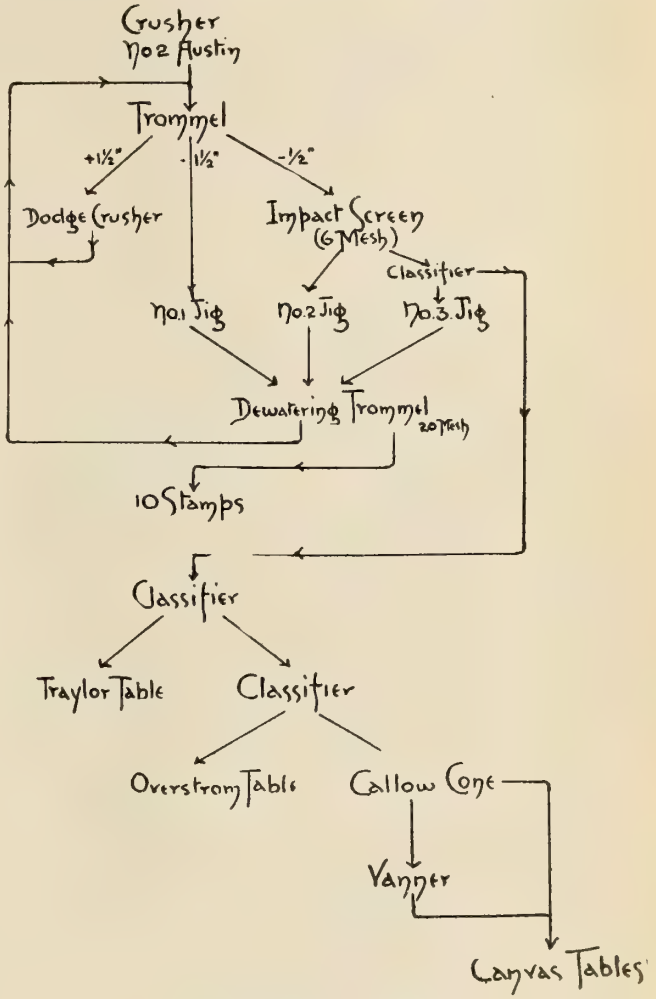
No payment for cobalt or nickel.

No penalties for insoluble.

Arsenic.—An addition to the working charge will be made at the rate of twenty-five cents per dry ton for each per cent. of arsenic in excess of 5 per cent.

Payment.—Payment forty-five days after agreement of assays.

The average freight from Cobalt to Perth Amboy is $9.20 per ton, and from Cobalt to Denver, $12 per ton.



5. FLOW SHEET, KING EDWARD CONCENTRATOR

2. BALBACH SMELTING & REFINING COMPANY, NEWARK, N.J., U. S. A.

This company is buying high grade silver ore from Cobalt at the following rates:

Pay for the ores thirty days after agreement of assays and at the silver quotation on date of payment.

Penalties.—Forty-five cents for each per cent. of arsenic in excess of 6 per cent., and 6 cents for each per cent. of insoluble in excess of iron.

Ores over 1,000 ounces to 1,500 ounces pay for 93½ per cent. of the silver contents and a smelting charge of $4 per ton of ore, with penalties as above.

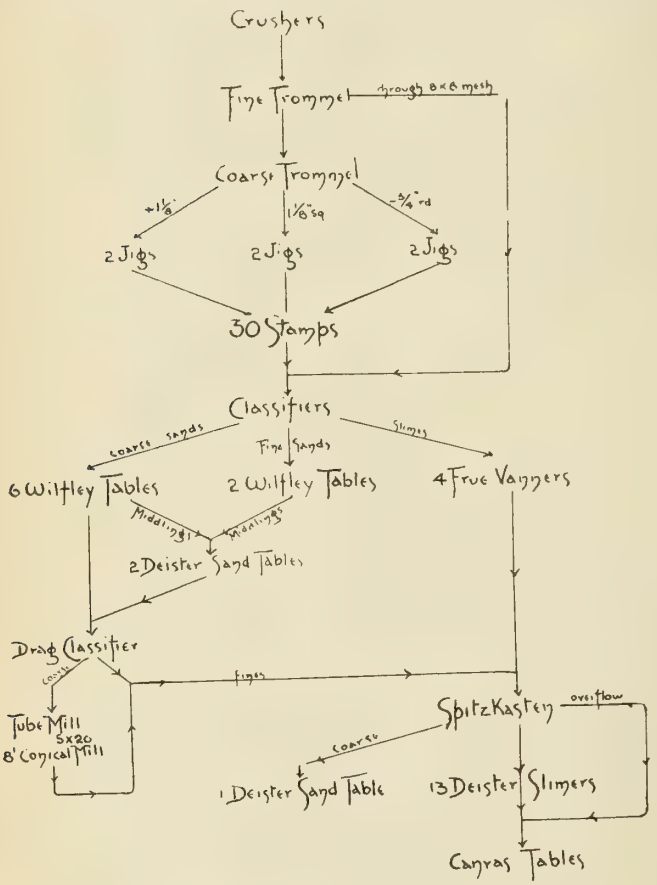
Ores above 1,500 ounces to 2,000 ounces pay for 93½ per cent. of the silver contents, and a smelting charge of $20.00 per ton of ore, with penalties as above.

Ores over 2,000 ounces silver per ton, pay for 93½ per cent. of the silver contents and a smelting charge of $19 per ton of ore, with penalties as above.

3. Beer, Sondheimer & Company, Frankfort-on-Main, Germany and New York.

High grade silver ore is bought for this company as follows:

Pay for 94 to 95 per cent. of the silver contents.
Smelting charge, $30 per ton.
No refining charge,
Ore to be delivered at New York.



6. FLOW SHEET. M'KINLEY-DARRAGH CONCENTRATROR.

4. Canadian Copper Company, Copper Cliff, Ontario, Canada.

All purchases of Cobalt ore are made through the Orford Copper Company, of New York. The purchasing schedule is as follows:

Purchaser to make payment for

75%	silver	per	ton,	when	same	assays	100 oz. and over.
84%	"	"	(2,000 lbs.)	"	200	"	
86%	"	"	"	"	300	"	
87%	"	"	"	"	400	"	
89%	"	"	"	"	500	"	
90%	"	"	"	"	600	"	
92%	"	"	"	"	800	"	
93%	"	"	"	"	1,000	"	
93¼%	"	"	"	"	1,300	"	
93½%	"	"	"	"	1,600	"	
94½%	"	"	"	"	2,000	"	
94¾%	"	"	"	"	3,000	"	

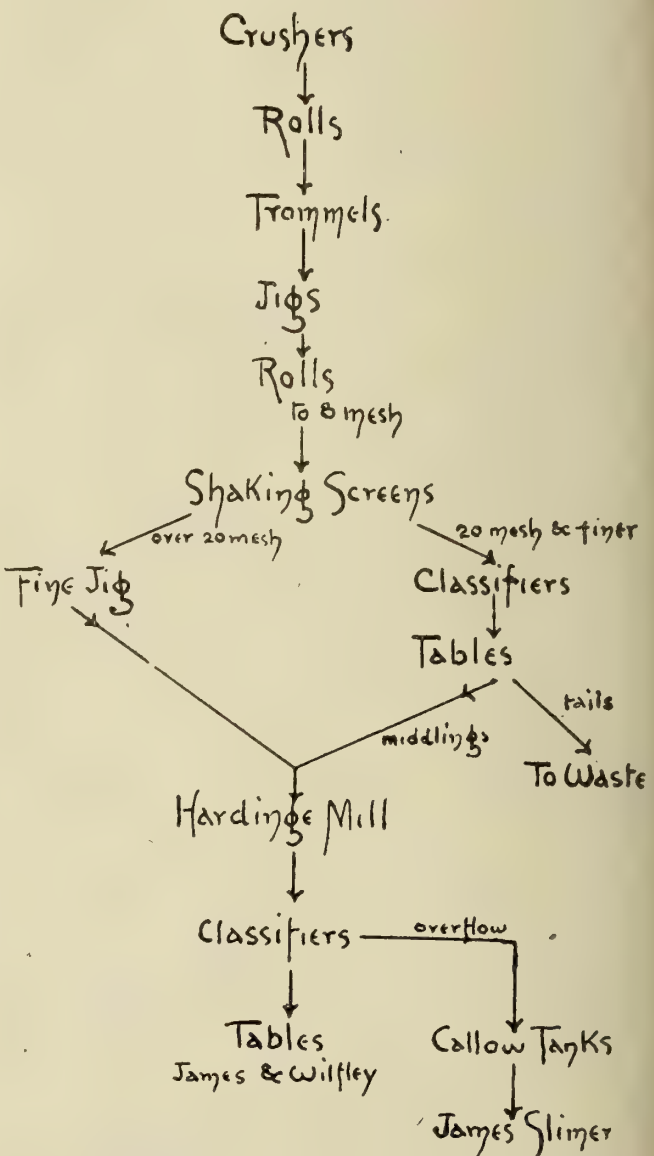
Purchaser to make payment of

$10.00	per	ton	when	same	contains	6%	cobalt and over.
$20.00	"	"	"	"	8%	"	"
$30.00	"	"	"	"	12%	"	"

No payment will be made for cobalt in ores containing less than 6 per cent. cobalt, nor in which the nickel contents are higher than the cobalt contents. Further, purchaser reserves the right, to return at shipper's expense, any such ores (i.e., nickel contents higher than cobalt contents) received at Copper Cliff.

Ore to be delivered by seller to the Canadian Copper Company, f.o.b. cars, Copper Cliff, Ontario. Ore to be at shipper's risk until sampling is undertaken, as purchaser can assume no responsibility for the ore until same has been taken into its sampler.

Purchaser to sample at its expense, purchaser's and seller's representatives to be present. Assays to be made by Ledoux & Company, of New York, at seller's expense, which assays are to govern in settlement.



7. FLOW SHEET. NIPISSING REDUCTION CONCENTRATOR.

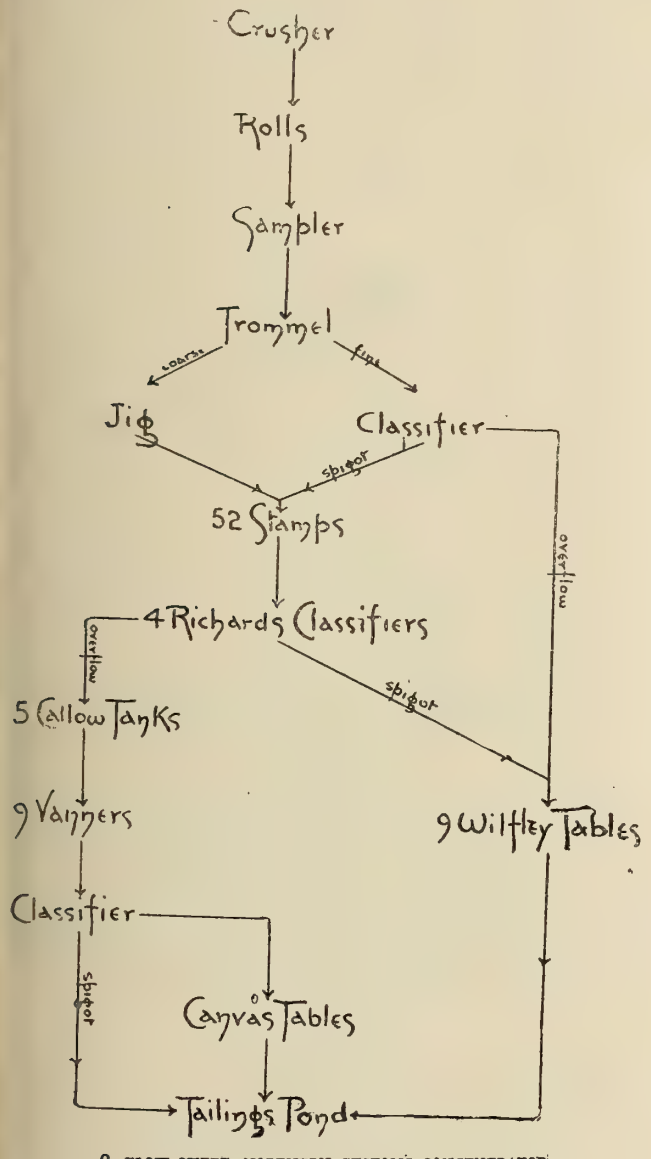
Payment for 70 per cent. of the silver returnable to the seller, as per the above scale to be made at the New York official price for silver on the first settlement date, which shall be thirty-five days after the date of which sampling of the ore is completed, and the balance 30 per cent. on the second settlement date at the New York official price of silver on that date, which shall be 90 days after sampling of the ore is completed. The purchaser, however, reserves the right to deliver upon either or both of the settlement dates above specified in lieu of cash, at its option, such silver bullion (commercial bar silver)

as is due the seller in settlement upon these dates, such delivery to be made in New York City.

Payment for cobalt will be made as per the above scale when the cobalt content of the ore comes within the specifications mentioned, settlement for same to be made on the first due date for silver, namely, in 35 days after completion of sampling of ore.

Purchaser has named a rate of 75 per cent. silver returnable to the shipper on ore running from 100 to 200 ounces per ton of 2,000 pounds. This is to be considered as a penalty clause and to apply only in such cases where ores under 200 ounces have been shipped by mistake.

Purchaser does not agree to accept regular shipments of ore which run less than 200 ounces of silver per ton of 2,000 pounds.



8. FLOW SHEET, NORTHERN CUSTOMS CONCENTRATOR.

5. The Coniagas Reduction Company, Limited, St. Catharines, Ont.

The above company will purchase cobalt and silver ores on the following schedule:

Will pay for:—

75%	of silver contents	assaying	over 20 ozs.	
84%	"	"	"	200 "
86%	"	"	"	300 "
89%	"	"	"	500 "
91%	"	"	"	750 "
93%	"	"	"	1,000 "
93½%	"	"	"	1,500 "
94½%	"	"	"	2,000 "
95%	"	"	"	3,000 "

Ores containing less than 100 ounces per ton are subject to a treatment charge of $10 per ton of 2,000 pounds, unless ore contains 12 per cent. or over of nickel and cobalt combined.

Terms of Payment for Silver.—75 per cent. of net proceeds at New York quotations 30 days after completion of sampling.

25 per cent. of net proceeds at New York quotations 90 days after completion of sampling.

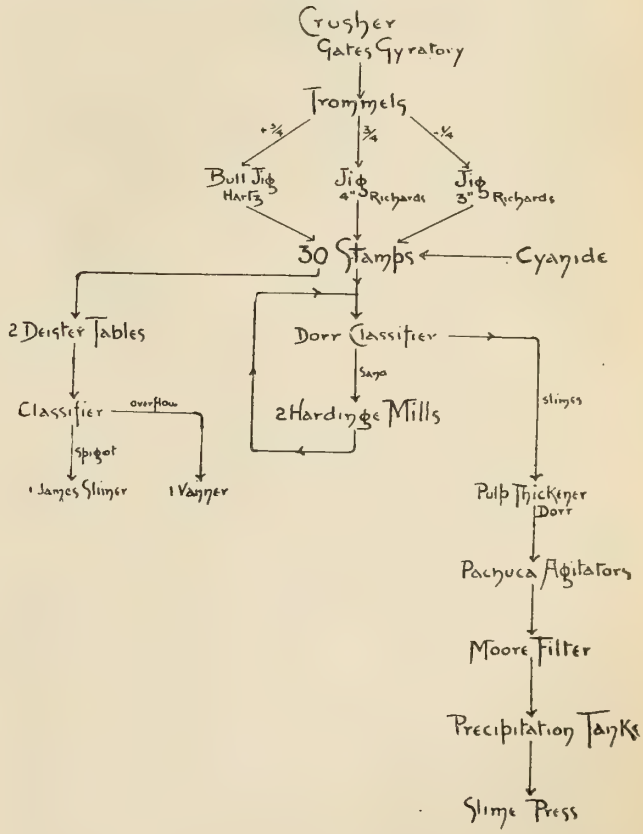
For cobalt.

Pay	8c	per lb.	of	cobalt	when	ores assay	6%	or more.
"	10c	"	"	"	"	"	8%	"
"	12c	"	"	"	"	"	10%	"

No pay for cobalt when ore assays less than 6 per cent.

Payment for cobalt to be made ninety days (90) after completion of sampling, which will be carried out without unnecessary delay on receipt of the ore. Ore to be delivered F.O.B. Thorold Smelter, via G.T.R., in carload lots. Ore to be at shipper's risk until sampling is undertaken. Sampling at Coniagas Reduction Company's works at buyer's expense. Sellers to have representatives present during sampling and weighing. Weights to be taken after milling.

Above terms subject to change without notice.



9 FLOW SHEET, O'BRIEN CONCENTRATOR.

6. Deloro Mining & Reduction Company, Deloro, Ont.

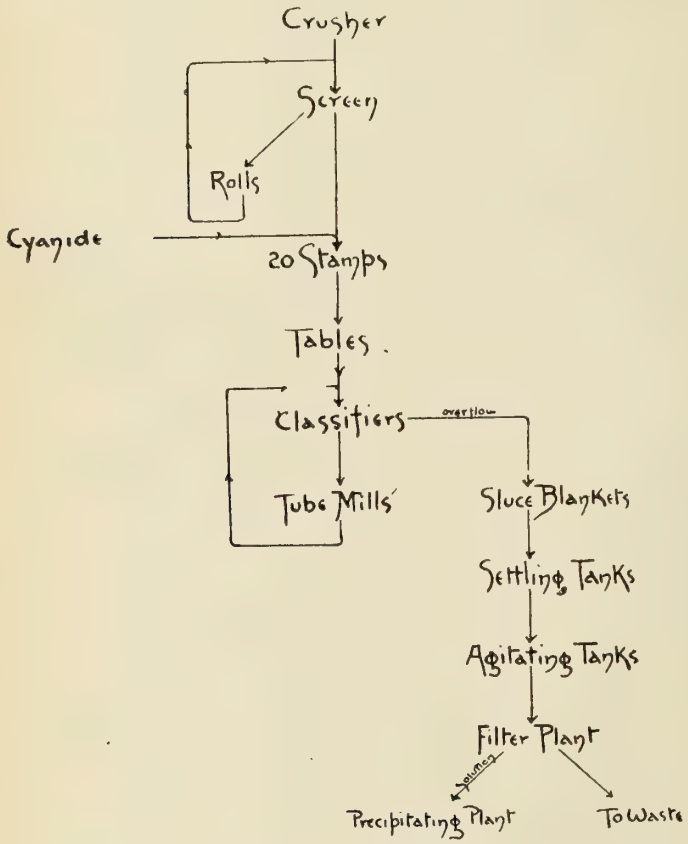
Tariff on Cobalt Silver Ores and Concentrates:

Silver.—Pay for 98 per cent. of silver contents.

Treatment Charge.—$20 per ton of ore and a refining charge of one cent per ounce of silver contained.

Terms of Payment.—75 per cent. of net proceeds at New York quotation 30 days after completion of sampling; 25 per cent. of net proceeds at New York quotation 90 days after completion of sampling.

Cobalt.—On ore containing 6 per cent. and over, 10 cents per pound for cobalt contained. No payment will be made for cobalt in ores containing more nickel than cobalt. Payment for cobalt to be made with the second payment for silver. Ledoux & Company's assays accepted with the usual provisions as to umpire assays in case of unusual differences. Above assays to be made at shipper's expense. No charge for sampling. Ore to be delivered in carload lots F.O.B., Marmora Station, C.O.R. This tariff is subject to change without notice.



10. FLOW SHEET, NOVA SCOTIA CONCENTRATOR.

7. Pennsylvania Smelting Company, Pittsburg, Pa., Works at Carnegie, U.S.A.

The Pennsylvania Smelting Company buys ore from Cobalt ranging from 50 ounces to 500 ounces per ton, on the following schedule:

Silver.—Pay for 95 per cent., less one cent per ounce.

Treatment Charge.—Eight dollars per ton. Settling price, average for 20 days following date of arrival. No payment for cobalt or nickel. In some cases arsenic is penalized.

Special contract prices a little more advantageous to the shipper than the regular schedule are offered for the entire output of a mine, or for a definite tonnage.

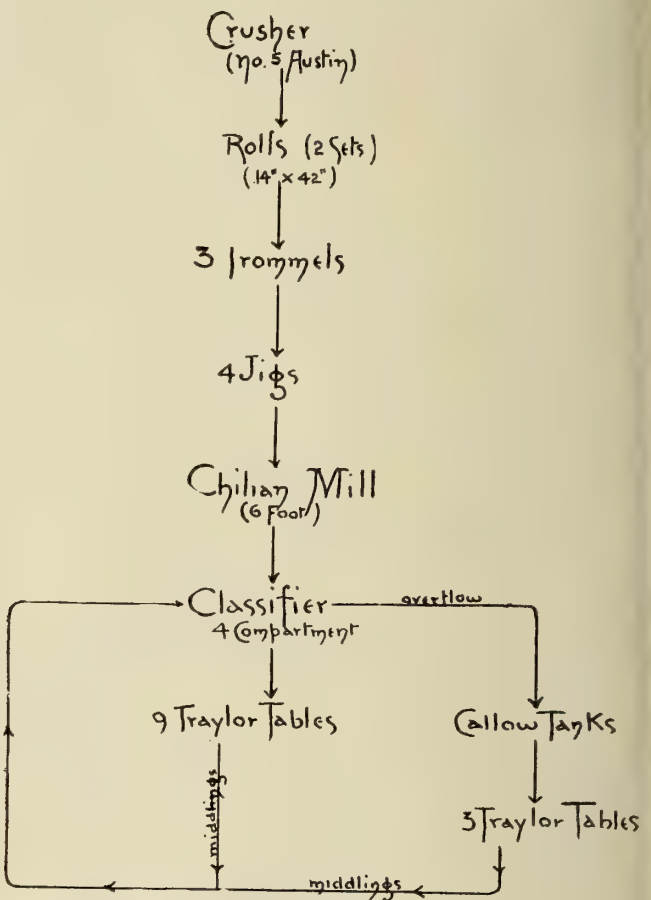
This company is also coming into the market for high-grade ores.

8. Quirk, Barton & Company, London, England.

A contract was made for the buying of a limited amount of cobalt ores from one of the mines of Cobalt, but this was of a private nature, and no general schedule has been issued. At the present time they are not in the market, as the contract they have takes all their capacity.

9. United States Metals Refining Co., New York, Works at Chrome, N.J.

The silver ores from Cobalt that are being purchased by this company are comparatively low grade, the richest containing 400 ounces silver per ton. No regular schedule is published, but the prices vary with the character of the ore purchased .



11. FLOW SHEET, SILVER CLIFF CONCENTRATOR.

Concentration.

Milling and wet concentration have now become a well established feature of the Cobalt Camp. There are now nine mills operating in the district, with a maximum daily capacity of 850 tons, while four more are under construction, which will add another 400 tons when running full. The following is a list of these mills, with their respective daily capacities, under full load:

Mill.	Capacity in tons.
1. Buffalo	150-
2. Cobalt Central (Standard Cobalt Mines)	100-110
3. Colonial	50
4. Coniagas	90
5. King Edward	36
6. McKinley-Darragh	120-140
7. Nipissing Reduction	75
8. Northern Customs	140
9. O'Brien	90
Under Construction—	
10. Nova Scotia	100
11. Silver Cliff	125
12. Temiskaming	75-80
13. Trethewey	100

The following is a statement of the concentration tonnage for the camp during 1909:

CONCENTRATION IN COBALT FOR 1909.

Mill.	Mines.	Ore milled Tons.	Concentrates Tons.	Concentration ratio.
1. Buffalo	Buffalo	27,875.0	507.00	55–1
2. Cobalt Central	Bailey	2,482.0	36.24	68–1
	Cobalt Central	21,272.0	362.40	59–1
	Crown Reserve	45.0	1.02	44–1
	Foster	547.0	10.20	54–1
	Kerr Lake	1,093.0	104.79	10–1
3. Coniagas	Coniagas	19,671.4	465.70	42–1
4. Colonial	Colonial	1,500.0	25.00	60–1
5. King Edward	King Edward	4,769.6	105.43	45–1
6. McKinley Darragh	McKinley-Darragh	18,703.0	741.59	25–1
7. Nipissing Red. Co.	Nipissing	9,597.0	229 00	49–1
	Cobalt Lake	301.9	60 00	5–1
8. Northern Customs Con.	City of Cobalt	2,576.3	57.01	45–1
	LaRose	5,988.2	255.62	23–1
	Nancy Helen	284.9	5.87	49–1
	Nova Scotia	1,173.1	39.71	30–1
	Right-of-Way	1,289.7	28.22	46–1
	Silver Queen	2,371.9	132.68	18–1
	Trethewey	1,180.8	17.02	66–1
9. O'Brien	O'Brien	3,749.5	57.00	†
		126,421.3	3,241.50	* 39–1

† No comparative ratio can be stated for O'Brien, as all low grade Concentrates were cyanided and yielded 12,656 ounces, which were shipped as bullion.
* The O'Brien is omitted from this ratio.

Comparing the above table with that of 1908, a marked advance is noted.

Year.	Ore Milled.	Concentrates.	Ratio
1908	49,424.0	1,093.85	45—1
1909	126,421.3	3,241.50	39—1
Totals	175.843.3	4,335.35	

The mines without mills do a certain amount of concentration by hand-picking, etc., and in the case of the Crown Reserve and Hudson Bay mines, coarse jigging is employed.

The Buffalo Mining Company is now operating the cyanide part of the mill, and at the O'Brien mill cyaniding is one of the principal features. As a result of this these companies ship out a certain amount of silver bullion as well as raw concentrates.

A certain amount of ore was treated by wet concentration by the Montreal Reduction & Smelting Company of Canada at Trout Mills.

The following are the rates offered by the custom mills in the camp for treating ores:

NORTHERN CUSTOMS CONCENTRATOR, LIMITED.

Tariff.—On ore yielding less than 20 ounces silver per ton crushed, retain 10 ounces and return balance to the mining company with 50 per cent. of other metals that can be sold.

20 to 35	ounces	silver,	pay	50	per cent.
35 to 50	"	"	"	55	"
50 to 70	"	"	"	60	"
70 to 90	"	"	"	65	"
90 to 110	"	"	"	70	"
110 to 125	"	"	"	75	"

Ore will also be treated on the tonnage basis of $4 per ton, ore to be delivered at the mill and concentrates delivered to owners, in their sacks, dried and loaded on cars.

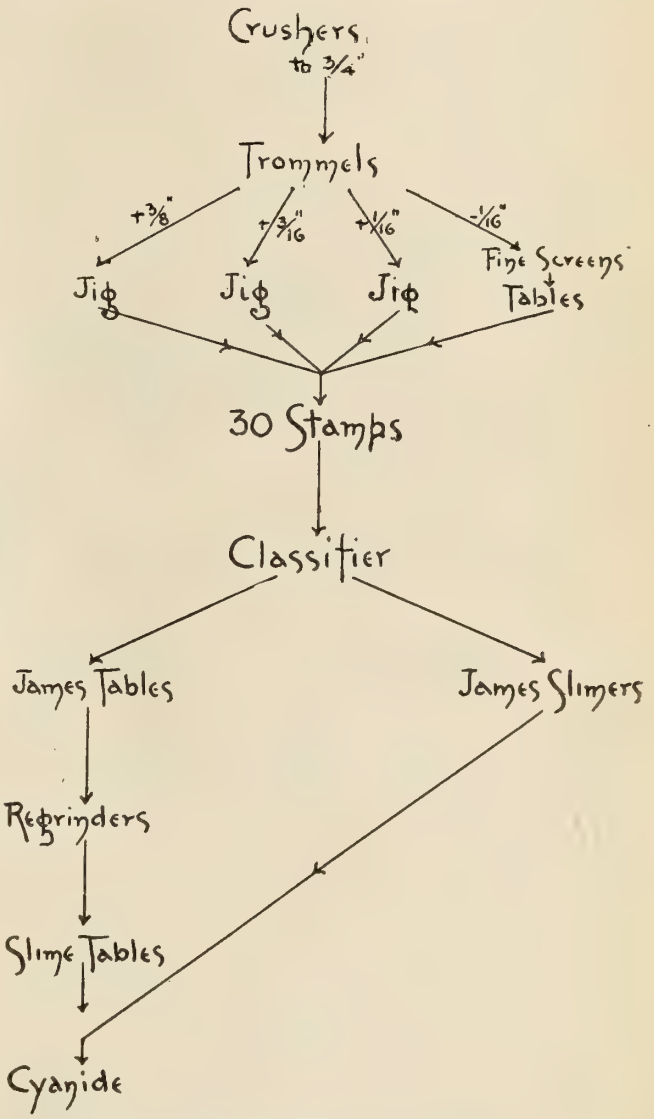
THE STANDARD COBALT MINES, LIMITED (Cobalt Central).

Makes the following schedule for milling ore:

Ore on dump running 30 ounces or better, 50 per cent. of the product from concentration.

Ore	60	oz. and under	80	oz.,	55	per cent.	of product.
"	80	" "	100	"	63	"	"
"	100	" "	125	"	70	"	"
"	125	" "	150	"	77	"	"
"	150	" "	200	"	82	"	"
"	200	" "	250	"	85	"	"

The above company pays all charges of hauling and milling of ore, and will deliver at its mill the percentage of product due the mine furnishing the ore.



12. FLOW SHEET, TEMISKAMING CONCENTRATOR.

The Nipissing Reduction Company has not at present a fixed tariff for treating ore, but varies the rates to suit conditions and the nature of the ore.

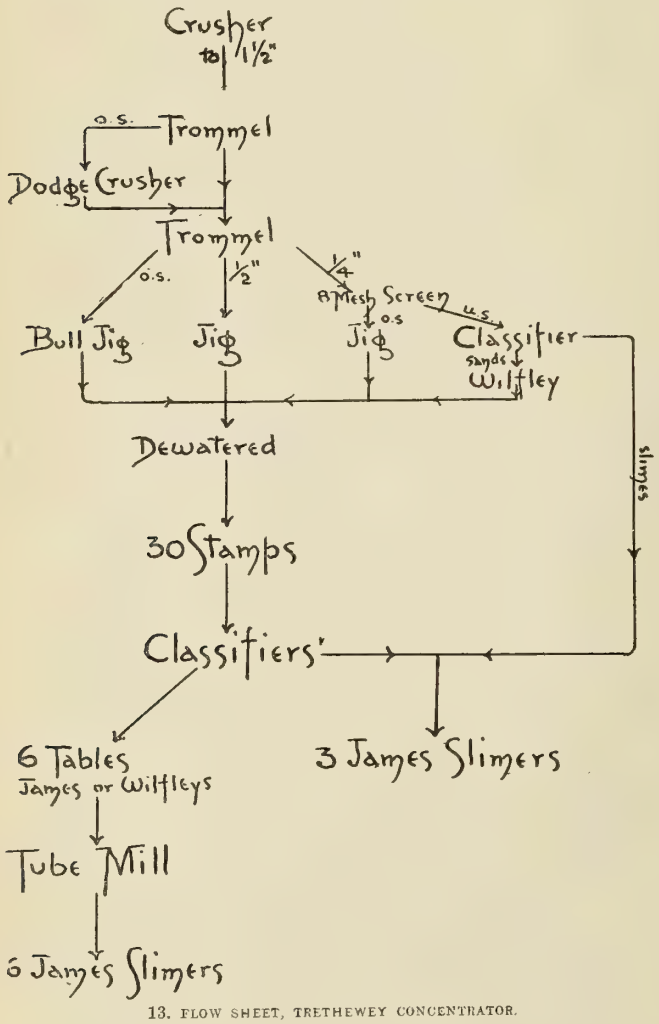
The Montreal Reduction & Smelting Company of Canada at Trout Mills, Ontario, treated ores by wet concentration on the following schedule after the 1st June, 1909:

Settlement to be made on the thirtieth day after the agreement upon the assays, and at the New York quotation price of silver on the day of settlement.

Ores to be delivered f.o.b. at Trout Mills.

Charge for treatment, $5 per ton.

Grade.	Percentage of assay paid.
Over 30 ounces	75 per cent.
" 70 "	76 "
" 80 "	78 "
" 90 "	80 "
" 100 "	82 "
" 110 "	83 "
" 120 "	84 "
" 130 "	85 "
" 140 "	86 "
" 150 "	87 "
From 180 to 200 ounces	88 "



13. FLOW SHEET, TRETHEWEY CONCENTRATOR.

Power Development.

At the commencement of mining operations at Cobalt the exceptionally rich outcrops of silver ore made it a very easy matter for a mine manager to keep his returns from shipments above his cost of production, even if this cost might have been unreasonably high. With deeper mining and a handling of higher tonnages of lower grade material, this state of affairs has altered. The mine managers, who are men of proven mining ability, are looking closely after their working costs and in this connection the cost of power production takes a prime position.

The boiler horsepower of the district is now about 11,000 horsepower.

Practically all the boilers represented in the above amount are burning coal, so that the daily consumption is a large one. The following table shows the coal received in Cobalt for the years 1908 and 1909:

1908.	Tons.
January	5,067
February	1,429
March	8,670
April	3,568
May	1,401
June	2,827
July	4,318
August	3,561
September	2,713
October	5,740
November	7,407
December	9,058
Totals	55,759

1909.	Tons.
January	7,687
February	8,136
March	10,173
April	9,930
May	5,771
June	4,102
July	5,677
August	5,060
September	6,173
October	9,007
November	14,957
December	18,743
Totals	105,416

Totals 1908	55,759 tons.
Totals 1909	105,416 "
Total	161,175

As all this coal is brought in from the United States, the cost of freight is higher than the original cost of the coal at point of loading on cars. The average cost of coal to the mines is about $5.50 per ton f.o.b. Cobalt.

The cost of power generation from coal in the camp is necessarily high, even in the most economical plants, and is particularly high in the smaller plants. In some plants it will run over $175 per horsepower per annum, and the average price will likely be over $150.

With this high cost of power production it was only natural that the great water powers in the vicinity of Cobalt should not long be unharnessed, and now three companies are installing plants and expect to be delivering power in Cobalt early in 1910.

These companies are:

1. Cobalt Hydraulic Power Company, Ragged Chutes, Montreal River.

2. Cobalt Power Company, Hound Chute, Montreal River.

3. Mines Power Limited, Matabitchouan River.

Leases.

Of the mining companies leasing mining property from the T. & N. O. Ry., four made shipments during 1909. The following statement shows the amount paid by these four companies in royalties to the T. & N. O. Ry. Commission from the time the leases were granted to the 31st December, 1909:

City of Cobalt Mining Company	$87,251.24
Cobalt Townsite Mining Company	16,972.35
Nancy Helen Mines, Limited	1,640.27
Right of Way Mining Company	204,392.82
Total	$310,256.68

On the other T. & N. O. Ry. leases a certain amount of prospecting work has been done, but with rather indifferent success.

Outlying Districts.

Silver.—During 1909 a large amount of prospecting and development work has been done throughout the silver belt of which Cobalt is a part. Several shipments of high-grade ore have been made from the South Lorrain District, and small shipments have gone from Maple Mountain and Gowganda. At Elk Lake and Gowganda a certain amount of rich ore is now ready for shipment.

The following are the shipments to the end of 1909.

District.	Mine.	Date.	Tons.	Total.
South Lorrain	Keeley Mine	June, 1908	12.50	
		Dec., 1908	30.75	
		Feb. 1909	1.09	44.34
	Wettlaufer	Sept., 1909	25.00	
		Nov., 1909	29.90	
		Dec., 1909	26.50	
		Dec., 1909	30.10	111.50
Maple Mountain	Canadian Silver Ores	Sept., 1909	6.50	6.50
Gow Ganda	Bartlett Mines	June, 1909	2.00	2.00
		Total		164.34

Gold.—For more than a year back prospectors have frequently been bringing in specimens of gold-bearing quartz from the region around Lake Abitibi and from the Townships of Beatty, Munro and Guibord to the east of Matheson, but it was not until late in the year 1909 when the gold finds in the Porcupine Lake District became known, that the public really became aroused and interested. The district is situated west of Matheson in Tisdale and Whitney and the adjoining townships.

Although hardly any development work has yet been done in the district, there seems to be reason to regard it as one of great promise.

The change in the Mining Law of the Province of Quebec, which becomes effective on the 1st January, 1910, is already awakening keener interest in the mining industry in that province, and it is likely that many prospectors will go into the country that will be thrown open. The natural route to follow to get into a large area of this practically unprospected country will be by the T. & N. O. Ry.

The plants treating copper ores by the Elmore vacuum process are eleven in number. These are treating low-grade copper ores alone in Austria, Africa, France, England, Wales, Hungary, Norway, Sweden and the Malay States. In practically every instance they are operating on a grade of copper ore which by ordinary methods of concentration would fail to yield any profit. Some of these plants have been in continuous operation for about three years, a distinct encouragement to owners of other low-grade mines to install similar plants.

CANADIAN IRON AND STEEL.

Written for the Canadian Mining Journal by Watson Griffin.

I.

Many attempts to manufacture iron and steel in Canada were made in early times, but they all ended in failure largely on account of lack of tariff protection. No country ever established a great iron and steel industry without government encouragement in the form of high tariff protection or bounties, or both combined. The United Kingdom had the highest kind of protection until it lead the world in iron production. The iron industries of the United States, Germany, France, and Belgium were all developed by means of very high protection continued for a long period. For many years Canada gave practically no protection to its iron and steel industries. In recent years there has been moderate protection supplemented by large bounties, and as a result iron and steel industries of considerable magnitude have developed.

The great increase in the production of both pig iron and steel since 1896 is shown by the quantities on which bounties were paid. The figures are as follows:—

Years ended.	Pig Iron. Quantity. Tons.	Pig Iron. Bounty. $	Steel. Quantity. Tons.	Steel. Bounty. $
June 30—1896	52,052	104,105	29,749	59,499
" 1897	33,254	66,509	8,683	17,366
" 1898	72,523	165,654	24,673	67,454
" 1899	76,496	187,954	23,342	74,644
" 1900	101,838	238,296	21,453	64,360
" 1901	150,339	351,259	33,352	100,058
" 1902	341,654	693,108	36,375	77,431
" 1903	321,191	666,001	260,668	729,102
" 1904	273,434	533,982	128,884	347,990
" 1905	386,719	624,667	300,421	676,318
" 1906	581,858	687,632	569,237	941,000
Mar. 31—1907	416,265	385,231	454,932	575,259
" 1908	686,780	863,817	661,940	1,092,201
" 1909	609,431	693,423	570,588	838,100
Totals	4,103,834	3,261,638	3,124,297	5,660,782

During the calendar year 1909 the Canadian production of pig iron amounted to 724,016 tons. For the ten years 1851-60 the total production of pig iron in the United States was 6,600,000 tons, an average of 660,000 tons annually, so that the present annual production of pig iron in Canada is greater than the average annual production of the United States during that period. In 1850 the United States had a population of 23,191,876, and in 1860 it was 31,443,321. Canada has at the present time about seven and a half million people.

No country can be industrially independent until it has iron and steel industries of sufficient capacity to supply its own wants. The need of government assistance in the early stages is due to many causes. There is no other industry that requires such a large initial outlay for plant. What would be considered an immense investment in starting almost any other industry is sufficient to construct only a small iron and steel plant. The successful operation of a plant constructed

at such great cost is dependent upon the economical assembling of the raw materials, iron ore, limestone, and fuel. The materials must be of at least passably good quality; they must be found in sufficient quantities; they must not be too far apart; and the cost of transportation must be low. The present methods of making iron and steel require much larger and much more expensive plants than those used during the early history of the industry in the United States, and the supplies of materials must be greater. Thus iron ore deposits that would have been sufficiently large to have justified the establishment of a small plant in their vicinity fifty years ago would be considered too limited for local utilization now. Often after very great expense in development work an ore bed is found to be too limited in extent to be of value. Very costly experiments must be made in using the different materials together. It is seldom that any two deposits of iron ore or limestone are exactly the same. Coal also varies in quality. The materials assembled at a newly established smelting centre may be just as good taken together as the materials used at some older smelting centre from which workmen come, but they require a different method of handling. For instance, in one locality the iron ore may be low in sulphur and the coal high in sulphur. Iron ores from different localities must often be mixed. Sometimes the iron ore contains a high percentage of limestone, so that comparatively little limestone need be added for flux. Sometimes the limestone used for flux contains a percentage of iron, and this may make it possible to use with it iron ores having a rather low percentage of iron. All these and many other variations in materials must be taken into consideration.

The conversion of the materials into iron and steel requires many skilled workmen. The industry being new to Canada, the workmen had to be brought from abroad until Canadians could be trained for the work. To induce these workmen to leave remunerative employment in old-established smelting centres it was necessary to offer them higher wages than they were getting at a time when wages were at the maximum. This made the scale of wages higher than at any of the old centres, and added enormously to the cost of production.

Men gathered together at a new plant from a number of different plants in foreign countries had to learn how to work together and how to make use of materials to which they were not accustomed. Many mistakes were made at first, even by experienced men who had been very successful at old-established works. Men coming from different works where varied materials were used had each their own theories as to what was wrong. Of course, all these difficulties were most manifest at the largest plant established in Canada, that of the Dominion Iron & Steel Company, and it required very great organizing ability to get everything into good working order.

Fortunately, Canada has now passed the most critical stage in the development of an iron industry. The work has become systematized, the workmen from other countries understand the new conditions, and a number of Canadians have already become skilled workmen, but higher protective duties or a continuance of bounties will be necessary for the establishment of the industry in the different provinces of Canada on a permanent basis. The bounties have been steadily decreasing, and this is the last year for such government aid unless a new arrangement is made. The unexpected abolition of the German surtax, coming at a time when the bounties have reached the minimum, exposes our iron and steel works to severe German competition.

In his budget speech December 14, 1909, Hon. Mr. Fielding made a statement showing the customs revenue collected at the ports of Sault Ste. Marie, Ont., Sydney, N.S., North Sydney, N.S., Sydney Mines, N.S., Glace Bay, N.S. New Glasgow N.S., and Hamilton, Ont., during the ten years 1890 to 1899, both inclusive, and for the ten years from 1900 to 1909, both inclusive, showing that in the latter period the customs revenue from these ports was over nine million dollars greater than in the former period. At all these ports, excepting Hamilton, nearly the whole increase was due to the establishment of iron and steel works, and at Hamilton a considerable portion of the increase was due to the same cause. Mr. Fielding did not mention Midland, Ont., Port Arthur, Ont., Deseronto, Ont., Radnor Forges, Que., and Londonderry, N.S., at all of which are blast furnaces and communities dependent upon them that have contributed largely to the customs revenue of Canada. Besides the direct payment of customs duties at the points where blast furnaces are located Mr. Fielding pointed out that the iron and steel companies and the communities dependent upon them purchased supplies largely in Toronto, Montreal, Quebec, St. John, Halifax and a number of other cities and towns of Canada, thus considerably increasing the customs revenue of these towns and cities. It is thus certain that as a direct result of the establishment of iron and steel industries in Canada the Government has received more revenue than has been paid out in bounties. In addition to the imported supplies purchased by the iron and steel companies and the communities dependent upon them, they have purchased vast quantities of goods made in Canada, upon which no duties were paid, thus indirectly giving extra employment to work-people throughout the country, stimulating every branch of trade and creating a large home market for Canadian farm products.

The value of the iron and steel produced was enormously greater than the bounties paid, and but for the establishment of iron and steel industries in Canada, an immense amount of money would have been sent out of the country to purchase iron and steel. By keeping these vast amounts of money in circulation at home instead of in foreign countries these industries contribute to the prosperity of every section of the community.

There are at present eight Canadian companies having blast furnaces, viz., the Dominion Iron & Steel Company, the Nova Scotia Steel & Coal Company, the Londonderry Iron & Mining Company, the Canadian Iron Corporation, the Algoma Steel Company, the Hamilton Steel & Iron Company, the Atikokan Iron Company, and the Deseronto Iron Company. There are four companies which have steel plants but no blast furnaces, viz., the Montreal Steel Works, Ltd., Montreal, the William Kennedy Sons, Ltd., Owen Sound, Ont., the Ottawa Steel Castings Company, Ltd., Ottawa, and the Ontario Iron & Steel Company, Ltd., Welland, Ont.

In future articles I shall describe the plants of the different Canadian iron and steel companies, the location of their raw materials, and their position as regards the home and foreign markets, discussing also the possibilities of future development of iron and steel industries in the various provinces of the Dominion.

STEAM-DRIVEN AIR COMPRESSORS IN COBALT.

Written for the Canadian Mining Journal by H. V. Haight.*

The article in the Canadian Mining Journal for February on "Costs of Producing Compressed Air in a Canadian Mining Camp," by Richard L. Webb, is very interesting. Mr. Webb has certainly made extensive investigations of the cost of compressed air, from which we may, with care, draw valuable conclusions.

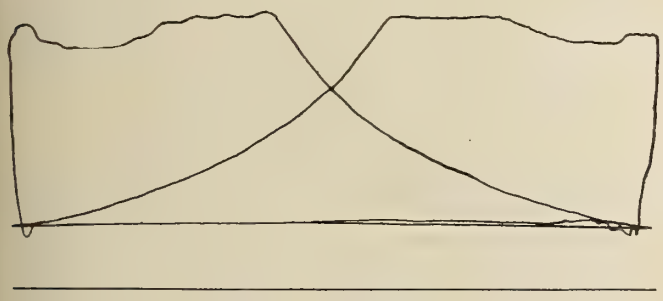
In justice to your readers, Mr. Webb should have explained that he was till lately in the employ of the Cobalt Hydraulic Company, which company is installing a hydraulic air compressing plant on the Taylor system to supply compressed air to sell at retail to the Cobalt mines, and that the information contained in his article was gathered while in their service. This would have enabled your readers to have appreciated Mr. Webb's point of view and the reason of gathering such information.

Mr. Webb has referred to many efficiencies, mechanical, volumetric, adiabatic, over-all and commercial. The point of greatest interest to the mine management is usually the commercial efficiency. This is hard to define exactly, but it is contained in the answers to the questions, Is the machine a profitable investment? Would some other machine be a more profitable investment? In regard to the first question there can be no doubt; compressed air for mining is cheap at any price, and any compressor is a profitable investment. This is indicated in Mr. Webb's paper where he says: "Many owners will not allow a plant to be shut down for repairs so long as it will turn over."

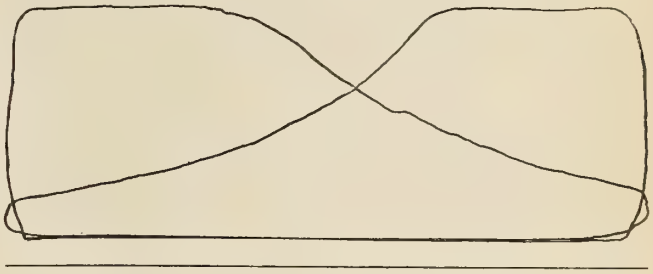
The second question opens up a large field. The cost of compressed air may be divided roughly into capital cost and operating costs. These will vary widely with the type of machine and equipment; when the capital cost is low, the operating cost is high, and vice-versa, and it is a nice problem for the mine manager to strike a proper balance between them. The usual stages of development of a compressed air mining plant are as follows:—

(1) A prospecting plant, usually a three to five drill straight-line compressor. It runs non-condensing with 80 pounds steam. This is low in first cost, easy to transport over the rough new roads, easy to erect, requires little foundation, and can be run by unskilled men, as it is nearly "fool-proof." The fact that its steam consumption is high is a minor consideration, for if the mine turns out well there will be lots of money later to buy a compressor which will take less fuel, while if the mine doesn't turn out well, no money will have been wasted on an expensive plant.

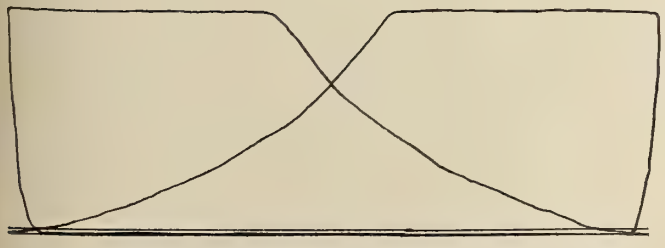
(2) The second stage in the mining plant is usually a duplex machine of ten to fifteen drill capacity, for thoroughly developing the mine. These machines usually have compound air cylinders and either simple or compound Meyer steam cylinders. The steam pressure is usually about 100 pounds, and some of them run condensing. The mine managers often exercise a false economy at this stage in buying a machine with simple steam cylinders instead of compound. With a duplex



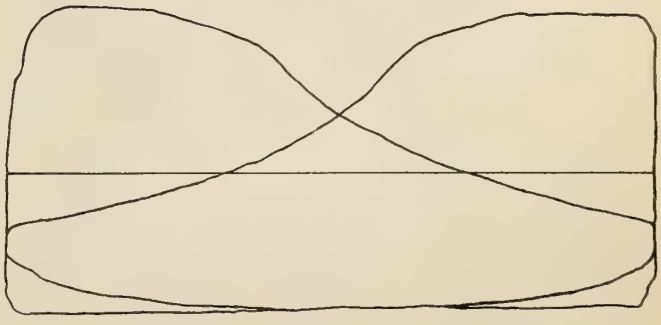
H.P. Air 22x48 80 R.P.M. 60 Spring



H.P. Steam 22x48 75 R.P.M. 60 Spring



L.P. Air 36x48 80 R.P.M. 20 Spring.



L.P. Steam 40x48 80 R.P.M. 12 Spring

INDICATOR CARDS FROM RAND COMPRESSOR.

22 & 40 x 48 Steam. 100 lbs. Boiler Pressure—Condensing. 36 & 22 x 48 Air. 100 lbs. Air Pressure.

Crows Nest Pass Coal Co., Michel, B. C. Cards taken by T. Truran, Master Mechanic, Oct. 1909.

machine, which must have two steam cylinders anyway, the extra cost of compound steam cylinders is less than ten per cent. of the cost of the machine, while the fuel saving is very large. This is shown in Mr. Webb's paper where compressor No. 1, which had simple steam cylinders, took fifty per cent. more steam than compressor No. 2, which had compound steam cylinders.

The final stage or permanent mining plants are usually of 20 to 40 drill capacity, and driven either by electric power from a hydraulic plant, or by cross-compound Corliss steam cylinders, running condensing with 125 to 150 pounds steam pressure.

At each of these stages the air compressor will usually show the lowest fuel consumption of the power generators of the plant. Take hoisting and lighting, for instance. The prospecting plant, with the straight-line compressor, will have a small steam-driven hoist, with plain slide valves, and the steam consumption per average indicated horsepower will probably be fifty to one hundred per cent. greater than in the air compressor. The lighting will be by candles and kerosene, of which the fuel consumption is remarkably high for the small amount of light produced. If the air compressor is "one of the most wasteful machines ever employed," words fail to describe the wastefulness of steam hoists and candles.

In the development plant, the compressor will, or should, have cross-compound Meyer steam cylinders; the electric light engine will be a simple high-speed single-valve engine, and the hoist will be a geared hoist with simple steam cylinders, plain slide valves and perhaps link motion. The air compressor is still much the lowest in steam consumption.

Taking the highest type of steam plant, we find the compressor having cross-compound Corliss steam cylinders, running condensing. The electric generator will likely be a tandem compound single-valve engine, but in rare cases may be of the same high class as the compressor. The hoist will be of the first motion type, but still with simple non-condensing steam cylinders, although there will likely be link motion or even automatic cut-off on the steam valves. The steam consumption of the generator may in this case approach that of the compressor, but the hoist will still take many times as much steam per horsepower.

To illustrate this latter stage of development, note the indicator cards shown herewith, taken from a large Corliss compressor recently installed by the Crow's Nest Pass Coal Co. These were taken by the master mechanic at the mine, and while some small improvements might be made in the valve setting, they represent what may be expected of a good compressor in good hands. These cards speak for themselves.

The fact is that each type of plant, the prospecting plant, the development and the permanent plant, is suitable for its own conditions, and is not suitable for either of the other conditions. Cobalt was chiefly in the development stage. The mine managers who put in machines with simple steam cylinders, where the extra cost of compound steam cylinders would have been saved in a month's fuel, did not exercise the best judgment; neither did those who put in expensive Corliss steam-driven machines, which are already nearly obsolete. The third stage in Cobalt is hydraulic power, and it is nearly there, but it should not be overlooked that in the meantime Cobalt mines have paid thirteen million dollars in dividends by the aid of the "wasteful" steam-driven plants.

Referring for a moment to the tests themselves, they are open to criticism in several points, such as the absence of steam pressure readings, and the fact that in each test there is a mistake in the air cylinder sizes (14" for 22" in one case and 14" for 18" in the other case), but I wish to refer only to one point. The second machine was tested when the crank shaft was in such bad shape that over 38 per cent. of the power was lost in friction, and yet this is considered a sufficiently valuable test to publish. Would a test of a three-phase motor with one lead disconnected be considered typical of motors? An electric motor with the bearings in such bad shape would soon be disabled with either burnt coils or babbitt run out of the bearings. Must a compressor be blamed as an extremely wasteful machine because it will continue to do its work under adverse conditions, where another machine would quit? Which is the more profitable miner, a man who demands fifty cents a day more to work in a wet shaft, or a man who gets sick when he gets his feet wet?

But let us see what are some of the lessons to be learned from Mr. Webb's tests and from the experience of the Cobalt camp generally in the matter of air compressors. They might be summed up in a few sentences.

1. Any air compressor is a good investment, or "commercially efficient."

2. Each type of plant is suitable for certain conditions; for prospecting, the simple straight-line compressor; for development, the cross-compound Meyer compressor; for a permanent plant, the cross-compound Corliss or the power-driven if water-power is available.

3. A duplex machine should always have compound steam cylinders.

4. The steam consumption of a cross-compound Meyer machine is very satisfactory. An average steam consumption from two-thirds load to full load running non-condensing and probably with low steam pressure, of 28 pounds per I.H.P. per hour, must be considered very good.

5. The speeds of air compressors are too low, and machines built for much higher piston speeds will show lower costs per cubic foot of air delivered.

6. All steam-driven compressors should be of a type which may readily be converted to power-driven when electric power becomes available, as it surely will.

*Chief Engineer, Canadian Rand Company, Limited.

CLAIMS ASSESSMENT WORK IN THE PROVINCE OF ONTARIO.

By James Rennie.*

Subsequent to the staking and recording of mining claims in Ontario, the assessment work required by the Mines Act is as follows:—

"(a) During the three months immediately following the recording, to the extent of thirty days of not less than eight hours per day.

"(b) During each of the first and second years following the expiration of such three months to the extent of sixty days of not less than eight hours per day.

"(c) During the third year following the expiration of such three months to the extent of not less than ninety days of eight hours per day."

It will be observed that a very reasonable working day is called for, and no objection could be made by the prospector who has contracted to carry out the required number of days' assessment work for any

*Mining Engineer, New Liskeard, Ont.

owner, but there have been cases where objection could be taken to the amount of work executed in the time allowed.

It would be unfair to blame the prospector for the conditions under which these complaints have arisen. The objection usually occurs when the prospector has no retaining interest in the claim, but has simply contracted to do so many days' assessment work at either a lump sum or daily wage, the amount of work to be performed being left an open question between the owner and prospector.

Sheet N°....

Assessment Work on Claim N°.....

Total Area of Claim ..... Acres or thereby

Name of Party on whose behalf Claim is staked .....

Address of D° .....

Number of License of Claimholder N°.....

Location of Claim .....

Minerals found in place .....

Rock formation in which the Minerals were found .....

Give approximate Total Area of Swampy ground, Muskeg or Marsh } in Acres .....

— Statement of Assessment Work —

Date of Recording Work	Reference Letters on plan	Nature of Work done	Number of Days Work	Approximate amount of Work, by Average measurements Cubic Feet	Give name of Minerals found in place during the work as separately Stated
		Trenching			
		Stripping Overburden Soil etc			
		Rock opencutting			
		Shaft sinking			
		Adit Tunnels			
		Total			

-Note-

The amount of Work to be derived from approximate measurements, with the figures in average marked at the various parts of the work shown on plan and denoted by the reference letters.

When the owner of a claim is resident some distance from the district in which the claim is located, the prospector is usually called upon to record the assessment work on the owner's behalf at the recording office of the district. Here he states the nature of his work and the number of days in accordance with the Mines Act. These statements are sworn to under affidavit, but the amount or nature of the work executed is not called for. Nevertheless this is an important factor, and if some approximate idea of the actual work done, together with the location of such work, were shown upon a sketch plan and filed similarly to the sketch plan showing the position of the discovery post upon a mining claim, with the approximate measurements given, the additional data would no doubt be appreciated by all parties who are interested in prospecting work. The industrious prospector would at the same time appreciate the statement showing the amount and result, if only in approximation, of the number of days' assessment work he has done upon any claim.

This would also tend to eliminate the feckless prospector who sometimes spends a month or more of congenial camp life at the expense of the owner during a season of the year that prospecting can be carried out most expeditiously.

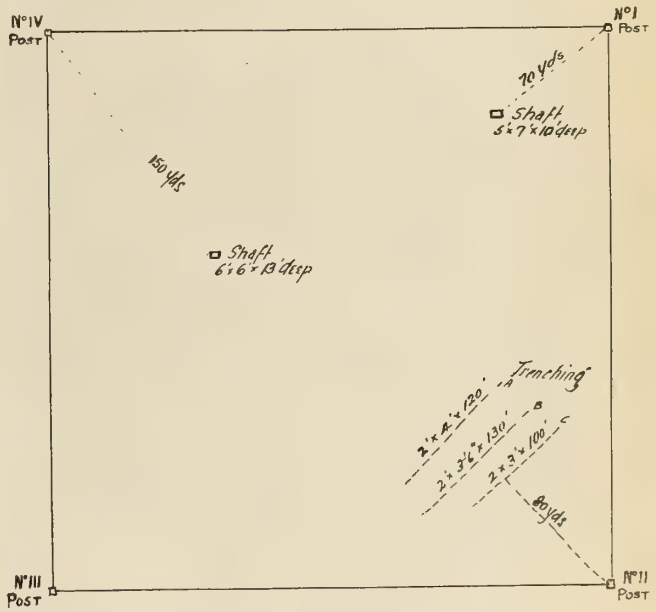
As suggested, some definition of the amount or quantity of work might be established under a common measure in conjunction with the number of days and nature of the work which would be advantageous to all interests.

The general sphere of prospecting work is known to those who take an active interest in mining and may be classified as follows: surface trenching, shipping over burden, soil, etc., rock open cutting, adit tunnels, and sinking of trial shafts.

One common measure could be taken for some of the above work namely the cubic contents, given by the average measurements of the work and stated in cubic feet. To arrive at this common measure of work done, the prospector would be called upon to take the average measurements in width, depth and length for the first three classes of work, for adit tunnels the average width, height and length, and for each shaft sunk the average breadth, length and depth. The figures representing the average linear measurement for each portion of the assessment work could be marked upon the sketch plan of claim with the approximate distance from the nearest corner post of the claim to the location of the respective portion of the assessment work.

Plan of Assessment Work on Claim N°.....

Referred to in Sheet N°.....



A suggested form of record is shown by the blank statement and plan appended, including the nature, time and quantity, and result of the prospector's work to a useful approximate degree of definition. The prospector or owner of a claim when recording his first portion of the assessment work might also state the rock formation and all the minerals found.

The information described, if placed on record, with reference given or abstract obtainable as desired, cannot but tend to promote the further development of claims by the record of the actual result from the prospector's pick.

The Broken Hill Proprietary Company, New South Wales, was incorporated twenty-five years ago. Its capital is £384,000, in 960,000 shares of 8s. each. Since incorporation £11,500,000 has been distributed in dividends.

THE EIGHT HOUR DAY IN NOVA SCOTIA.

A commission, appointed by the Government of Nova Scotia to enquire into hours of labour in that province, recently submitted a careful report. The section referring to the eight-hour day as applied to coal mines is particularly interesting. The commission, in a most unqualified manner, declared the eight-hour day to be an economic impossibility. Here is the formal opinion:—

"The investigation of the probable effects of a statutory limitation of the hours of labour in the industries of Nova Scotia is a difficult work, even when confined to the industries that are subject to the control of the Provincial Government. The commission undertook to work in sympathy with the effort to shorten the working day, believing that every humanitarian interest of the workers would be promoted by lessening the hours of manual toil. It is the first investigation of the kind attempted in Nova Scotia, and there were many difficulties in conducting it. They were difficulties arising from the lack of statistics, and the lack of detailed and accurate evidence on some of the most relevant subjects, from the fact that employers of labour had given little attention to the question, from the fact that labour organization is limited, and from the fact that there were controversies and strikes in the coal industry.

"The commission, however, believe that a general and compulsory provincial eight hour law would be at present a fatal blow to the industrial prospects of Nova Scotia. Such industries as fishing, farming and lumbering are not suitable for the legislation, and this applies also to dock and wharf labour and to shipping. The manufacturing industries would be put, by a merely provincial law, under great disadvantage in competing with those of the other provinces. An eight-hour law for any industry should be applicable to all the competing firms in that industry; but this condition could not be secured by a provincial law.

"So far as coal mining is concerned, the commission would gladly report in favour of the shorter day if the facts permitted them to do so. But the existing market for Nova Scotia coal presents features of a grave character. The coal industry is fundamental to the welfare of this province, and before enacting legislation which would undoubtedly add to the cost of operating the mines, or seriously reduce wages, further consideration should be given to the features referred to."

CORRESPONDENCE.

Fitzroy Harbor, Ont., Feb. 26th, 1910.

The Editor of the Canadian Mining Journal:

Sir,—In your issue of February 15th you attack, in a leading article, certain statements made by the Hon. Clifford Sifton before the Commission on the Conservation of Natural Resources.

As the recognized organ of the Canadian mining industry, it is of national importance that such leading articles as you may, from time to time, publish, shall be absolutely correct in fact, entirely impartial in tone, indeed like "Caesar's wife, above suspicion."

Certain of the statements made by Mr. Sifton and to which you object, had already been published in the report for 1909, issued by the Bureau of Mines of the Government of Ontario, Vol. xviii, Part 1, 18th Annual Report, which report should have been in your hands some weeks ago.

If these statements be wrong, and I cannot believe that they are, it is not against Mr. Sifton, nor against any Department of the Government of the Dominion of Canada, the vials of your wrath should have been poured forth, but against the Government of the Province of Ontario.

On page 10 of this report, it is stated "that so far as tonnage is concerned" "the bulk of the ore" "was exported to the United States" "as follows:"

	Tons	Per cent.
Canada,	7,401.14	29.18
Great Britain,	222.08	88
Germany,	229.46	1.18
United States,	17,439.42	68.67

On page 12, after naming the reduction plants then operating in Canada, the report states:—"Through these works there were passed an aggregate of 6,958 tons of ore, containing 11,658.008 ounces of silver, of which 8,972.958 fine ounces were recovered, the remainder, 2,685.050 ounces being contained in the speiss product reserved, **or exported for further treatment.**" Page 13, "The elements other than silver, in the ores of the Cobalt camp, **are at present of comparative little value, at any rate to the miners of the ore.**"

Such reports, if correct, justify any and every Canadian's desire to find processes by which the metals contained in Canadian ores may be recovered in Canada, and entirely justify the remarks made by the Honourable Clifford Sifton.

The unfortunate question of accidents you will find fully dealt with by Mr. Corkhill on pages 69-78 of this report. If you will refer also to page 14 of the same report where Mr. Gibson gives data as to the number of men employed underground in the Cobalt district, you will find that Mr. Sifton's statement as to the ratio per 1,000 employees of fatal accidents underground is in accord with the data given in this report.

I desire to think that with these explanations before you, there will be no hesitation on your part to make the "amende honorable" due under the circumstances from one honourable man to another. I am,

Yours truly,
LOUIS SIMPSON.

Editor the Canadian Mining Journal:

Sir,—A half-page advertisement of the Willow River Timber Company in the Toronto Globe of 2nd inst. includes the assertion that Fort George, in British Columbia, "is the centre of one of the largest and richest agricultural districts in the world, as well as being contiguous to one of the most extensive coal and mineral deposits in America."

May I point out that to date there has been little, if any, production on a commercial scale, from either the agricultural or the alleged mineral resources of the district surrounding Fort George, whatever may be its potentialities, which, though as yet unproved, may possibly be considerable. My particular purpose in writing to you now is to state that, so far as I am informed, there has not yet been done any large amount of development work such as would be necessary to determine whether or not there really does exist in the district above-mentioned "one of the most extensive coal and mineral deposits in America," neither has there been any production of coal or other mineral on a scale which would in even slight degree warrant such an assertion. I regard that assertion as a gross misstatement, and its being made in an advertisement designed to induce the public to buy shares in the company first

above named, to my mind constitutes an offence which should be punishable by law. I therefore suggest that the proper authorities in Ontario make the necessary inquiries and take such action as shall thereafter be deemed advisable.

Yours, etc.,

E. JACOBS.

Victoria, B.C., March 11, 1910.

PERSONAL AND GENERAL.

Mr. W. G. Miller has returned from a visit to Porcupine.

Mr. J. E. McAllister, general manager of the British Columbia Copper Company, is in New York.

Mr. R. W. Leonard is in England.

The Hon. C. R. Devlin, Minister of Mines for the Province of Quebec, has returned from Europe.

Mr. P. W. Lover, formerly superintendent of the Oro Denoro mine, at Summit camp, is now foreman at the Mother Lode mine, in the place of M. Edgren.

Mr. F. Hille, Port Arthur, was in Toronto on March 29th. Control of the Laurentian gold mine, which is soon to be put in operation, has been secured by Mr. Hille.

The Hardinge conical mill is invading the Orient. One mill was recently shipped to the Philippines, and another to New Zealand. The Mines Trials Committee has also ordered one for experimental purposes on the Rand.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

The Albion Mine Fire.—We understand that a Draeger apparatus was exhibited before the members of the Canadian Mining Institute at their Annual Meeting recently held in Toronto, but the members did not have the same opportunity of deciding on the utility of these devices as fell to the lot of several of the members of the Nova Scotia Mining Institute who attended the annual meeting at Halifax. One or two of these gentlemen who had evidently been looking forward to the annual relaxation for which the Nova Scotia Mining Society's annual dinner is justly renowned, were called to a fire in the Albion Mine at Stellarton, and although they missed hearing President T. J. Brown's jocular jeremiad—of which, more another time—they witnessed a very practical demonstration of the utility of oxygen breathing apparatus in fighting mine fires.

For some little time the Acadia Company has had trouble with a fire in the workings of the Albion Mine, which is supposed to have its origin in an abandoned upper seam that has been on fire for some years past. On the 12th of March the fire showed itself through a stopping at the foot of a "balance." The stopping was reinforced, but the fire made its way into the level and showed in the roof coal. Stoppings were commenced to isolate the district affected, but on the afternoon of the 15th the fire seemed to be making headway, and the work of building the stoppings became increasingly difficult through the heat and the fumes given off from the fire. Effective work upon the fire was out of the question, although two good streams of water were available, as it was impossible to get within working range of the fire with the hose. The assistance of the Draeger corps of the Dominion Coal Company and the Nova Scotia Steel & Coal Company was asked for about 3 p. m. In response the Dominion Coal Co. despatched seven experienced men with three apparatus and refills sufficient for eighteen hours' work. The Nova Scotia Steel Co. sent five men with four apparatus and refills, in charge of Mr. Robert Robson, a veteran of many mine fires. The combined corps arrived at Stellarton at midnight by special train, which thanks to the Intercolonial Railway officials, made very good time from Sydney. On arrival, the corps were met by Mr. John Johnson, of the Nova Scotia Steel Co., Mr. Blackwood, the Inspector of Mines for Pictou County, and Mr. Coll, the General Manager of the Acadia Company, and his assistants. The corps divided into two parties, and seven men immediately descended into the mine, getting to work about 2 a.m. They were able to get within close range of the fire and played the hose on the blaze until 7 a.m., when they were relieved by the party of five who had remained on the surface.

By noon of the 16th another stream of water was available with better pressure, and the fire was gradually got under control. At the time of writing—18th March—the work of confining the fire area within permanent dams is proceeding rapidly, and flooding will then be undertaken. While it cannot be said that the situation was beyond control when the Draeger corps were asked for, it is certain that their presence enabled the fire to be tackled effectively at short range, and rendered it possible to confine the flames within a much smaller area, as otherwise it would have been necessary to undertake much more extensive damming operations.

As only two streams could be used, the whole of the apparatus or the men was not necessary. The men relieved each other at intervals. There was good ventilation in the deep not more than 80 yards away, and the work was not by any means so strenuous as that done with the aid of the same apparatus at Sydney Mines in September 1908. In the case of this fire, as in many other mine fires, all that was needed was some means of enabling the fire-fighters to bring a stream of water to bear at a sufficiently short range to be effective.

A joint rescue station for the mainland mines of Nova Scotia has been under consideration for some time past. It is to be hoped that the scheme will now be proceeded with, as Cape Breton is rather a distant base of supply for the Nova Scotia mainland, and should a really serious fire or explosion occur in Pictou or Cumberland necessitating a prolonged fight, the Cape Breton collieries dare not denude themselves of their own apparatus and the necessary oxygen and potash refills beyond a certain limit. In the present instance, the Nova Scotia Steel Co. despatched their oxygen refill pump and a supply of oxygen, which they probably would not have been justified in doing had they not known that the Dominion Coal Co. also possessed a refill pump and oxygen stores. So far the Nova Scotian government has not granted any aid to the coal companies of the province in the matter of rescue stations, and it might be suggested that a little financial aid or recognition of the work that has been done by the coal companies, would be more appreciated by them than the present persistent persecution and baiting of our coal industry, which appears to be the favourite amusement of the Legislature, or certain members thereof.

Glace Bay.—During the first fortnight of March, the weather in Cape Breton was unusually mild and open, and there were none of the interruptions to production which the month of March generally brings with it. The outputs were large and shipping was carried along in Sydney Harbour as well as at less a task, and it is hardly likely that the proposal will com-

Louisburg. The mines of the Dominion Coal Company produced more coal than in any similar period since the strike. The output to the fifteenth was 125,000 tons, or at the rate of 250,000 for the month. The production for the six days ending the twelfth was 59,600, or very nearly a daily average of 10,000 tons. When it is remembered that the daily average of the Coal Company in July 1909, the first month of the strike, was only 4,600 tons, it should not be difficult to form a conclusion as to the effectiveness of the U. M. W. strike.

The troops which have been stationed at Glace Bay since the disorders in July last were withdrawn on the 3rd of March. The Coal Company have now a very efficient and numerous police force which will be quite adequate to guard the Company's property. The lessening of breaches of the peace must be attributed very largely to the salutary lesson administered at the last term of the Supreme Court in Sydney.

The attempt of the clergymen of the district to find acceptable terms of settlement, and to bring the strike to an end, came very nearly to success, but unfortunately it was not found possible actually to reach the desired conclusion. As a result of the efforts of the ministers a conference took place between Messrs. Butler and McDougall, the General Manager and the Assistant General Manager of the Dominion Coal Company., Mr. John C. Douglas, the Mayor of Glace Bay, the Rev. Dr. Thompson, Vicar-General of the Diocese of Antigonish, and two of the former employees of the Coal Company, who, it was understood, attended the conference in their individual capacities as men out of work and seeking employment. As a result of this conference the company reiterated their refusal to recognize the U. M. W. and offered to take back their former employees, without discrimination within thirty-five days, and as far as possible to reinstate them in their old positions. The company stated that any employee who had a just grievance had the right to present his complaint to his superior, with an ultimate right to appeal to the President of the Company if necessary. The statement further read that "for such purpose, the aggrieved employee may be accompanied by a committee of his fellow-workmen from the mine where the grievance is alleged to exist." The representatives of the U. M. W. wished to add conditions tantamount to complete recognition of their organization, whereupon the company withdrew their statement in its entirety, announcing that no further steps would be taken by them.

Since the new heads of the Dominion Coal Company took charge at the mines they have shown a spirit of reasonableness, and have evinced a desire to meet their former employees. The local President of the U. M. W. some time last summer wrote a long, open letter to the newspapers, the gist of which was the statement that the members of the U. M. W. on strike at Glace Bay did not insist on formal recognition, but would be content with an undertaking on the part of the company that the management would meet committees of its employees to consider and adjust grievances. Great publicity was given to this letter, and although the untruthfulness of its general tenor was pointed out at the time, a good deal of capital was made out of the fact that the Dominion Coal Company refused so reasonable a request as that to meet a committee of employees. Whoever counselled the men on strike to refuse the very liberal and honourable offer which was made by the management of the company in their desire to end a situation disastrous to all alike assumed a grave responsibility. The strike was always unnecessary, and those who called it were guilty of crime, but its continuance under present conditions is merely foolishness. The individual strikers are beginning to realize this, and the increasing outputs tell their own unmistakable tale.

Legislation.—As usual, the Nova Scotia Legislature is being asked to devote a large amount of its time to consideration of matters affecting the coal industry. These included the report of the Eight-Hour Commission, of which Dr. Magill was the chairman. This is said to be a valuable document, and from what we know of the painstaking nature of Dr. Magill's work on this Commission will repay careful reading and mature study. The report has not yet been distributed to the public, and we hope to refer to it in detail at a later date. It is sufficient to remark that the Commission were unable to recommend any statutory limitation of the present hours of work in Nova Scotian coal mines.

A government measure dealing with compensation to injured workmen, and the dependents of men fatally injured at work, was introduced, and if it should become law it will have a more important bearing on the mining industry than on any other. The proposed measure is practically a copy of the first enactment passed by the English Parliament, except that the maximum and minimum limits of compensation payable to relatives of those fatally injured are higher than provided by the British statute. The Nova Scotia statute provides for a period of two weeks' disability before compensation becomes payable, and for a minimum payment of $1,000 and a maximum of $2,000 to dependents. This matter also calls for comment in full, but space will not permit. There can be no valid objection to the principle of compensating those injured in their work, and it is but right that each industry should carry its own victims. The injustice of the measure proposed by the Nova Scotia Legislature and of the measure which is now the law in Britain, is that it places the entire onus on the employer, and relieves the employee of practically all responsibility for his own safety. The British Act has put a premium on malingering, and the general indefiniteness of the measure has given rise to endless litigation. It has killed the colliery relief societies, which once formed so large a part of the British workmen's interests. There is at present on the statute books of Nova Scotia, legislation, which may become effective upon proclamation, that is indefinitely preferable, both for the master and the man, so far as the coal industry is concerned, to the Compensation Act as known in Britain and Newfoundland. This legislation arose out of the work of the Commission appointed to enquire into the Relief Societies and an old age pension scheme for miners, and we know of no more provisions more likely to be of lasting benefit to coal mining and the workmen employed in this industry than is the legislation referred to.

The Compensation Act, and the legislation which provided for a consolidation of the colliery relief societies, the formation of a permanent fund for the relief of dependents, etc., cannot exist together. If the Compensation Act should become law the relief societies will die, and any old age pension scheme which might be formulated, will die also.

The report made by Mr. T. E. Forster of Newcastle-on-Tyne, on the submarine coal areas of Cape Breton and the proposed methods of extraction was laid on the table of the House, but so far no legislation has been proposed. There is no necessity for any further legislation on this matter, as it is within the power of the Commissioner of Mines to approve or otherwise of systems of coal extraction. It is quite impossible to frame legislation to cover matters which experience can only elucidate. What is the Commissioner of Mines appointed for if not to act as Commissioner?

Dr. Arthur Kendall again moved for a Commission to investigate the coal trade, root and branch, and delivered an exhaustive and forceful speech in the House in support of his contentions. Many of the evils pointed out by the member for South Cape Breton are only too apparent, but the remedies proposed seem in some cases worse than the disease. We gather from the newspaper reports of Dr. Kendall's speech that he is of the opinion that the Government should decide which of two warring labour unions should be favoured with recognition, and that the Government should be empowered to enforce their choice upon the employers of labour. Surely it would be a very disingenuous Government that would impose upon itself so obviously thank-

mend itself to such acknowledged "sidesteppers" as the politicians of Nova Scotia.

The word "recognition" seems to have achieved a great vogue of late in Nova Scotia. It has remained, however, for Mr. Paul, M. P. for Cumberland, to prepare a bill providing for compulsory recognition of labour unions by employers of labour on penalty of fines of from $100 to $200 per day, the fines to be collected by the union asking recognition. This is rather an ingenious way of raising strike funds. The bill is a very crude attempt to force the Nova Scotia Government to forcibly intervene in the present U. M. W. strikes at Glace Bay and Springhill, but nevertheless it is but a sorry compliment to the N. S. Legislature to present to them a bill so manifestly unconstitutional and at variance with common law. Mr. Paul's bill, if passed would not only legalize the "closed shop," but would force the acceptance of this condition upon the employers of labour. The position is unthinkable and absurd, but it shows how much of a shibboleth "recognition" has become in Nova Scotia, when it is possible for so ridiculous a proposal to be gravely submitted to Parliament. The bill is stated to be introduced at the request of the "Halifax Trades and Labour Council, the U. M. W., and organized labour generally." That is to say, the bill is the offspring of the U. M. W. alone, and the baby is very like its father.

QUEBEC.

Thetford.—Mining operations have been carried on extensively during the past winter and general business conditions have shown a marked improvement over preceding years. New mills are being erected on several properties that were exploited last season, and nearly all the old companies are increasing their plants very considerably. New mills that will be ready for early production are the Black Lake Consolidated, Black Lake; Jacob's Asbestos, Thetford Mines; Berlin Asbestos and B. & A. Asbestos, Robertsonville. The milling plants that are being largely increased are the several plants of the Amalgamated Asbestos Corporation at Thetford Mines and Black Lake, the Bell Asbestos, Thetford Mines, and the Robertson Asbestos at Thetford North. Although there is promise of a rapidly increasing production, shipments are improving steadily and large sales are being put through at high prices.

Interest is again being directed towards the development which is taking place in the placer deposits of the Chaudiere Valley. An engineer with large experience in the California placers has been engaged to supervise the operations and the installation of modern hydraulicking machinery. The syndicate handling the enterprise is composed of strong business men and the intention is to carry on the work on a large scale. Mr. J. R. Duckith exhibits magnificent samples of alluvial gold recovered from the test work done last fall and is sanguine in the belief that large profits will be realized from the operations in the near future.

The International Asbestos Association was recently formed in New York for the purpose of extending the knowledge and use of asbestos. The Amalgamated Asbestos and many of the private companies are associated with the movement, which promises to be an important factor in the growth of the industry.

A movement is on foot to organize a branch of the Canadian Mining Institute at Sherbrooke, having for its purpose the healthy growth and development of the existing mining industries and the further expansion of the natural resources of the province. The comments of the local press and public expression generally heartily endorse the formation of the local branch.

ONTARIO.

Kenora.—At a recent meeting of the Prospectors' and Mine Owners' Association of the Kenora Mining Division, it was decided, in view of the present movement in mining circles in the district and the present difficulty of giving inquirers some correct idea as to the rock formation and type of ore to be found in this district that the members of the Executive Committee should as far as lies in their power, make a collection of average samples of ores of this district and that such a collection should be on view in some public building in the town so that any bona fide prospector could obtain from it information that might be of inestimable service to him in deciding his course of action. A discussion then took place upon the possibility of moving the Government to act in a similar manner to the Governments of the Australian States. It is in these Australian States the habit of the Government to install small stamp mills at central points so that the prospector can obtain from the official in charge of such plant a certificate as to the value of his ore. The cost of fire outlay of such a plant is paid by the Government, the plant is then made to be self-supporting by making a charge for putting through sample shipments practically at cost. The first sample sent from any mineral claim is put through absolutely at cost, while any further samples from the same claim are put through at a slight advance over the cost so as to insure the Government plant being self-supporting. In Australia many poor prospectors have been enabled to sink a sufficient depth thoroughly to show up their properties by having their output milled in this manner, since the gold extracted by the Government mill is the property of the prospector putting through the ore, once the charges for milling and treating have been deducted. These plants are often in charge of only one man since the prospector for his own sake as well as the saving in cost usually supplies the man to feed the battery. When the gold has been recovered from the ore the Government official gives the prospector a certificate showing the value of the ore and deducts from the gold recovered a sufficient amount to pay the Government charges for the treatment, while the balance is handed back to the prospector. In many cases where a prospector has been too poor himself to purchase and erect a battery the fact of being able to procure the services of such a mill established by the Government has been a means of permitting him not only to know at once the value of his prospect, but also to do such work as to enable the capitalist to see what he is buying, and consequently lessen the possibility of fraudulent practices. In very few cases it has been known that the Government has been left with such a plant upon its hands when the day for its use has passed in as much as almost in every case where one of these plants has been erected some one or other of the claims at work in the vicinity has found it either expedient or necessary to purchase this plant for its own use. The amount of good which has been done by the Australian Government is incalculable, nor is there any reason why our Canadian Government should be backward in opening up the mineral wealth of the country.

It seems as if the West Hawk Lake District is at last getting that notice from capitalists that it has so long deserved but been without. A Winnipeg syndicate has, we have been informed on good authority, taken an option on some prospects in that vicinity for $50,000. This news, together with the now almost certain opening of the Mikado gold mine this spring, will mean such a revival of mining industry in this district as almost to amount to a rush.

Cobalt.—The condition of the lower level of the Crown Reserve, since it was known to have passed into the Keewatin formation, has been the subject of much speculation, and in view of this, it is interestng to note what is said regarding it by the manager. Mr. Cohen reports as follows:—

'However, it cannot be said that the vein at this level is as phenomenal as it was in the conglomerates above, although it is better than the average high-grade vein in the Cobalt distrct. The east winze at the present time is being sunk from the 200 to the 300-foot level, and shows the vein strong at the bottom

at a depth of 225 feet. In the development work on this vein about 8,000 ounces were obtained and stoping on this vein during the year produced 2,750,000 ounces.''

This mine produced 4,034,325 ounces of silver in 1909, having a gross value of $2,080,155, at a cost of 10.31 cents an ounce. This amounts to about one-sixth of the total production of silver from this camp for the year; but notwithstanding this the manager states that the mine is in a better physical condition and has more ore blocked out than it had a year ago. The average value of the ore was as follows:

	Ounces per ton.	Value per ton.
High-grade	4784.7	$2466.96
Low-grade, ...	184.4	75.81 ..

In addition to this, 76,152 ounces of bullion were produced that ran 869 thousands fine. The total cost of the silver produced is given at 10.31 cents per ounce, and the average price received for silver was 51.56 cents per ounce.

The Buffalo mine has declared the first dividend for this year, the same being 5 per cent. payable April first and a bonus of 3 per cent. payable May sixteenth. Up to date, the Buffalo has declared and paid dividends to the extent of 58 per cent, with additional bonuses of 15 per cent., making 73 per cent, in all. The President in speaking of the property, stated that although they had been greatly handicapped for lack of power, they had last year put in sight 3,000,000 ounces for the 1,000,000 ounces produced. The additional territory opened up to the west has added largely to the ore reserves.

The report of gold discoveries to the west of Matachewan is still arousing considerable interest among the prospectors in the vicinity of Elk Lake. The discoveries were made in quartz veins, in a country rock of schist, to the south west of the Township of Holmes. This formation is practically the same as that found in Porcupine. Some of the quartz veins or dykes are very wide. The territory is stated to be of large extent, and a number of parties have been sent in, within the last couple of weeks. These discoveries, coupled with the recent good finds made in several of the Elk Lake properties, have given a considerable impetus to operations in that district. The town of Elk Lake has unfortunately suffered another serious fire, which is stated to have done about $100,000 damage.

The City of Cobalt has again shipped high-grade ore, sending out 21 tons. All the low-grade is in the future to be treated in the Northern Customs Concentrator. A tramway has been built from the mine to the mill, a distance of 800 feet, which will greatly facilitate handling the material.

The Ophir Cobalt has cut what is believed to be the main vein, at the 200-foot level. On the upper levels this vein carried native silver, and where level this vein carried native silver, and where cut at 200 feet, the values are believed to be high.

An option has been given on the McAlpine property at Shanty Lake in the Gowganda district to New Liskeard men, most of whom are interested in the Hudson Bay Mine in Cobalt. Up to date, but little work has been done on the property although some good veins showing smaltite and native silver have been found. Should the option be taken up, the necessary machinery to open up the property will be sent in at once.

A new company, known as the London and Gowganda Exploration Co., with headquarters in London, England, has been formed for the purpose of developing properties in various parts of the country. In all, twenty-one claims have been acquired, and a gang of men will be sent in immediately to start work on the Gowganda properties.

About the first of April sinking will be started in the No. 2 shaft of the Provincial Mine. It will be put down to open up the vein located with the diamond drill before the present owners took charge. The shaft is now about 60 feet deep. The property is being systematically developed and has a good chance of making ore. To the east of the main shaft a long cross-cut is being run to explore the ground underneath the swamp. The two shafts are also to be connected up on the 125-foot level. During the coming summer the surface will be thoroughly trenched.

The main shaft on the Badger property is to be sunk an additional 200 feet from the present 200-foot level. This shaft was sunk on a vein that can be traced on the surface for about 1,700 feet. The silver contents of this vein are, however, low. There is another shaft down 200 feet on a vein from which about fifteen tons of high-grade ore has been produced, but the ore is pockety and not consistent. The property consists of about 82 acres on which a number of promising surface veins have been found.

The management of the Victoria Mine have decided to do a considerable amount of diamond drilling as underground work has been stopped until such time as the power companies are ready to turn on the air. The drill will be operated from the bottom of No. 1 and No. 2 shafts, and will test the veins that have been discovered on the surface.

At the Hargraves property there is at the present time nearly a carload of high-grade ore ready for shipment, besides a couple of cars of low-grade ore. Nearly all this ore came from the 375-foot level of the No. 3 shaft, from the extension of the Jacobs vein. Some time ago high-grade ore was found in the No. 1 shaft and considerable work has been done on the vein, which is showing up well. On the 175-foot level of the No. 3 shaft, a cross-cut is being run to cut the vein.

The recent discovery of high-grade ore on the 120-foot level of the Moosehorn Mine in the Elk Lake district has decided the management to install additional machinery. The equipment will consist of a six-drill compressor and two 75-horsepower boilers. When the plant is installed, development work can proceed much more rapidly. The main drift is only about 150 feet from the Pardon vein which shows high-grade ore on the surface. The Elk Lake district has been considerably excited lately over the discovery of free gold in the township of Bryce, near the trail between Elk Lake and Charlton. The finds were made within a short distance of the road. The country rock is schist and the gold is found in quartz veins. The formation is said to be very similar to that of Porcupine.

Last summer on the Rochester property, a vein was discovered on the surface that gave high assays in silver. In underground development from No. 2 shaft a vein that was believed to be the one on the surface, was cut, and a considerable amount of work was done on it, without any results. A short time ago a cross-cut was started to the north, which cut the original vein at a point about thirty feet from the other. Where opened up by the cross-cut it shows from four to five inches of ore that carries a good deal of native silver. In the No. 1 shaft a drift is being driven on a large calcite vein, which so far has proved unproductive. This is the first time in the history of the company that pay ore has been found in the underground workings.

In recent developments at the Princess mine of the La Rose consolidation the best ore shoot that has yet been discovered on that property was opened up on the 135-foot level. This is known as the No. 4 vein, on which a stope is being carried up. The ore in the back of the stope has been steadily improving until now it will carry in the neighbourhood of 2,000 ounces of silver to the ton. Conditions in other parts of the mine have been improving steadily, and it is probable that before long the shipments from this property will be an important factor in the La Rose production.

Although development work on the Little Nipissing has been greatly retarded for lack of power a very creditable showing has been made in the last few months. Last January rich ore was struck on the 160 foot level, and since that time a drift has been run on the vein for over sixty feet and a winze has also been sunk on the vein to a depth of 60 feet. The face of the drift and the bottom of the winze are both in good ore. The winze will be sunk 75 feet, and from that point a cross-cut will

be run to open up a parallel vein that lies about 20 feet distant. When power is available the management will carry out an extensive scheme of development.

The mining companies in South Lorraine are again agitating for the construction of a summer road and they wish the Government to do it. That part of the road that is most badly needed is from the Government docks back to the mines. The companies have already spent many thousands of dollars in road building but feel that as they are the ones who are opening up the country they should not be expected to shoulder all the expense. That the road is badly needed there is no question, but it is doubtful if the Government will give much aid, as that is not their way in this north country.

The Haileybury Silver Company has paid another dividend of 50 per cent., payable on April 5th. This makes a total of 100 per cent. paid to date. The money was raised by the sale of the south half of their property to the Haileybury Frontier Company, on which some good finds have lately been made.

In connection with the high grading cases now before the courts, true bills have been returned against several of those implicated. The information in all the charges has been changed so that the defendants are now charged with having in their possession ore which was the legal property of the Crown. This is in conformity with the statute, which declares that any ore for which an owner cannot be found lays in the name of the King. By this means it is hoped to circumvent the old clause, which throws the proof of ownership on the complainant.

The Airgoid Cobalt, which is situated to the east of the Nova Scotia, has been purchased by Seattle capitalists for $200,000, and the first payment of $25,000 has already been made. This year one-half of the total amount, or an additional $75,000, is to be paid. This property, which is advantageously situated, has never been developed. A small plant was at one time installed and a shaft sunk for a short distance, but later the company got into financial difficulties and work was stopped. Work will be started this spring and it is understood that a plant is to be installed.

Good ore is now being produced from the 185-foot level of the Meyer shaft of the Nipissing. The vein left the shaft at 75 feet, and from the bottom of the working a cross-cut was run to cut it. The vein has now been drifted on for about 30 feet and in places shows about 12 inches of high grade ore.

The famous suit of the Florence Mining Company against the Cobalt Lake Company has finally been settled. Before the Privy Council in England the appeal of the Florence was dismissed and the Cobalt Lake has now a clear title, although the outcome was never in doubt. The Florence Mining Company maintained that they had been sold the mining rights under twenty acres of the south end of the lake before the Ontario Government put the whole lake up at auction. The case has been carried from court to court and finally dismissed before the Privy Council.

Mr. H. L. Timmins, who owns the Hollinger properties in Porcupine, has taken an option on another group of claims in the same immediate vicinity. The option was only given in consideration of a large cash payment being made. Free gold has been found in more than one vein on these properties and they will be developed as rapidly as possible. The plant for the Timmins is on its way and will soon be installed. A trial shipment of ore has also been made and a mill test will be made to find out the best means of treating it. The McArthur properties are now being developed and shafts are being sunk. One of these is down about 30 feet and there are high values in gold at the bottom. Three carloads of machinery and supplies have been sent up by men closely identified with the Buffalo Mine. These people own several claims and will develop them as quickly as possible. Several deals are under way for well-known properties in the district, among them the Higginson claims, which are being negotiated for by New York men.

BRITISH COLUMBIA.

Phoenix.—The Granby Consolidated, pursuing its expansive and far-sighted policy, has just made another important deal in Phoenix district, whereby it acquired the Summit group of twenty claims comprising nearly 1,000 acres. The claims were acquired of G. W. Rumberger and associates, and are known to contain large deposits of low grade copper-gold ore similar to that now being mined at the Granby property. A contract has been awarded to Boyles Bros. for extensive diamond drilling on the Summit claim of the group and work will be started at once.

It is now definitely announced that the Canadian Pacific Ry. Co. will extend its line from Midway to Penticton and across Hope Mountains to the coast. As the Great Northern has already awarded contracts for its line from Princeton to the coast, with possibly the exception of a piece over Hope Mountains, this puts the two companies vying with each other in a race for Vancouver. No doubt inside of two years the Boundary and Similkameen districts will have two competing outlets to coast points and the benefits of such facilities cannot be over-estimated. The extension of the C. P. R. will particularly benefit the Crow's Nest district, and East and West Kootenay, as well as the sections named above, and the mining industry will not be one of the least important recipients of the benefits that will accrue.

The Columbia Coal & Coke Co., owning an extensive area of ground said to contain a good quality of steam coal, is now opening up its property with a view to active mining operations. Mr. Geo. L. Fraser, erstwhile of the International Coal & Coke Co., Coleman, is at the property in charge of the work. The mine is situated on Granite Creek, not far from Princeton, and the extension of the Great Northern line will soon afford it transportation facilities.

The new Rand compound condensing compressor and other heavy machinery recently bought by the Daly Reduction Co. are now at the Nickle Plate Mine, Hedley, and the main efforts of the mine force are being put forth toward erecting the addition to the plant.

Rossland.—The Le Roi 2, Ltd., during the week ending March 5th, shipped 800 tons of ore and concentrate, which constituted a record shipment for the year to date. Of 58 tons of concentrate shipped to Trail smelter by this concern in January the returns were $26.12 per ton, and of 2,382 tons of ore the returns were $17.14.

Nothing of an unusual character has developed during the past ten days in the work at the Le Roi, Centre Star, I. X. L., or Mayflower, at all of which work is proceeding along regular lines.

Nelson.—The men who are interested in the future of the zinc industry of this district are much gratified to learn that the Dominion Government is considering the matter of appropriating $50,000, to be spent in experimental work, toward a solution of the zinc smelting question here. There is no doubt about this being a problem of paramount importance to the province of British Columbia and to the Dominion, in more ways than one, while the success of lead-zinc mining here in the immediate future hinges upon its solution. This sum, along with that already expended by the interests here and the Provincial Government, should place the matter on a satisfactory plane and result in some definite action toward the smelting of zinc ore in this district.

The annual report of the Van-Roi Mining Co. shows that the company failed to earn a profit during the last year; in fact, have gone behind nearly $20,000. Owing to the lack of smelting facilities in British Columbia—or in Canada—for zinc ore, the plans of this company made at the beginning of the year were somewhat upset by the imposition of a higher tariff on zinc products entering the United States. This aided toward

the deficit. A profit on the year's operations, however, was not really striven for, as the main efforts of the operating force at the mine were concentrated upon the development, and particularly upon the driving of a straight 1,300-foot adit, 200 feet below previously existing openings, which has opened up the ore at depth and will be of economical importance in the future mining operations of the company. With the steady operations of the Van-Roi Mine and mill in the future it is estimated the property can be made to pay about $175,000 per annum on its capital stock.

The Yankee Girl mine, near Ymir, which has shipped nearly 1,500 tons of ore since the beginning of the year, has temporarily ceased shipments, owing to the bad conditions of the road from mine to railway siding.

The mines of the Crow's Nest Pass Coal Co. are probably shipping more coal than ever before. During the month of January the daily average was 4,100 tons per day, which was a record. The Hillcrest mines are busy just now on a contract for coal to the Great Northern Ry. Co. at Michel.

At Moyie, while no large finds of new ore are reported from the St. Eugene mine of the Consolidated Co., work is proceeding along regular lines and already this year the mill has made 3,195 tons of concentrate which was shipped to the company's smelter at Trail. During the past six weeks this company has also shipped 1,440 tons of lead ore to Trail smelter from the Sullivan mine.

At the Aurora mine it is said there is a tonnage blocked out of 35,000 tons and that shipments will shortly be begun to the smelter. The Society Girl mine, not far from the St. Eugene, is looking quite promising and ore shipments are to be started at no late date. The ore in the three-foot lead recently opened up carries 60 per cent. lead and approximately 30 ozs. silver per ton.

Vancouver.—While mining on the coast has been advancing gradually during the past several years the stimulus that has been and will be given to the situation this season will tend to a banner year. It is now seen that a lot of development work will be done on the copper deposits of Morseby Island; diamond drilling on the Ikeda property; work on the Sullivan group, the Swede group, in which that ubiquitous capitalist, J. P. Morgan, has bought an interest; drilling for coal on Graham Island, the development of the Portland Canal, Telkwa, Babine, Texada and Valdez Islands, and the probable working of the iron deposits on Vancouver Island. The plant at the Red Cliff Mine, Portland Canal, is rapidly being erected. An air compressor and electric lighting apparatus are being put in at the Perreault, in the same district.

On the Silver Cup group, near Hazelton, the work carried on during the winter has resulted in the opening up of ore valued at several hundred thousand dollars, and the property bears all the appearance of becoming a mine. Work on the Dibble group, in which Jas. Cronin is interested, has also been successful in opening up the ore shoot in the tunnel, and it begins to look as if this property would turn out a second St. Eugene or better.

At the Marble Bay mine, Texada Island, on the 1,000-ft. level, the company is working a 250-ft. shoot of bornite twenty feet wide, that carries approximately 9 per cent. copper, $7 gold and 25 ozs. silver. The Britannia Mining and Smelting Co. is going to have a good year. The Tyee Co. has added another and larger smelter to its plant and will no doubt enjoy a profitable and busy season. In fact, the outlook for coast mining is brighter than it ever was.

It is somewhat disappointing to British Columbians to learn that the Dominion Government does not intend to extend the bounty on iron and steel, for so far this province has had little or no benefit of this bounty, and at this time when several companies are about to open up our iron deposits it would undoubtedly prove of benefit.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax, March 9.—It is reported that the Dominion Iron and Steel Company intend to commence work sinking two stopes on the areas of the Cumberland Railway and Coal Company, often referred to as the Cowan and Drummond areas.

The Steel people took an option on these properties during their recent law-suit with the Dominion Coal Company, with the ultimate object of securing their own coal supply should the contract between the two companies be broken. Since that time, it is said that the Steel Company have completed the purchase of the areas from the Cumberland people. Stopes are to be located from the town of Port Morien. It is estimated that there are thirteen square miles of good, clean coal in areas which have been secured by the Steel Company, containing 150,000,000 tons of coal.

Stellarton, N.S., March 16.—The fire in the Albion slopes is now completely under control. Thirteen fire fighters with fire extinguishing apparatus arrived early on Wednesday morning from Cape Breton by special train, and they have succeeded in controlling the flames in the colliery. While these men have been working others have been busy building a substantial wall between the burning portion and other parts of the mine, and to-night it is thought that the loss will not be a very great one, although perhaps it will take a day or two more of steady work before the fire is completely extinguished.

Mr. John Johnson, assistant manager of the Nova Scotia Steel and Coal Company's mines at Sydney Mines, who has been here assisting at the fire, leaves on Thursday, but the fire fighters and the Draeger fire fighting equipment will probably be kept over for a few days. The mine workmen of this slope and the other collieries of the company have valiantly assisted in checking the progress of the flames, all working diligently towards this end, and some have been assisting with the fire fighters' equipment.

Sydney, N.S., March 18.—Judge Lawrence this morning granted an injunction restraining Harry Bousfield, D. McDougald, and other officers of district No. 26 United Mine Workers, and the officers and members of Mullins, Victory, Patterson, Bridgeport, Power, Caledonia, and McPherson locals from besetting and watching places where the Dominion Coal Co. carries on its business, or from interfering with its workmen.

Halifax, March 18.—The Government pronounced itself today as opposed to the appointment of a commission to enquire into the advisability of passing a law compelling recognition of labour unions or of investigating the price of coal in this Province. The vote showed three Government members—Kendall, Gillis and Paul—besides the Opposition, in favour of the resolution for the commission.

Premier Murray, in conducting the debate, said that New Zealand was the only part of the British Empire which made recognition of labour unions compulsory; that the United Mine Workers had not been recognized in any State of the Union and that it would be more becoming in them to obtain such recognition at home before coming to this Legislature asking for it. He was opposed, he said, to any enquiry into the price of coal, which he thought would be as unwise as an enquiry in the West into the price of wheat, or in Nova Scotia as to the price of fish. No one thought of asking for such enquiries; why,

then, should an enquiry be demanded regarding the price of coal? Under the amendment that carried, the matter was referred to the Government. An amendment moved by the leader of the Opposition, that the Government at once pass a compulsory recognition law, was voted down. Mr. Paul, a Government supporter, voting with the Opposition.

Amherst.—The Maritime Coal, Railway and Power Company is making rapid development. The output from their collieries recently exceeded 1,000 tons in one shift. This is about three times the output of this company a year ago.

The coal from the new slope at Joggins seems to be particularly popular. The sales in Amherst during January and February of this year were about four times greater than in these months of last year.

The electrical power department of the company is also advancing. For the installation of the new power unit which the company is adding at Chignecto, a new set of four 150 h.p. boilers have been lately placed, a new 750 h.p. generator, manufactured by Canadian General Electric Company, is now ready for wiring, and the Robb Engineering Company to-day shipped a 750 h.p. engine which is to be coupled to the above generator.

The company expects to add the additional power about the first of April. In the meantime the electric load is rapidly increasing. Among the large concerns which have lately taken power from the colliery are the McLean Milling Company and the Hewson Woollen Mills.

ONTARIO.

Toronto.—At Osgoode Hall, Toronto, judgment was given by Chief Justice Falconbridge last week in the case of John W. Casler against the Grace Mining Co., Ltd., and Messrs. G. J. Blake, Adam Witzel, Wm. J. Casler, and John F. Vogt for $12,000 and interest, secured by mortgage upon the company's mining claims in the Eagle Lake mining district.

The personal defendants disputed the mortgage and counterclaimed for $100,000 damages loss through the excessive price paid for the claims, $25,000 for sums wrongfully taken, $25,000 for carelessness in managing the property, $4,500 for amounts wrongfully paid directors, $10,000 for 20,000 shares wrongfully converted, besides $450 on subscriptions of stock.

The plaintiff was given judgment for the amount of his claim, but the defendants were held to have established their defence as bearing on their counterclaim and a reference was directed to the Master-in-Ordinary to ascertain the extent of the plaintiff's liability to them for large sums wrongfully converted while acting as their manager.

The plaintiff, his Lordship remarked, was an extremely plausible, presentable and intelligent witness, but (his only corroborators being his brother and his brother-in-law, and those only on minor points) he is contradicted by too many witnesses, too many circumstances, and too many writings. The plaintiff, while acting as manager of the company, and in the employ of the company, obtained large sums for the purpose of being applied in operation upon the company's property and he wrongfully and improperly converted to his own use large amounts of the money so entrusted to him.

Dealing with the mortgage, the judgment points out that by agreement of April 25, 1908, the time for repayment had been extended for three years from Feb. 25, 1908, four years after its execution. The plaintiff had been president of the company and resigned after a stormy meeting in 1907. After that, the company had practically ratified the mortgage and plaintiff was therefore entitled to judgment for the $12,000 and interest.

Cobalt, Ont., March 19.—Silver Bar lost its plant and blacksmith shop by fire yesterday afternoon. Superintendent Brown, who keeps steam up and water pumped out, now that no development is in progress, had just left the plant when the flames broke out, the fire being over within half an hour.

Elk Lake, Ont., March 15.—Disastrous fire at Elk Lake this morning destroyed the Woods hardware store, Chamandy Bros.' general store. King Edward Hotel, Smythe Hotel, and the Strong drug store. The total loss is about $155,000; insurance $80,000. Cause unknown.

Sudbury.—The Cheeney mine, north of Thessalon, is being pumped out, and it is probable that mining operations will be shortly resumed. The ore is very high grade, and the vein of good width and continuous for considerable length. The distance from railway is a drawback.

Fort William.—It is announced that the controlling interest in the Northern Pyrites Co., operating the well-known pyrites mine near Lake Superior Junction, has passed to the General Chemical Company of Chicago and Detroit, the company that had contracted for a large quantity of the output and took several cargoes of it last fall. This has somewhat changed the general policy of the shipment of ore and it is understood that the Grand Trunk Pacific Railway has arranged to take care of the product this year, and in the meantime the engineers of the General Chemical Co. will look over the ground at Fort William with a view to building a permanent dock.

BRITISH COLUMBIA.

Fernie.—Several important cases came before Stipendiary Magistrate J.S.A. Alexander in connection with breaches of the Coal Mines Regulation Act. The regulations strictly forbid any one working in them with matches, pipes, or tobacco, but, notwithstanding this fact the law has often been broken in this respect and the lives of many endangered by the practice. To-day six delinquents appeared before the court for having disobeyed this law with the following results:

Edward Ellis, charged with taking matches into the mine, found guilty and fined $10 or 21 days in jail.

N. Dosepan, $10 or 21 days in jail.

Luigi Ventura, $10 or 21 days in jail.

A. C. Stephenson, $10 or 21 days in jail.

The magistrate in passing the sentence pointed out the seriousness of the offence, explaining that this sort of carelessness placed in jeopardy the lives of those working in the mines and intimated his intention in future cases of this nature to send those charged and proven guilty to jail without the option of a fine.

Phoenix.—The Granby Consolidated Mining, Smelting and Power Company has secured a working bond on the Summit group and a number of adjoining claims, covering about 1,000 acres. It is one of the most important mining deals in the history of Phoenix camp.

The acreage of the bonded claims is about equal to the acreage of the Granby's present holdings in Phoenix camp. Very little development has been done on the Summit claims, but from indications it is expected that exploratory work will reveal large bodies of ore similar to those of the Granby mines. The Granby company will spend a large sum of money prospecting the properties under option with the diamond drill. The contract has already been let to Boyle Bros., of Spokane, and drilling will commence immediately.

YUKON.

Dawson, Yukon Territory, February 28th.—The Klondike has been roused to a storm of protest over interviews given the press of Canada and the United States recently by Albert J. Beaudette, formerly in the Mining Department of the Government of the Yukon, in which he is quoted as saying that prospecting is a thing of the past in the Yukon, and that the prospector is a rare bird in the Yukon, and that the Yukon Gold Company is the only outfit washing gold. The citizens have voluntarily subscribed to a fund to contradict this assertion as widely as possible.

Acting Governor Arthur Wilson, on receiving copies of interviews, immediately volunteered the following statement:—

"There is more systematic prospecting being done in this territory now than at any time since the advent of the white man. The faith of our people in the permanency of this country as a great mining district is more firm to-day than at any time since Robert Henderson made his discovery. More money is being spent by our citizens generally now in legitimate and systematic prospecting than in any other period of our history."

Mr. Wilson also names many other large dredging concerns besides the Yukon Gold now operating in the Yukon and washing and marketing gold.

The Klondike is just opening some of the richest quartz ever found in Canada, and it is believed by many here to be on the eve of a boom that will rival Tonopah, Cobalt, and Cripple Creek.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The reports of some of the leading South Wales collieries for the past year show in nearly all cases a substantial reduction in profits as compared with the previous year or two. This is largely attributable to the unsatisfactory conditions prevailing in the second half of the year. Nearly all collieries suffered from stoppages of a more or less prolonged character; working costs have increased considerably, and there has been a heavy reduction in outputs consequent upon the lessened hours of labour. Prices ruling for coal on the open market have been satisfactory, but this has been more than counteracted by the low-priced contracts almost generally held by colliery owners. In fact, in the autumn contract season of 1908 orders were booked for delivery over the whole of 1909 at prices ranging from 3s. to 5s. per ton below those obtained for 1908 contracts. This fact in itself has been sufficient to interfere with the earning powers of all undertakings, and, in a large measure, has been responsible for the decline in profits. Had the conditions governing business in the second half of the year, however, been more favourable, there is no doubt that a much better showing would have been made by all companies. The prospects for the current year are much more favourable. The coal sold under contract for shipment in 1910 has been at advances of from 2s. 6d. to 4s. per ton, which alone should mean a marked increase in profits, whilst, in addition, there is every indication of comparatively high prices ruling on the open market for all classes of coal.

RUSSIA.

Oil producers in the Baku fields have hitherto been considerably hampered by the high rates of export to the port of Batoum, and it is satisfactory to learn that representations to the Russian Government have had the desired effect, and in future the rate will be reduced to 12 copecks per pood, instead of 19 copecks as hitherto.

During 1909 the total losses of oil through leakage while being exported from Baku by rail amounted to 117,320 poods of fuel oil, 92,500 poods of crude oil, 78,900 poods of kerosene, 168,200 poods of lubricating oil and 4,500 poods of benzine.

RHODESIA.

Bulawayo.—The development of the Surprise is proving highly satisfactory, the reef showing a width of 30 ins. and yielding over an ounce to the ton.

Further reports of a satisfactory nature are to hand from the Umkondo copper mine of the Consolidated (Africa) Copper Trust, the development data being consistently good.

News is just to hand of an important discovery on the Bunthorne (Bulawayo) property. It is stated to consist of a lode of auriferous schist 6 ft. wide, carrying visible gold.

The Aladdin block of claims has just been acquired by the Rhodesia Exploration Company. The rock at 100 ft. is stated to be giving 5 ozs. to the ton. The Arcturus, the Slate and the Grand Blocks belonging to the Rhodesia Exploration Company are looking very promising. Energetic development is being carried out on this line for a distance of nearly six miles.

The new mill of the Bucks Reef Company will start crushing in April. The development work continues to be quite satisfactory.

SOUTH AFRICA

Johannesburg.—There is promise of tremendous activity in the near future in that cluster of three Far East farms Modderfontein, Benoni and Brakpan. The whole of the Modderfontein of which only the new Modderfontein portion is at present producing gold, will then be either developing or producing. Modderfontein is a triangle with its base or northern side corresponding with the line of outcrop on the new Modderfontein and Modder B properties. To the dip of Modderfontein are the 326 claims of the Modder deep levels and the triangular block marked Kitzinger of 51 claims. Below this, in the apex of the triangle, are the two areas of some 1,250 claims each leased by the Government to Messrs. Barnato Brothers in terms of the State Mines scheme. Areas aggregating over 5,500 claims will thus be either developing or producing in quite a short space of time.

Johannesburg.—The repatriation of the Chinese has been completed; the last batch of labourers have left for home.

AUSTRALIA.

Queensland Mining in 1909.—Although the gold yield of Queensland, like that of all the other Australian States, showed a shrinkage during the past year—the return being 450,937 ozs., against 461,359 ozs. in 1908—the outlook is considered distinctly brighter for 1910. On the Charters Towers field important developments are reported to be taking place. In this district the total output for the past year increased, the value of the yield being £756,977, as against £722,557 in 1908. Official statistics show that the dividends for the twelve months amounted to £156,819, as compared with £100,980 in 1908, and the calls to £57,475, as against £60,522. At the close of the year came the long-looked-for news of a find in the new Brilliant Freeholds, and if this development opens up in a satisfactory manner it should much improve the prospect of the mines to the eastward, particularly Brilliant, Brilliant Block, Victory, Clark's Brilliant, Day Dawn Fine, Day Dawn and Brilliant St. George. At the Mount Morgan Company's mine at Rockhampton, the difficulties which for a time checked production have been surmounted, and the normal output has again been reached. The change in the system of mining has now been completely carried out, with the result that there is a larger output of average grade ore. In the annual report submitted to the directors by the general manager it was stated that as a result of exploration work carried on in the last half-year the reserves of the auriferous ore in the mine showed a very substantial increase, amounting to 530,000 tons blocked out. The completion of the Mount Chalmers, the Boyne Valley, the Mount Elliot and the Etheridge railways will undoubtedly be attended by increased activity in the various districts served by these lines.

UNITED STATES

Richmond, Va.—By dismissing the appeal of the United Mineworkers of America, the U. S. Circuit Court of Appeals has made permanent a temporary injunction of sweeping

character. The case is that of president of the Mineworkers, as an individual, and as vice-president of the Union against the Hitchman Coal and Coke Company of West Virginia.

It is an appeal from the decision of the Circuit Court for the northern district of West Virginia.

The injunction restrains the Union from interfering with employees of the company for the purpose of unionizing the mine; from interfering and conspiring to interfere with employees of plaintiff; so as knowingly to bring about in any manner the breaking by the plaintiffs' employees of contracts for service, existing at the time or thereafter entered into; from trespassing on the company's property; from compelling by threats of violence any employee to leave; from establishing pickets around the property of the company for the purpose of using violence or threatening or persuasive language to induce the company's employees to leave.

Wilkesbarre, Pa., March 12.—Seven miners lost their lives in the No. 5 shaft of the Lehigh and Wilkesbarre Coal Company near here to-night in an explosion of gas. There were eight men in the party, but one of them was away from the scene of the explosion getting some tools and was not injured.

The officials have the theory as to the cause of the explosion. General Manager Huber said it did not cause much damage.

De Lamar, Nev.—Mining engineers representing both the Newhouse and the Guggenheim interests have been in De Lamar for some time examining the old De Lamar mine and properties adjacent to it, especially the Magnolia.

The Magnolia, to the depth of 300 feet, carried large values in free-milling gold. Below that depth silver and copper values came in to such an extent that the company's mill was unable to handle it. A reduction plant had been planned by the company's engineers when came the order to close down.

This property, near the surface, produced several fortunes from its gold ores, the product being of such grade as to make its marketing profitable even after it has been hauled across the desert to Milford, Utah, and from there placed on the local market via the railroad.

The ground was eventually taken over by the Delamar company, the management of which started the sinking of a deep shaft. As depth was attained, however, the gold values apparently gave out and were replaced by silver and copper ores, for the treatment of which there was no nearby plant.

Goldfield, Nev.—A petition has been filed in the supreme court at Carson in the case of the state of Neveda on relation of O. C. Moore against the Manhattan Verde Mining Company and R. P. Dunlap, its president, for a writ of mandamus compelling the company to stamp certain certificates of its stock treasury or promotion as required by the act passed by the last legislature, commonly known as the wildcat law.

The act went into effect on March 5, 1909.

Juneau, Alaska, March 3.—Twenty three miners were killed last night by an explosion of a powder mazagine in the 1100-foot level of the Mexican mine, one of the group of Treadwell gold properties on Douglas Island. Eight men were seriously injured and four of these may die.

The last shots had been fired by the night shift 20 minutes before the men were assembled at the elevator to go on top. The mazagine, which contained 275 pounds of powder, was 30 feet from the place where the men were standing, but every man was killed or injured.

Most of the miners were foreigners. The man in charge of the magazine had locked the door where the explosives were stored, and was standing with the other men. He was also killed.

Company Notes

YUKON GOLD.

The Annual Report of the Yukon Gold Company, in which a large number af Canadians are interested, for the year ended December 31, 1909, is issued. President Guggenheim says in part:

"It is to be noted that the company finds itself practically one season behind in its hydraulic operations, which will necessitate some modification of the estimates, heretofore made of probable earnings for 1910. This, however, does not affect the estimates which are of paramount importance, such as the value per cubic yard of the property owned by the company, operating costs, etc., which have been verified by actual results.

"During the year the company was placed upon a dividend-paying basis at the rate of eight per cent. per annum, and this rate should be maintained until the earnings justify an increase.

"Mr. Yeatman, consulting engineer of the Guggenheim Co., made a very favourable report during the year, summarized as follows: 'To sum up, I may say after carefully looking into conditions, that your undertaking in the Yukon Territory is a wonderful piece of work; from an engineering point of view, one of great promise, whose success is now being satisfactorily proved.'"

The balance sheet as of Dec. 31, 1909, follows:

ASSETS.

Property and investment	$11,857,000
Equipment	6,073,045
Deferred charges	491,244
Supplies and material	434,579
Accounts collectable	300,931
Cash	9,863
Total	$19,166,662

LIABILITIES.

Capital stock	$17,500,000
Guggenheim Exploration Co.	1,050,266
Accounts payable	120,849
Depreciation	142,731
Surplus	352,816
Total	$19,166,662

BRITISH COLUMBIA COPPER COMPANY.

The report of Mr. J. E. McAllister, general manager of the company, is as follows:

"Production was interrupted for a period of three months from May 4th to August 8th; a strike of the coal miners of the Crow's Nest Pass District (from which our fuel supply is obtained) causing a cessation of coke shipments, and the cost of fuel from more distant points being prohibitive when taken with the price of copper.

"The material handled at mines and reduction works during nine months' operation was:

	Tons. Shipped	Tons. Shipped
Mother Lode Mine	338,639	337,089
Oro Denoro Mine	11,771	13,384
Napoleon Mine	16,614	11,950
	367,024	362,423
Custom Ore		6,964
Converter Slag		3,939
Total		373,336

"**Mother Lode Mine.**—Operations are under the direction of Mr. Paul S. Couldrey, superintendent, and the greater portion of ore shipped has been from above the 200 foot level. During the year the open cut workings have been extended in two directions, and stoping in the underground workings has further increased the ore reserves beyond the estimates, this being particularly the case on the 400-foot level, where the largest amount of development work has been performed. This property has furnished the bulk of the supply, and the workings, as well as the surface plant, have been maintained in excellent condition. Additional receiver capacity has been added for the purpose of equalizing the pressure of the compressed air supply with very satisfactory results. The diamond drill exploration has consisted of 3,680 feet.

"**Oro Denoro Mine.**—The ore from this mine being more basic than that of the Mother Lode, it has only been drawn upon as required. Mr. P. W. Lover is in charge at the property, and during the year 1,181 feet of diamond drilling has been done.

"**Napoleon Mine.**—This property has been worked intermittently, its production being drawn upon as required to make up for the deficiency of sulphides in the other ores. Of the 16,614 tons shipped from the mine, 2,120 tons were sold, the balance coming to this company's own reduction works.

"**Jack Pot Group.**—Comprises the Jack Pot, Athelston Fraction, Molly Pritchard, Coronet Fraction, Iron Clad Fraction, Florence and Prince, located in Wellington Camp, operations being in charge of Mr. H. Johns. The claims were secured under a working bond in September of 1908, since which time prospecting and development have been carried on continuously. In all 2,532 feet of drifts, tunnels, and raises have been driven and a large tonnage of ore opened up, the grade of which will be somewhat better than the average of the other properties, the values being chiefly gold.

"Developments having justified completing the purchase, surface buildings are in course of construction, and the Canadian Pacific Railway is now building a line to the property which will be completed early in March, 1910, after which shipments will be regularly maintained. The company undoubtedly has here a valuable asset, all of which has been established during the past year.

"**Lone Star Mine.**—Work has been suspended throughout the year awaiting transportation facilities, although a railway line has been surveyed to the mine by the Canadian Pacific Railway Company.

"Operations at the reduction works are under the superintendence of Mr. E. G. Warren, and various improvements have been added to the plant, chief among which is the additional storage bin capacity for 1,000 tons of coke. The three blast furnaces (48 in. x 240 in. at the tuyeres) were in operation for 623 furnace days, the failure of the coke supply previously mentioned causing a loss of approximately 290 furnace days.

"The average tonnage handled exclusive of coke during the period of operation was 599.2 tons per furnace each twenty-four hours, making a total of:

	Tons
B. C. Copper Co.'s Ores	362,423
Custom Ores	6,964
Converter Slag	3,949
	373,336

"Included in the item of converter slag is an amount of 1,588 tons of custom ore and clay used in converter linings. From the above material handled, blister copper to the amount of 6,366,318 lbs. has been recovered, containing:

"A comparison of figures with those of the year 1909 is as follows:

Fine Copper	lbs...	6,325,000
Gold	ozs...	18,244
Silver	ozs...	64,234

"Appended will be found Balance Sheet as at November 30th, 1909, and Profit and Loss Account as rendered by the auditors.

Yield of Copper per ton of B. C. Copper Co.'s Ores	17.7 lbs.	17.8 lbs.
Yield of Gold and Silver per ton, B. C. C. Co.'s ores	$1.06	$0.985
Average price realized for copper	13.03c	13.504c
Cost of Producing, Refining and Marketing per pound of Fine Copper, after crediting expenditure with Gold and Silver Values	9.829c	9.996c
Cost per ton of Ore handled including all charges from Ore in place to sale of the contained metals	$2.683	$2,632

"In general the standard of operations has been higher than the previous year, as the expense of closing and re-opening, including the period of three months' cessation on account of coke shortage, has all been borne by the balance of the year when operations were in progress. All expenditure at the mines and reduction works for additions, improvements and maintenance has been taken up in the operating cost for the year, and the various plants have been maintained in as high a state of efficiency as possible."

PACIFIC PASS COAL FIELDS CO.

A report was presented to the shareholders of the Pacific Pass Coal Fields, Ltd., at their first annual meeting held on March 1.

The directors stated that the company had had an engineering and prospecting party on the property all last summer, and that the coal had been tested in numerous places. It was proved beyond doubt that an immense quantity of coal existed in the property, running into the hundreds of millions of tons, and from Government analysis the quality was found to be equal to the best grades of the well known bituminous coals of Cape Breton and the United States.

The directors were also pleased to be able to report to the meeting that they had signed on behalf of the company a contract with the Grand Trunk Pacific Railway Company, by which the railway company undertakes to build a branch line from their main road through the Yellowhead Pass to the property of the Coal Company, the Grand Trunk Pacific Company guaranteeing to have the branch line completed by December 1st of this year.

Further development work will be done this summer and there seems to be no doubt that the mines will be shipping coal almost immediately after the branch railway is completed.

The following directors were elected for the year: E. B. Greenshields, Hon. Robt. Mackay, W. Molson MacPherson, J. Theo. Ross, H. A. Lovett, K.C., A. H. Cook, K.C., F. L. Wanklyn, J. W. McConnell, R. Brutinel, A. De Bernis.

At the subsequent meeting of the directors Mr. E. B. Greenshields was elected president of the company, Hon. Robert Mackay vice-president, and George C. Cousins secretary-treasurer. An executive committee was also appointed consisting of the president and Messrs. H. A. Lovett, K.C., and J. W. McConnell.

BUFFALO.

The Buffalo mine has declartd a quarterly dividend of 5 per cent. payable on April 1st and a 3 per cent. extra dividend on May 16. This is the same as the last dividend declared.

Including the dividend just declared the Buffalo mine has paid to the shareholders 73 per cent. of the total capitalization. Up to last year a rate of three per cent. quarterly was maintained and eleven dividends at this rate totaling $297.000 dollars was paid. In 1909 the dividend was raised to the present rate.

According to a statement recently made by the president of the company, three million ounces of silver were put in sight in addition to the million ounces mined during last year.

The Buffalo Mines Co. has declared the regular quarterly dividend of 5 per cent., payable April 1, and an extra quarterly dividend of 3 per cent., payable May 16.

Directors of Crown Reserve have declared the regular dividend of 6 per cent. and a bonus of 9 per cent. on their company's capital stock, making a total of 15 per cent., payable April 13, to shareholders of record April 1st. The books close from 1st to 15 th of April.

The International Nickel Company directors have declared the regular quarterly dividend of 1 per cent. on the common stock, and one half of one per cent. extra was declared.

The Canada Cement Company has been awarded an order by the Dominion Steel Company for 40,000 barrels of cement, delivery during 1910.

This order was procured in competition with the English cement companies, it is said.

The shipments of the Canada Cement Co. up to March 1st are 40 per cent. greater than they were for the corresponding period in 1909.

STATISTICS AND RETURNS

The official report of the Temiskaming and Northern Ontario Railway is a most satisfactory one. The freight earnings for 1909 amount to $944,000, as against $471,000 in the previous year, while the passenger receipts were $592,000, as compared with $366,000 in 1908. The total net earnings for the year, including ore royalties, were $739,451, as against $419,488 in 1908. The ore royalties were $113,301, as compared with $134,820 the previous year.

The output of gold at the Transvaal mines in February, as reported by the Johannesburg Chambers of Mines, was 575,622 ounces, fine, valued at $12,232,000. London estimates at the close of February had, as reported by cable, been 555,000 ounces. The month's total was, nevertheless, the smallest in a year.

The Consolidated Mining and Smelting Co. of Canada report ore receipts at Trail Smelter for the week ending March 5 and year to date (in tons), as follows:

Company's Mines—	Week.	Year.
Centre Star	4.168	33,639
St. Eugene, (con.)	602	3,311
Snowshoe	4,471	35,719
Richmond-Eureka	33	894
Sullivan	261	1,444
Other mines	1,721	17,715
Total	11,256	93,222

ROSSLAND ORE SHIPMENTS.

Following is the tonnage of ore crushed at and shipped from the mines of Rossland for the week ending March 5th, and for the year to date:—

Mine.—	Week.	Year.
Centre Star	3,580	36,533
Le Roi Two	455	4,467
Le Roi	105	1,548
I. X. L.	....	26
Velvet	....	220
Totals	4,140	42,794

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Mar. 11, and those from Jan. 1, 1910, to date:—

	Mar. 11. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	.....	292,453
City of Cobalt	42,000	235,970
Cobalt Central	.....	165,286
Cobalt Lake	.....	132,000
Colonial	.....	63,660
Coniagas	.....	295,757
Crown Reserve	.....	951,350
Drummond	.....	664,200
Hudson Bay	.....	62,365
Kerr Lake	119,360	1,193,849
King Edward	.....	93,129
La Rose	375,615	2,427,516
McKinley-Dar.	166,000	437,860
Nipissing	311,892	2,260,946
O'Brien	.....	328,806
Peterson Lake	.....	170,450
Right of Way	67,000	320,436
Silver Cliff	.....	66,010
Temiskaming	.....	180,000
Trethewey	.....	127,000

Ore shipments for week ending March 11, were 1,081,868 pounds, or 540 tons.

Total shipments from Jan. 1 to March 11 were 10,469,052 pounds, or 5,234 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending Mar. 18, and those from Jan. 1, 1910, to date:—

	Mar. 18. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	124,500	416,953
City of Cobalt	.....	235,970
Cobalt Central	....	165,286
Cobalt Lake	.....	132,000
Colonial	.....	63,660
Coniagas	.....	295,757
Crown Reserve	61,110	1,012,460
Drummond	.....	664,200
Hudson Bay	61,330	123,695
Kerr Lake	.....	1,193,849
King Edward	.....	93,129
La Rose	238,974	2,666,490
McKinley-Dar.	150,561	588,421
Nipissing	65,381	2,326,327
O'Brien	.....	328,806
Peterson Lake	.....	170,450
Right of Way	.....	320,436
Silver Cliff	.....	66,010
Temiskaming	.....	180,000
Trethewey	.....	127,000

Ore shipments for week ending March 18 were 701,856 pounds, or 350 tons.

Total shipments from Jan. 1 to Mar. 18, were 11,170,908 pounds, or 5585 tons.

The output of gold at the Transvaal mines in February, as reported by the Johannesburg Chambers of Mines, was 575,622 ounces, fine, valued at $12,232,000. London estimates at the close of February had, as reported by cable, been 565,000 ounces. The month's total was, nevertheless, the smallest in a year.

SHARE MARKET.

Courtesy of Warren, Gzowski & Co.

Miscellaneous.

	Bid.	Ask.
Amalgamated Asbestos	28½	..
Dom. Coal, Com.	..	81¾
Dom. Steel, Com.	69⅞	70⅛
N. S. Steel	88¾	..
Granby	84	85
Consol. Smelting	85	90
Crow's Nest Pass	82	86

Cobalt Stocks.

Wettlaufer	1.02	1.07
Amalgamated	.07	.07⅛
Beaver Consolidated	.35¼	.35½
Buffalo	2.40	2.70
Chambers Ferland	.39⅞	.40
City of Cobalt	.39	.40
Cobalt Central	.17	.18
Cobalt Lake	.24⅞	.25
Coniagas	5.40	5.75
Crown Reserve	3.75	3.80
Gifford	.17¾	.18
Foster	.24	.25
Green-Meehan	.06½	.07½
Great Northern	09¾	.10½
Hudson Bay	103.00	110.00
Hargraves	.37½	.38
Kerr Lake	8.70	8.80
La Rose	4.47	4.48
Little Nipissing	.28	.28½
Mckinley-Darragh-Savage	.97	1.00
Nancy Helen	.10	.12
Nipissing	10.41	10.50
Nova Scotia	.41	42¾
Otisse	.08½	.08⅞
Peterson Lake	.27	.27¼
Right of Way	..	..
Rochester	.20	.20⅛
Silver Leaf	.10⅜	.10½
Silver Bar	.12	.13
Silver Queen	.17	.18
Temiskaming	.64½	.65
Trethewey	1.39¾	1.40
Watts	.12	.13
Ophir	.70	.75

New York Curb.

Boston Copper	19	19½
Brit. Col. Copper	6¾	6⅞
Butte Coalition	24½	25
Chino Copper	15⅛	15¼
Davis-Daly Copper	3⅛	3¼
Ely Consolidated	1⅜	1 7-16
Gila Copper	7¾	8¼
Giroux Mining	9¼	9⅜
Goldfield Consol.	8 7-16	8½
Greene-Can.	10¼	10½
Harcuvar Copper	..	no market
Inspiration Cop.	8 7-16	8⅝
Miami Copper.	22⅞	23
New Baltic Copper	8½	9
Nevada Con. Copper	23¾	24
Ohio Copper	4⅜	4½
Rawhide Coalition	16	18
Ray Central	3 7-16	3 9-16
Ray Consolidated	22⅛	22⅜
Union Mines	1½	1⅝
Yukon Gold	4⅜	4½
Calumet & Hecla	605	610

TORONTO MARKETS.

Metals.

Mar. 22,—(Quotations from Canada Metal Co.)
- Spelter, 6 cents per lb.
- Lead, 3.70 cents per lb.
- Antimony, 8 to 8½ cents per lb.
- Tin, 34.00 cents per lb.
- Copper, casting, 14.20 cents per lb.
- Electrolytic, 14.20 cents per lb.
- Ingot brass, 9 to 12½ cents per lb.

Mar. 22.—Pig Iron, (Quotations from Drummond McCall Co.)
- Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
- Summerlee No. 2., $23.00 (f.o.b. Toronto).
- Midland No. 1, off the market.
- Coal, Anthracite, $5.50 to $6.75.
- Bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Mar. 18.—Connellsville coke, (f.o.b. ovens).
- Furnace coke, prompt, $2.00 to $2.25 per ton.
- Foundry Coke, prompt, $2.65 to $2.75 per ton.

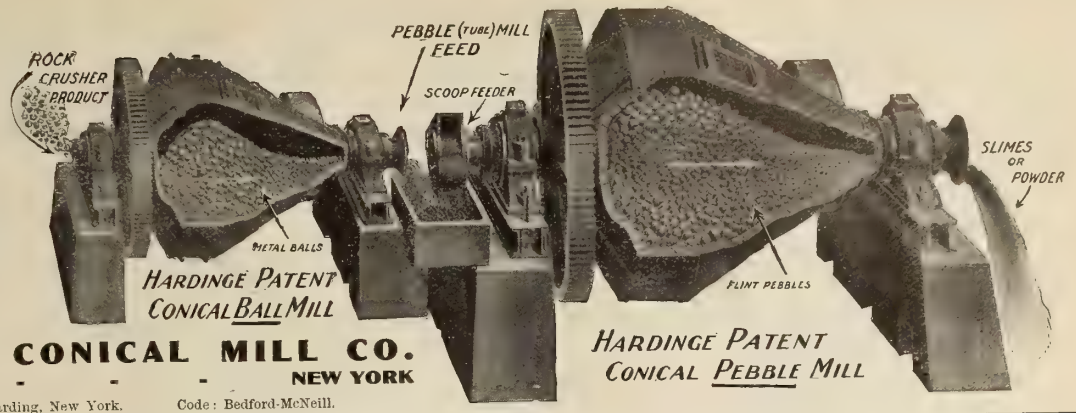
Mar. 18.—Tin (Straits), 32.12½ cents.
- Copper, Prime Lake, 13.35 to 13.75 cents.
- Electrolytic copper, 13.35 to 13.45 cents.
- Copper Wire, 15.25 cents.
- Lead, 4.52½ cents.
- Spelter, 5.72½ cents.
- Sheet zinc (f.o.b. smelter), 7.75 cents.
- Antimony, Cookson's, 8.50 cents.
- Aluminium, 23.50 to 25.00 cents.
- Nickel, 40.00 to 49.00 cents,
- Platinum, ordinary, $29.00 per oz.
- Platinum, hard, $34.50 per oz.
- Bismuth, $1.75 per lb.
- Quicksilver, $50.00 per 75-lb. flask.

SILVER PRICES.

	New York cents.	London pence.
March 8	50⅞	23 7-16
" 9	50¾	23¾
" 10	50⅞	23 7-16
" 11	51¼	23⅝
" 12	51⅜	23 11-16
" 14	51¼	23⅝
" 15	51⅜	23 11-16
" 16	51½	23¾
" 17	51⅜	23 11-16
" 19	51½	23¾
" 21	52	23 15-16

STEP REDUCTION
Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotten hold of,"



HARDINGE CONICAL MILL CO.
37 Wall Street, - - - NEW YORK
Cable Address: Halharding, New York. Code: Bedford-McNeill.

NOTICE

STUDENTS EMPLOYMENT REGISTER,

The CANADIAN MINING JOURNAL has opened an employment register for students taking mining or metallurgical courses at Canadian Universities or Technical Colleges. Mine operators who wish to employ students during the summer months are requested to communicate with the Business Manager.

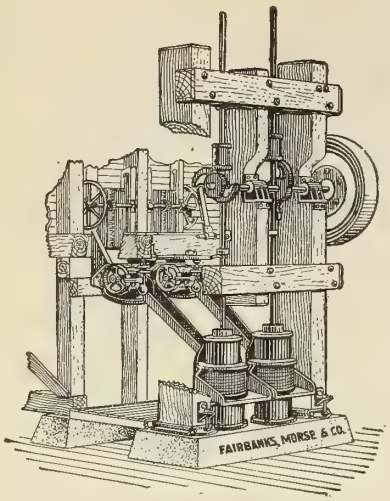
Students are requested to send in their names, along with brief records of experience. These will be filed and no effort will be spared on our part to place applicants in immediate communication with possible employers.

SAFETY — SPEED — SPLENDOR
CANADIAN PACIFIC RAILWAY CO'S
"EMPRESSES" of the ATLANTIC
FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records between Liverpool and Canadian Ports
900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA
For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to
W. G. ANNABLE, General Passenger Agent, Board of Trade, MONTREAL



NISSEN STAMPS

THE MODERN INDEPENDENT CIRCULAR MORTAR GRAVITY STAMP.

ADVANTAGES

MAXIMUM CRUSHING CAPACITY SECURED

BECAUSE—The feeding of ore into each individual mortar is under constant control.

Immediate free discharge of pulp as produced is secured.

Freedom from interruption of operation, is secured due to the independence of units, allowing any one or more units to be "hung up" without disturbing the operation of the rest.

QUALITY OF PULP—Owing to controlled feeding and screen discharge there are much less unmanagable slimes produced than with other mills.

POWER—Owing to the great crushing efficiency secured, the power to operate is about half that of other mills of the same capacity output.

WEARING QUALITIES—The shoes and dies wear evenly. The weight of the stamps can be maintained constant, counteracting wearing away of the metal.

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines

Montreal, Toronto, St. John, N.B. Winnipeg, Calgary, Vancouver.

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

Mining and Metallurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

When answering Advertisements please mention THE CANADIAN MINING JOURNAL.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
McGee, Boyd
Meyer, Ralph A.
Miles, A D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer
Mines and Mineral Lands Examined and Reported On
Port Arthur, Ontario, Canada

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. SC.
MINING ENGINEER
24 Adelaide St., West, Toronto, Can.
Cable Abmott Phone Main 5063

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers aad Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
EXAMINING AND REPORTING ON PROPERTIES A SPECIALTY.
Box K, Sudbury Box 990, Cobalt

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Ohemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Querinac, Toronto,

T. H. CRABREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98
Porcupine Claims—Write Matheson Post Office

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

WEBB & COOKE
Mechanical and Electrical Engineers
R. L. WEBB, Ass. A. I. E. E.
THOMAS F. COOKE, Jr. A. S. M. E.
Specialty—Mine Power Plants.
338 Ellicott Square, Buffalo, N. Y.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

DOBBS & YOUNG
PROPERTIES LISTED and INVESTMENTS DIRECTED
MINING BROKERS and CLAIMS AGENTS
Wire or write us for particulars to
Box 541, COBALT, ONT.
WATCH THIS SPACE

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

Porcupine District
TOWNSHIP OF TISDALE
MINING PROPERTY
FOR SALE

North part of Lot 8 in the second concession of Tisdale, containing 160 acres more or less: well located, adjoining Hollinger and Gillies' Claims.

Report of J. B. Tyrrell, Mining Engineer, may be seen at the office of the undersigned, 18-22 King St., E. Toronto, Ont.

Offers will be received until Saturday, the 9th day of April, 1910. The highest or any offer not necessarily accepted.

NATIONAL TRUST COMPANY, LIMITED
Administrators of the Estate of J. A. Platt, Deceased.

FOR SALE

Electric light plant, consisting of two 35 KW alternating Generators, 2400 volts, 133 cycles, with exciter, all Canadian General make, together with switchboard, transformers, arc lamps, etc. Generators belt driven by two 50 h. p. Leonard Peerless Engines. Capacity of plant 25 arc lamps and 1200 16 c.p. incandescents. Admirable equipment for small town or for isolated manufacturing plant. Address

THE CANADIAN COPPER COMPANY,
COPPER CLIFF, ONT.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1906. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite,
etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary. School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD — **Associate Editors Courtenay DeKalb, H. Foster Bain**

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners

Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:

32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals and extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The allied metal, cobalt, is also found in Ontario in unsurpassed quantities.

The output of iron, copper, nickel, silver and cobalt in 1906 was much beyond that of any previous year, and large developments in these industries are now going on.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

An Important Trio

Economics



Principles



Methods



Within a few months three highly important mining books have appeared, covering the practical, the fundamental and the economic phases. They are valuable books by thoroughly sound men of established reputations.

The Cost of Mining

By JAMES R. FINLAY

415 pages, 6x9, illustrated

$5.00 (21s.), net, postpaid

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover costs of mining **coal, iron, lead, zinc, copper, gold** and **silver.**

Contents: Value of Mining Property, Factors Governing Variations, Partial and Complete Costs. Statistics of Coal Production. Costs of Mining Coal. Cost of Mining Lake Superior Iron. Occurrence and Production of Copper. Lake Superior Amygdaloid Copper Mines. Conglomerate Copper Mines of Lake Superior. Copper Mines on Fissure Veins in Montana, Australia and Arizona. Various Copper Mines of Arizona and Mexico. Copper Mines in various other Districts. The Copper Mining Business in General. Lead. Silver-Lead Mining. The Cost of Silver-Lead Smelting. Zinc Mining. Occurrence and Production of Gold. Quartz-Pyrite Gold Mines. Cripple Creek. Kalgoorlie and Goldfield. Silver Mining at Cobalt and Guanajuato.

Principles of Mining

By H. C. HOOVER

200 pages, 6x9, illustrated

$2.50 (10/6), net, postpaid

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Part I deals fully with the determination of value, prospective and in sight—the sizing up of the mine—and in this Mr. Hoover's work has been extensive and highly successful.

Part II discusses the development of tunnels, shafts, crosscuts, etc., with chapters on mechanical equipment and efficiency.

Part III. Administration of mines with all the problems of labor efficiency, labor unions, wages, working costs, accounts, division of expenditure, etc.

The main chapter headings are: Valuation of Copper, Gold, Lead, Silver, Tin and Zinz Lode Mines. Mine Valuation. Development of Mines. Stoping. Methods of Supporting Excavation. Mechanical Equipment. Ratio of Output to the Mine. Administration. The Amount of Risk in Mining Investments.

Timbering and Mining

By W. H. STORMS

300 pages, 6x9, fully illustrated

$2.00 (8/6), net, postpaid

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Contents: Introduction. Timber Used in Mining. Preservation of Timbers. Drifting and Drift Sets. Driving Lagging in Drifting. Driving in Running Ground. Breast Boards. Structural Steel in Mine Workings. Timbering Drift Gravel Mines in California. Shafts. Location, Kind and Size of Shafts. Prospecting Shafts in Good Ground, and Those Requiring Close Timbering. Cribs and Single Compartment Shafts. Size and Division of Working Shafts. Drainage. Position of Temporary Hoisting Plant and Permanent Plant. Size of Shaft Compartments. The Collar. Hanging Belts. Cross Head in Sinking Shafts with a Bucket. Stull Methods in Many Small Mines of the Cobalt District, Ontario. Bucket Dumping at Vertical Shafts. Bucket Dumping at Inclined Shafts. Framing Shaft Timbers. Butt Corner and Dove-Tail Corner Methods. Framing for Vertical Shafts. Divider and Spliced Wall Plate. The Template. Placing Timbers of Shaft Sets in Position. Placing Timbers in Inclined Shafts. Lining the Sets. Difficulties in Sinking Through Running Ground. Sinking Through Running or Loose Ground. Combination Vertical and Inclined Shafts. Bearers in Shafts. Fenders for Protection of Shaft Timbers When Blasting. The Cable Mat. Extension Tracks for Sinking. Inverted Rails. Sinking Ladders.

We can supply any engineering book in print.

Book Department **Canadian Mining Journal**

Confederation Life Building, Toronto

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ackroyd & Best, Ltd xii
Allan, Whyte & Co. v
Asbestos Mfg. Co., Ltd.....outside B.C.
Astley, J. W. xix

B

Bateman & Brown..... xix
Beatty, M., & Sons, Ltd. ix
Bazzanger, Jacques & Co.....xi
Belliss & Morcom, Ltd i
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply..... xxvii
Behrend Concentrators Ltd..... xi
Brown A. H. xx
Bruce Peebles..... viii

C

Canada Metal Co..... xv
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Curtis & Harvey, Ltd.....xxiii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xxiii
Canadian Fairbanks Co. Ltd ... xviii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks....xxiv
C. L. Constant Co.....xviii

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus..... iv
Dominion Coal Co., Ltd. xiv
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables..... iv
Davis, John & Son..... xvi
Dessau's, S. Sons..... vii
Deloro Mining & Reduction Co...xxiv

E

Evans, J. W xix

F

Fleck, Alex., Ltd. xii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Ileys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C. xx
Laurie & Lamb i
Lymans Ltd..... xii
Link Belt Co. xi
Leckie, J. Edwards xx
Ledoux & Co. xx
The Lancashire Dynamo and Motor Co., Ltd..... xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxix
Nova Scotia, Province of.....xxvi
Nissen Stamps..... xviii

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros.....vi, vii, xvi
Patterson Mfg. Co. iii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co..... xii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,. Ltd xi

V

Vandeleur & Nichols..... viii

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Separating Co.....vii

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905. Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.
BRAUN'S Modern Laboratory Appliances.
WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

WANTED

A Nickle Mine. Give full particulars, price and commission.

Address W. D. B. care of Canadian Mining Journal, Toronto.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings (Diamond —
Montreal Steel Works, Limited
Peacock Bros.

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Peacock Bros.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

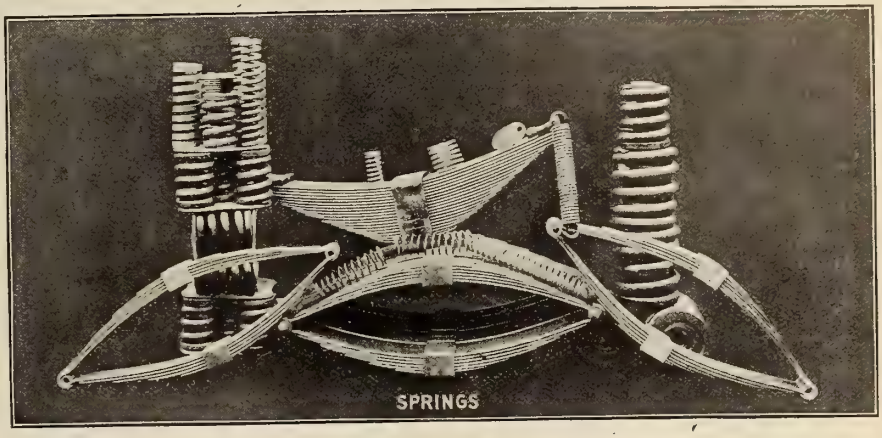
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

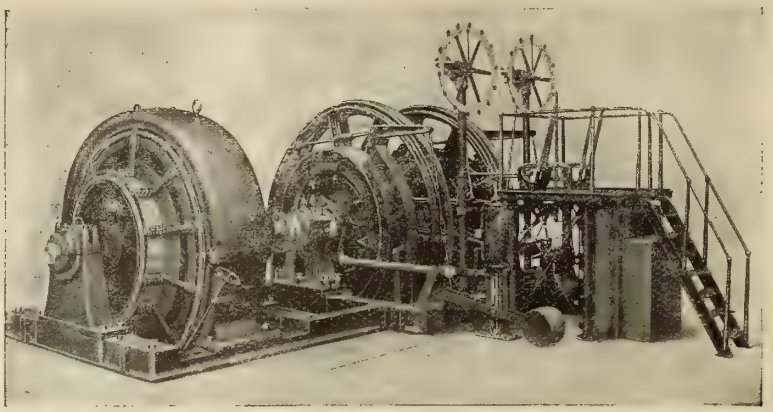
"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.



We illustrate the Hecla Mining Company's Hoisting Plant at Burke, Idaho, one of the largest of its kind and a good example of

The Westinghouse Equalizer Hoisting System

Some particulars of the installation follow:

The hoist motor is a Westinghouse 450 h. p., 600 Volt, 60 R.P.M. Direct-Current Motor, which obtains its power through a Westinghouse Fly-Wheel Motor—Generator Set, consisting of a 450 h.p., 2300 Volt. Type H. F. Induction Motor, a 30,000 lb. Fly Wheel and a 450 K. W., 600 Volt, Direct Current Generator. The normal duty of the hoist is 6,000 lbs unbalanced load; maximum speed 2,000 R.P.M. ultimate depth of shaft 2400 feet.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO. | For particulars address nearest office: HAMILTON. | 252 St. James Street, MONTREAL.

439 Pender Street, VANCOUVER. | Portage Ave. East, WINNIPEG. | 8th Street West, CALGARY | 92 Hollis Street, HALIFAX.

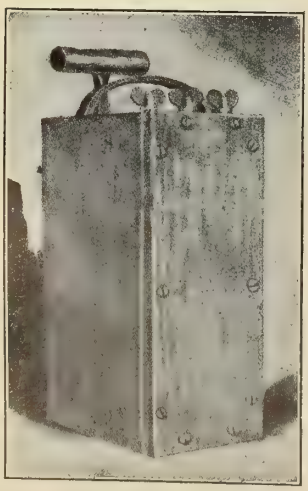
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines

Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

THIS TAN KHAKI DUCK SHIRT

$1.00

A great dollar's worth for Miners, Prospectors, Surveyors.



The kind of shirt that will turn a shower—you've seen them on sale time and again at $2.00, as these details will show you;—

Made from extra strong duck, double stitched throughout, with strong gussets, heavy yoke on shoulders, large long bodies, full sleeves with plenty of elbow-room, brass dome fasteners throughout, instead of buttons. Two pockets, with flaps and dome fasteners.

We've counted on a tremendous demand for this shirt and the quantities bought bring our price down to One Dollar.

N. B.—When ordering, be sure to ask for our "Dollar Invincible" shirt, and send 19 cents extra to cover postage. All sizes and half sizes from 14 to 18.

THE ROBERT SIMPSON COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

---

THE ASBESTOS MANUFACTURING COMPANY

LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

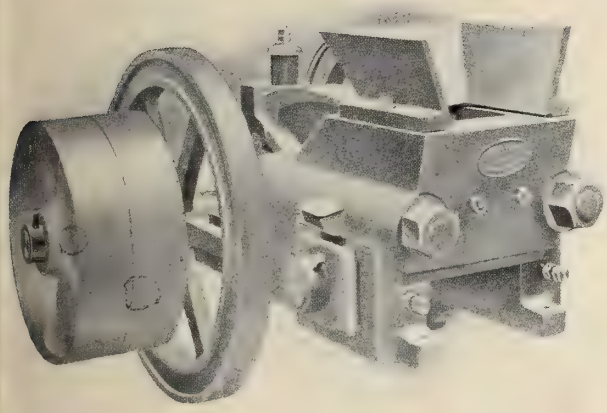
ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

L 31 TORONTO No. 8

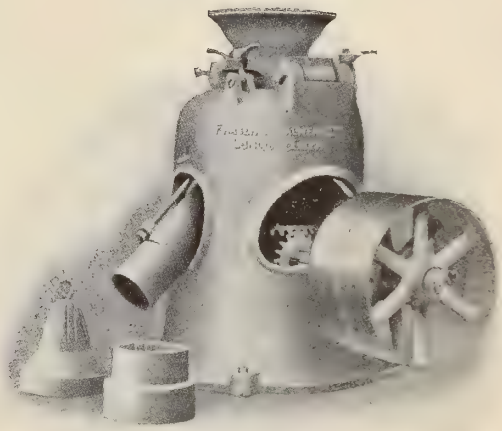


For Accurate Sampling

EVERY MINE, MILL AND SMELTER

Should Have a Small

CRUSHER AND SAMPLE GRINDER



We have both in stock with Manganese Steel Wearing Parts.

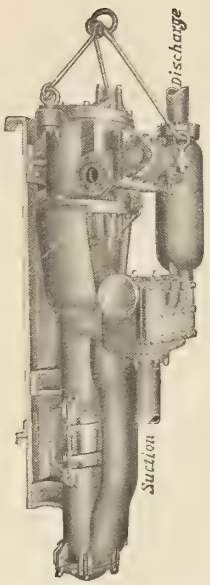
MUSSENS LIMITED

Head Office: MONTREAL

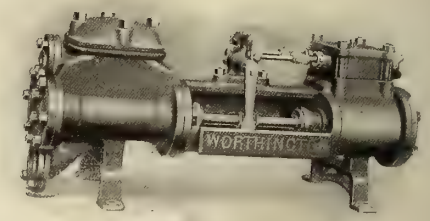
Branches { TORONTO, 73 Victoria Street
COBALT, opposite Right of Way Mine
WINNIPEG, 259-261 Stanley Street
VANCOUVER, Mercantile Bldg.
CALGARY, Crown Bldg.

PUMPS FOR MINES

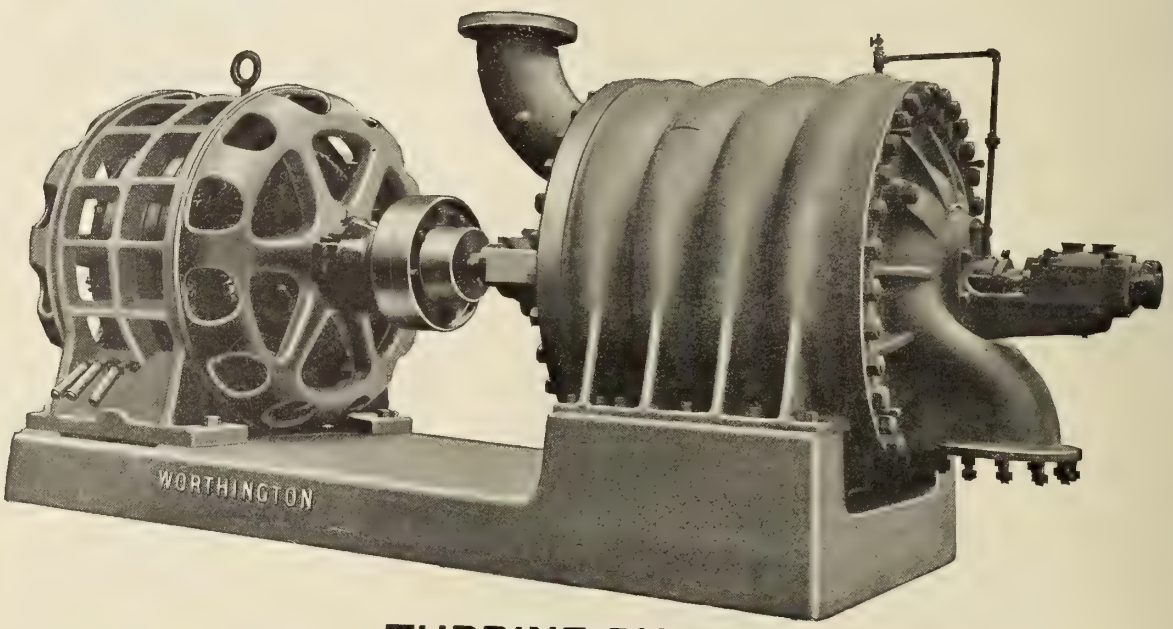
AND GENERAL SERVICE



VERTICAL SINKING PUMPS



BOILER FEED PUMPS



TURBINE PUMPS

The illustration shows a 4-stage 8-inch turbine pump, driven by a 300 h.p. induction motor, and having a capacity of 1200 Imperial gallons per minute against 500 ft. head. The pump is fitted with special chambers and impellers to resist the corroding effects of mine acids.

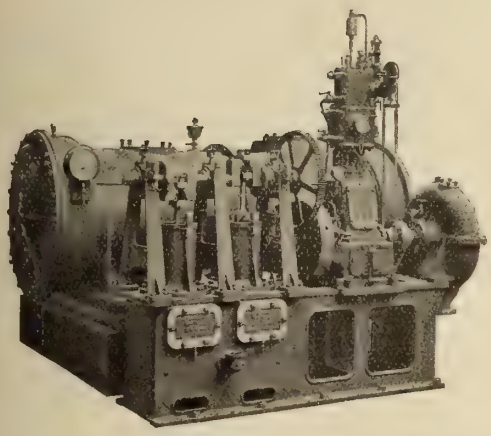
The John McDougall Caledonian Iron Works Co.

LIMITED

Works: Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

BELLISS & MORCOM, Limited

BIRMINGHAM, ENGLAND



BUILDERS OF

BELLISS ENGINES
CONDENSING PLANTS
AIR COMPRESSORS
BELLISS EXHAUST TURBINES

SOLE CANADIAN AGENTS

LAURIE & LAMB

Consulting and Contracting Engineers

BOARD OF TRADE BUILDING, - - - MONTREAL

Nova Scotia, Cobalt, British Columbia



"CLEVELAND" STOPE DRILLS are in use in every section because they give satisfaction, and do your stoping without any delays due to breakage or poor material.

A FEW EXCLUSIVE FEATURES:

Valve Chest on the outside. Automatic Oil Device. Easily taken apart or assembled. Small repair cost. Special Steel used for every part. Few parts. A removable wearing bushing in cylinder. Simple one-piece Chuck. No shank on Drill Steel. Exhaust straight down. No dust raised in close stopes.

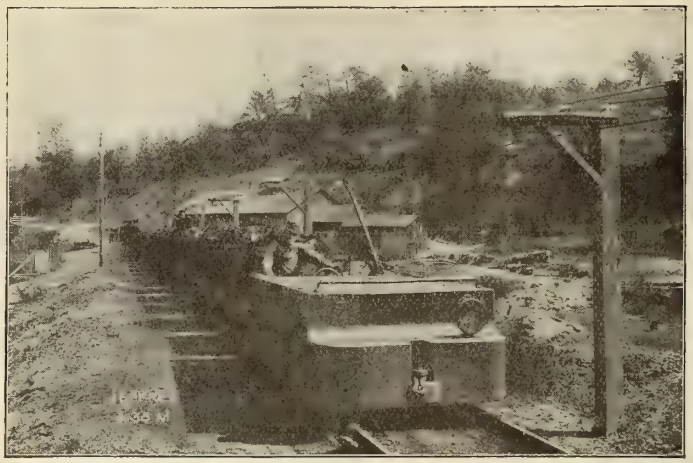


Write us for Bulletin 40-A

CANADIAN CLEVELAND DRILL CO.

LIMITED

P. O. Box 310, Cobalt, Ontario



JEFFREY

Electric Locomotives

Comparative cost of maintenance of Jeffrey locomotives with other locomotives has been made by a number of the largest users of electric locomotives in the United States resulting in the establishment of Jeffrey locomotives as standard equipment.

WE BUILD

Complete Coal Mine Equipments.

Electric and Air Power Coal Cutters and Drills, Car Hauls, Coal Washeries, Coal Tipples, Revolving and Shaking Screens, Elevating and Conveying Systems, Crushers, Ventilating Fans, Hoists, Pumps, Cages, Lorries, etc.

SEND FOR OUR GENERAL CATALOGUE 81

The Jeffrey Manufacturing Company

COLUMBUS, OHIO, U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance Street



Drill on Elevated Platform Working in a River.

FORSIGHT

is better than hindsight when applied to mine development, and less expensive.

This means testing your property with a Sullivan Diamond Core Drill, before you buy machinery or begin your shaft or tunnel.

A set of diamond drill cores will tell you where your values are, what they are and how you may reach them most quickly and economically.

Sullivan Diamond Drills are in stock for any capacity and any working conditions.

Catalogue 655

AIR COMPRESSORS ROCK DRILLS

COAL CUTTERS HOISTING ENGINES

SULLIVAN MACHINERY CO.

BIRMINGHAM
BUTTE
CLAREMONT, N.H.
DENVER
JOPLIN
KNOXVILLE
NEW YORK
PITTSBURG

RAILWAY EXCHANGE
CHICAGO, ILL.

PARIS, FRANCE
ROSSLAND
ST. LOUIS
SAN FRANCISCO
SALT LAKE
SEATTLE
SPOKANE

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

WILL END YOUR ROOFING TROUBLES



IF you will write to-day for a free sample of "Amatite" the end of your roofing troubles is in sight. After you have submitted it to every test that you can think of, you will be prepared to order it not only for your *new* buildings, but for your *old* roofs as well. You will find that it is cheaper to cover them with Amatite than to continue painting and repairing them.

We make a strong point of our "Free Sample" offer because the smallest sample of Amatite speaks for itself. It is more convincing than yards of talk.

There are all kinds of ready roofings on the market—so-called "rubber roofings," so-called "guarantee roofings," so-called "sand surface roofings."

The "rubber" roofings are no more made of rubber than a cow is made of saw-dust. The "guarantees" that are promiscuously handed out with many brands are hedged around with so many provisos that it will take three lawyers to dissect them and find out what they are all about. The "sand surface" has little or no protective value.

The point to remember is that all of these roofings have to be *painted* every year or two to keep them tight. In other words, it is the *paint* that protects and not the roofing.

You can lay Amatite on a roof and then forget all about your roofing troubles. *No painting, no coating, no worry.* The man who puts Amatitite on his buildings is insured against leaks and trouble for many years.

FREE SAMPLE

Send for sample and booklet to-day. The sample tells its own story: the booklet is written for practical men.

Address our nearest office.

PATERSON MANUFACTURING COMPANY, LIMITED,
TORONTO MONTREAL WINNIPEG VANCOUVER



MC 22
TELESCOPE FEED
HAMMER DRILLS

MA 13
PLUG DRILLER



The best type of drill is the one which has the most behind it in the way of knowledge, experience and record of practical success.

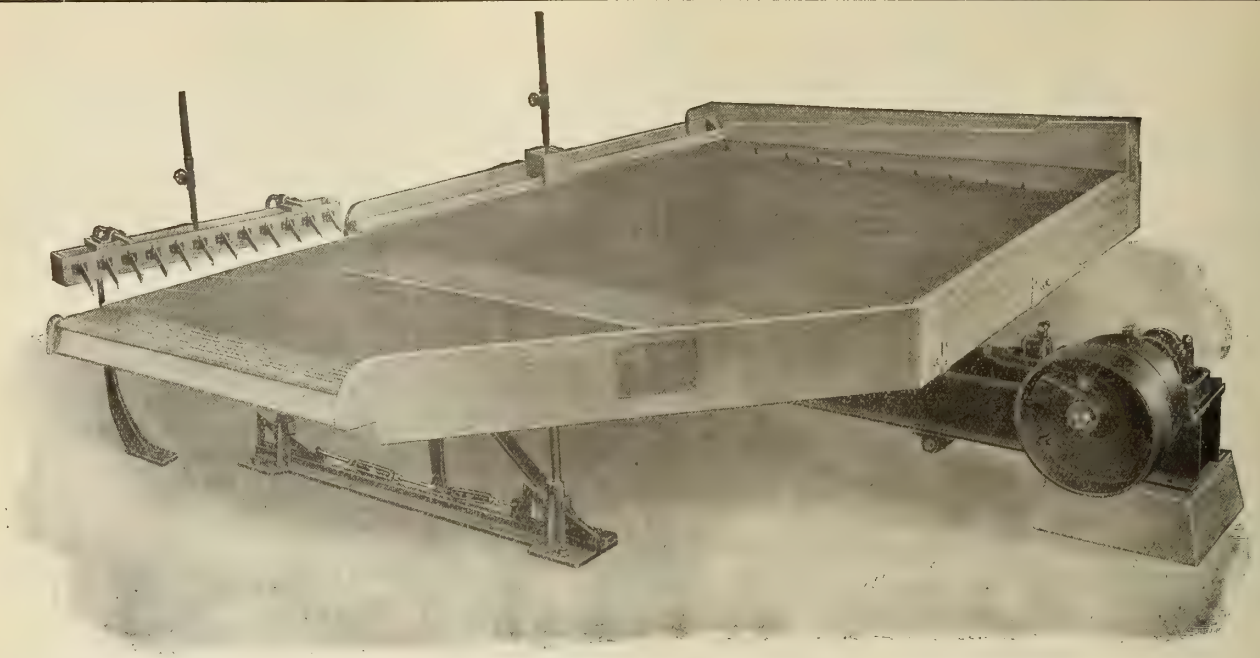
RAND DRILLS of every type represent the widest experience, the best design, the best methods of production, the longest uninterrupted record of success.

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS



Comparative Tests Show That The Improved No. 3 Diester Slime Table

makes closer savings from fines and slimes than vanners. We are installing additional tables in the Strattons Independence Mill at Victor, Colo., as the result of a trial of *one* table.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

THE CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

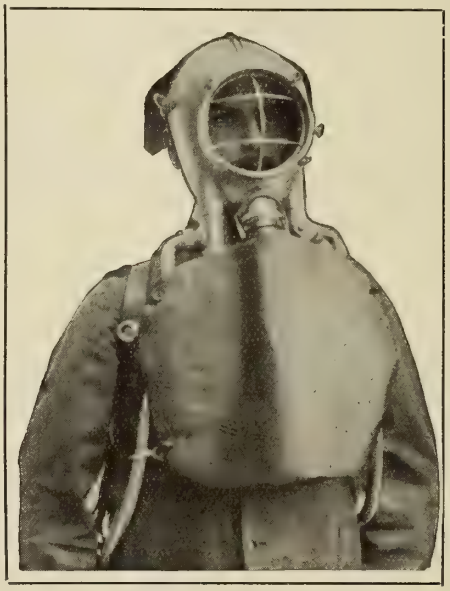
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

Austria-Hungary	French Cochin-China Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

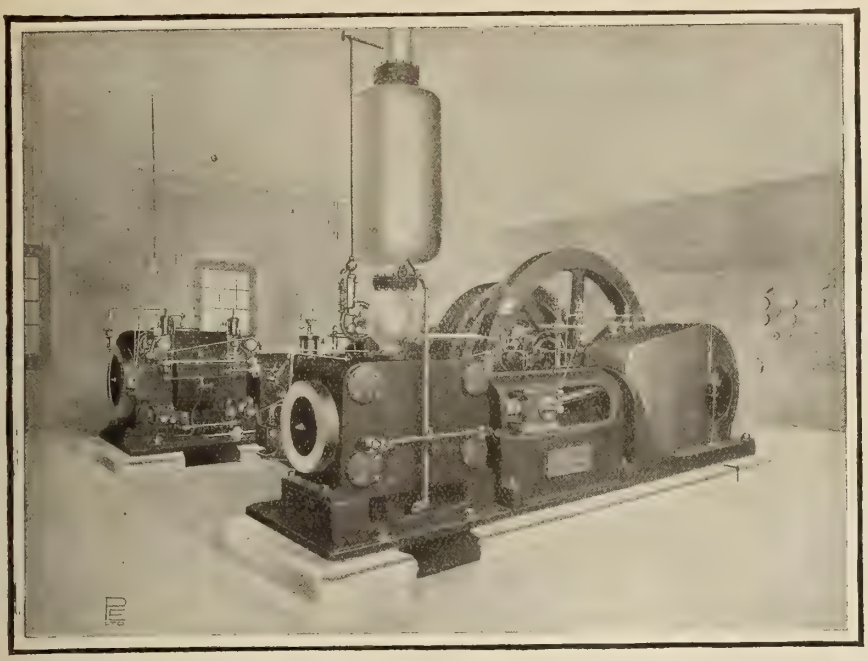
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English,
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE



POWER PLANTS
FOR
MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS
Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

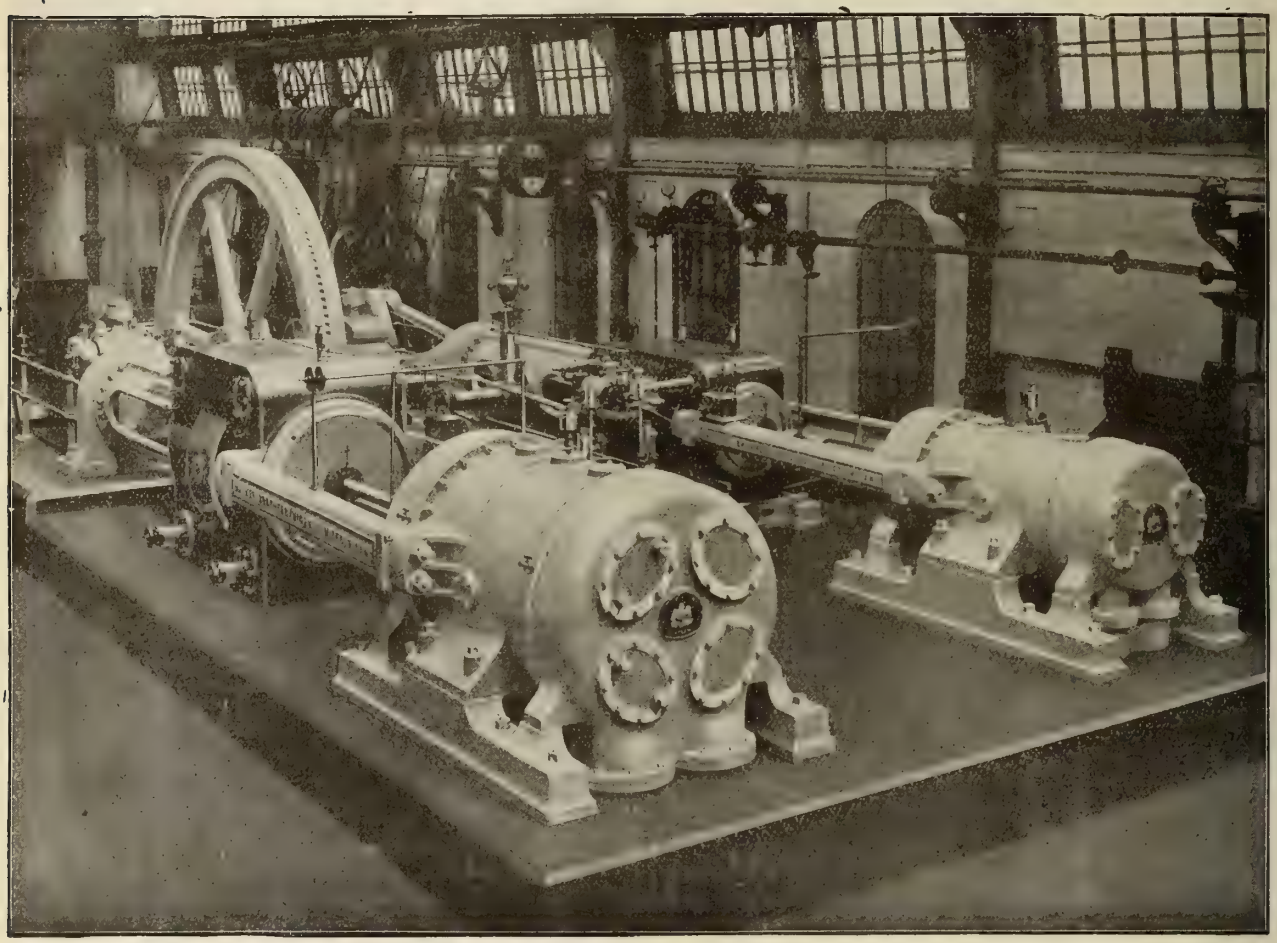
Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

Walker Brothers (Wigan) Limited

Wigan, England



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

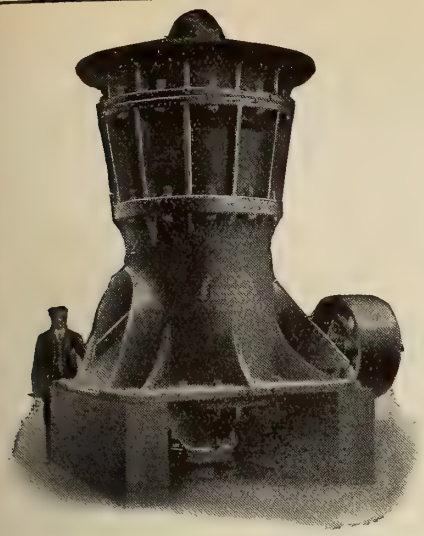
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jacks Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President

C. A. MACPHERSON, Sec-Treas.

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

We personally break all our carbons

Goods sent on approval for selection

CARBONS
Black Diamonds)
and BORTZ for
DIAMOND DRILLS



S. DESSAU'S SONS
Importers
180 B. Broadway,
N. Y.

Carbon for all mechanical purposes

Bortz for all mechanical purposes

GREENINGS

ROPE FITTINGS — ROPE GREASE

The safest and most reliable wire rope on the market is Greening's. The wire we use is imported directly from the world's best sources of supply and is subjected to a complete set of the severest tests.
We are always prepared to ship staple sizes from our large stock. At the same time our manufacturing facilities are so well organized and complete that we can arrange unusually prompt shipment of special ropes of all kinds.

The B. GREENING WIRE CO., Limited

HAMILTON, ONT. — MONTREAL, CAN.

WIRE ROPE

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

ANNOUNCEMENT

BRUCE PEEBLES

EDINBURGH & COMPANY, LIMITED - - SCOTLAND

are now represented in

CANADA

by

VANDELEUR AND NICHOLS

DINEEN BLDG., - - - TORONTO

SPECIALTIES:

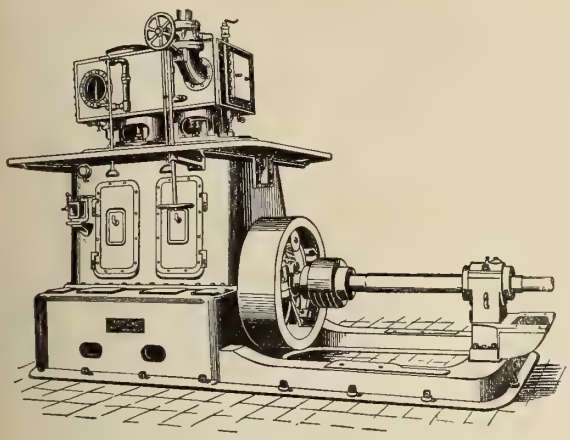
DIRECT and ALTERNATING CURRENT.
DYNAMOS and MOTORS for all Conditions of Service.
PEEBLES-LACOUR MOTOR CONVERTERS.
STEAM TURBO ALTERNATORS. TRACTION MOTORS.

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines

Cost Nothing For Repairs



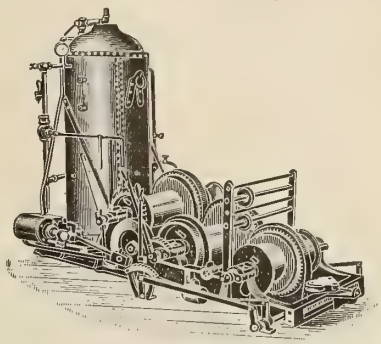
A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 435 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que. R. W. Robb, Manager
Traders Bank Building, Toronto, - - Wm. McKay, "
Union Bank Building, Winnipeg, - - W. F. Porter, "
609 Grain Exchange Building, Calgary, Alta. J. F. Porter "

M. Beatty & Sons
Limited
Welland, Ontario
MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.
Sole Canadian Maker Williams "Faivrette" Clams
Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.
BRIDGES
TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds
BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

We are Headquarters for
PIG METALS
Immediate Shipments
Large Stock, Low Prices
THE CANADA METAL CO., LIMITED, - TORONTO



LEAD
COPPER
ANTIMONY
TIN

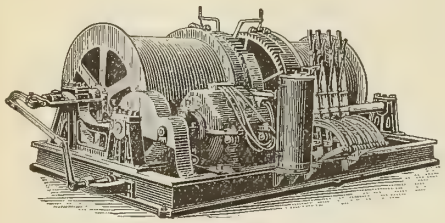
When answering Advertisements please mention THE CANADIAN MINING JOURNAL

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

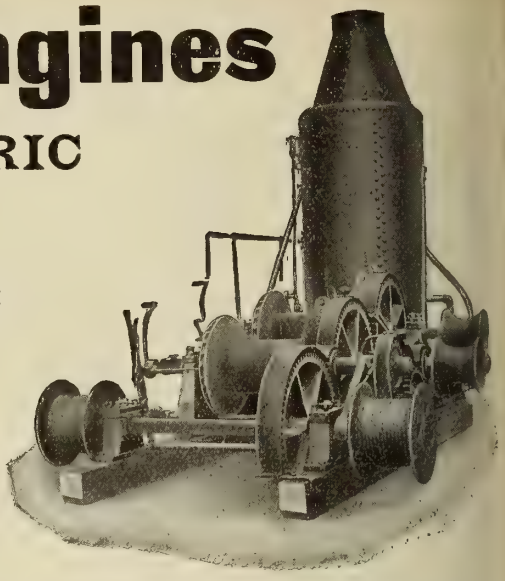
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 a.m to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

CANADIAN PACIFIC

CANADA'S GREATEST RAILWAY

Peterboro
Ottawa
Montreal
Quebec
St. John
Halifax

9.02 a.m.
10.00 p.m.

CANADIAN PACIFIC RAILWAY

LEAVES TORONTO FOR

Galt
London
Chatham
Windsor
Detroit
Chicago

8.00 a.m.
4.00 p.m.
7.20 p.m.

Connections Are Made for Points on Branch Lines

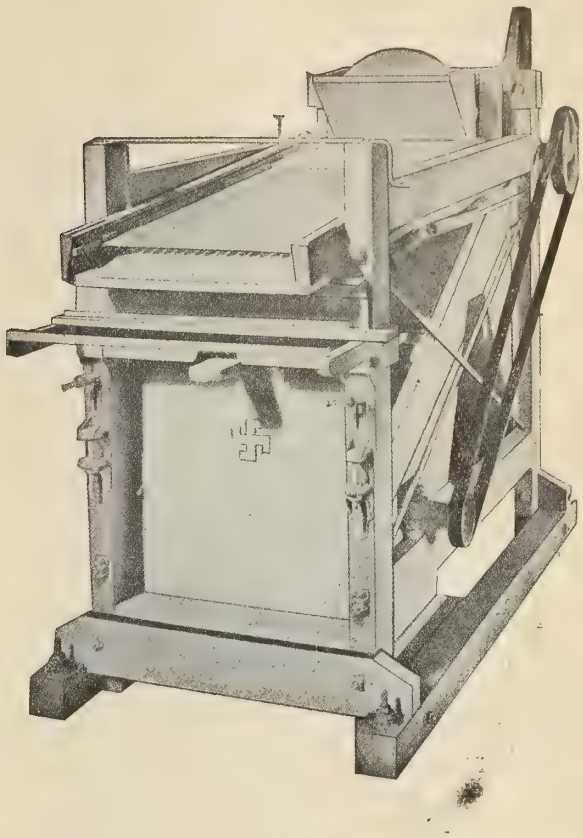
Behrend Concentration System

Combination WET and DRY

A complete recovery from all slimes and minerals such as Graphite, Galena, Stibnite, Chalcopyrite, Tetrahedrite, Sylvanite, Molybdenite, Stephanite, Argentite, Ruby Silver and and Native Silver.

This system will make low grade deposits pay. Every mine having an eye to business should investigate this system which has the approval of leading mining authorities.

A completely equipped plant, including concentrators, crushers, rolls, etc., for testing purposes is located at address below. Forward a sample of your ore for preliminary test.



Behrend Concentrators, Limited

48 Inspector Street, Montreal



Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scrantan, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

The Davis Handbook

OF THE

Cobalt Silver District

By H. P DAVIS.

ILLUSTRATED WITH PHOTOGRAPHS

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 PAPER COVER $2.00 STIFF COVER

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

TO BE SEEN AND OBTAINED AT THE OFFICES OF THIS PAPER.

NOW READY

Published February 9th. ***Twenty-fourth Year.***

Containing all the latest information up to within a few days of publication.

THE

MINING MANUAL

1910

BY WALTER R. SKINNER.

The Standard Reference Work on Mines.

Price 17/- net Post Free (Abroad).

1,600 pages. In demy 8vo, handsomely bound in RED cloth.

A record of information concerning

MINING COMPANIES

(Gold, Diamond, Silver, Copper, Tin, Iron, and other Mines, Collieries, Land, Exploration and Mining Investment Concerns, &c.)

Arranged in three sections—

Australasian, African, Miscellaneous,

Preceded by Tables of Crushings and followed by lists of Mining

DIRECTORS, SECRETARIES, MINING and CONSULTING ENGINEERS and MINE MANAGERS.

Their Names, Addresses, and Descriptions, and Names of the Companies with which they are connected, and a

DICTIONARY OF MINING AND OTHER TERMS.

THE MINING MANUAL for 1910 contains particulars of over 3,600 Companies arranged in three sections, 430 Companies being AUSTRALASIAN (including Western Australia, Queensland, Broken Hill, Deep Leads, New Zealand and Tasmania); 1,030 AFRICAN (including Transvaal, Rhodesia ,West Africa, Cape Colony, Natal, Egypt); and 2,140 MISCELLANEOUS (including Siberia, Mexico, India, British Columbia, America, &c., and the Coal, Iron, Tin and other Mining concerns of the United Kingdom). The particulars given of each Company include the Directors and other officials; date of establishment; seat of operations; description of the property, with the purchase consideration; plant erected or in course of erection; present working results; ore reverses; details of capital; calls; dividends paid; and the financial position as disclosed by the accounts. Highest and lowest prices of the shares for the last four years, also latest price. The three sections extend over 1,100 pages,

Crushing tables and Gold Outputs from the principal mines are given at the commencement of the volume, showing tons treated monthly, results obtained, and yield per ton; also annual yields.

The Lists of Directors (8,000), Secretaries (1,900, Mining and Consulting Engineers and Mine Managers (1,400) include their addresses and descriptions and names of the Companies with which they are connected.

A complete Alphabetical Index, containing the names of 5,300 Companies and including many useful items of reference, occupies 42 pages.

Full particulars of all Re-constructions, Re-organisations and Amalgamations during 1909 are given in a simple and concise form.

LONDON:

WALTER R. SKINNER, 11-12, Clements Lane, Lombard St. E.C.

Nat. Tel.: 1323 Avenue. Tel. Address: Capitalist, London.

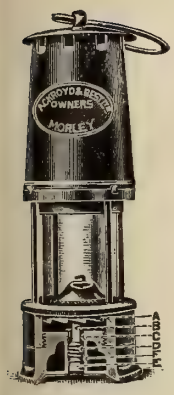
ACKROYD & BEST, LTD.

MORLEY, ENGLAND

CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.



Safety Lamps

Burns oil (flash point over 250°F). Electrically ignited. Platinum not used. Fitted with spring oil filling valve, and with Hailwood's Magnetic Lock.

Lamp Cleaning Machines
Safety Underground Re-lighting Machines, Lamp Glasses, Gauzes, Etc.

LYMANS, LIMITED

HEADQUARTERS FOR LABORATORY APPARATUS AND CHEMICALS.

ST. PAUL STREET, MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

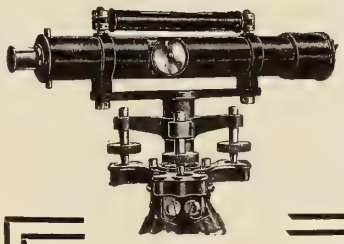
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



DUMPY (SURVEYING) LEVELS

BEST DUMPY LEVELS, with powerful telescope, having large object glass, three levelling screws, and improved locking plate. In mahogany case, and with round Tripod Stand.

The first level to be made with stage and parallel plates in one piece. Extra large centres carefully ground ensure accuracy and resist wear. This is "The Level that will last the longest."

Catalogue F. on request.

Joseph Casartelli & Son,

Scientific Instrument Makers,
43 Market Street,
Manchester, Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co , Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MIMERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1.00.**

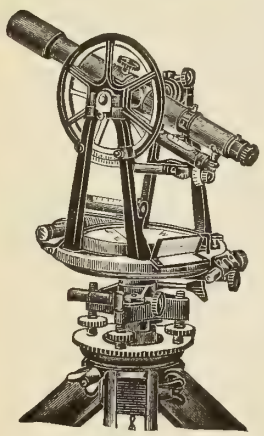
DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **1.50** paper cover, **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of those books in their library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196

Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical and Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

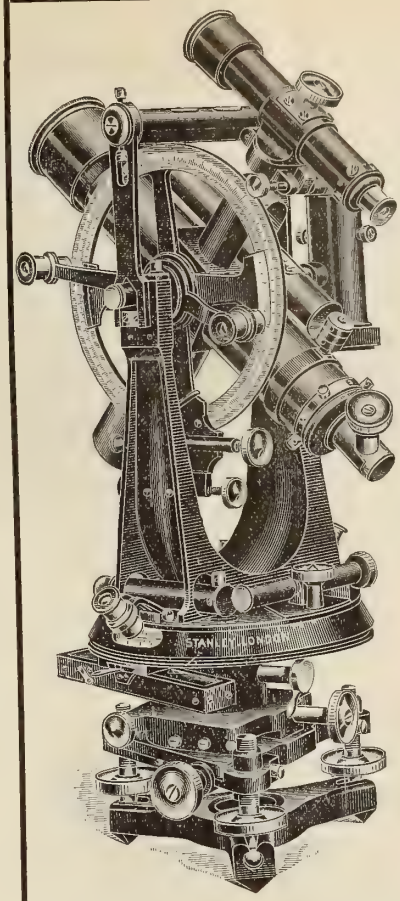
Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.



DUNBAR-SCOTT AUXILIARY TOP AND SIDE TELESCOPE—REQUIRES NO CORRECTION FOR ECCENTRICITY

TRADE STANLEY MARK

W. F. STANLEY & Co., Limited

Great Turnstile, London, ENGLAND

THE
Bennett Fuse

Crown  **Brand**

MANUFACTURED BY

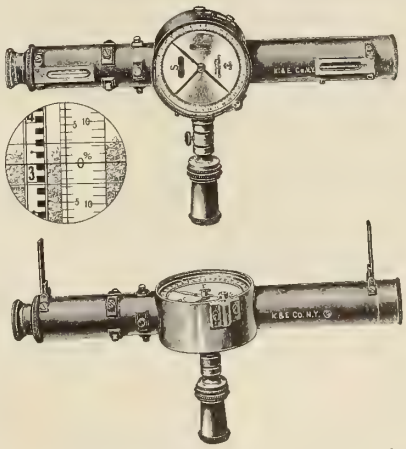
William Bennett, Sons & Co.
CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.
VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION.

An Ideal Instrument
For Preliminary Surveying



THE STADIA HAND TRANSIT

The Stadia Hand Transit gives more accurate and quicker results than any similar portable instrument. It is thoroughly well made and will meet the requirements of those who are engaged on preliminary work, or on the subdivision of larger surveys made with a regular transit.

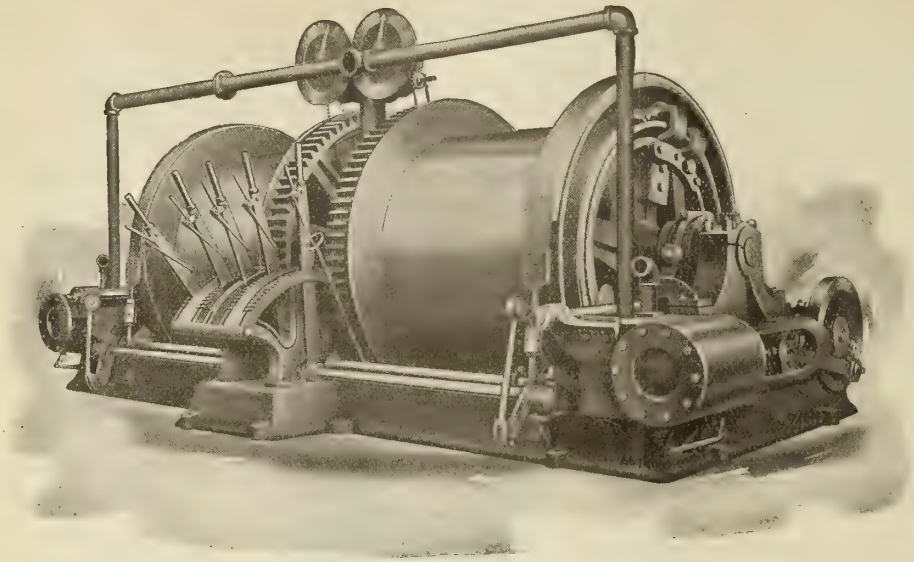
In measuring vertical angles, the sighted point and both scale readings (slopes and degrees) appear together in the field of view (see cut.)

Compass bearings can be taken by use of the telescope on level ground or by the folding sights on sloping ground.

Send for complete (550-page) Catalogue.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.

New York, Chicago, St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes



When desired we equip our winding Engines in the larger sizes with the Lane Friction.

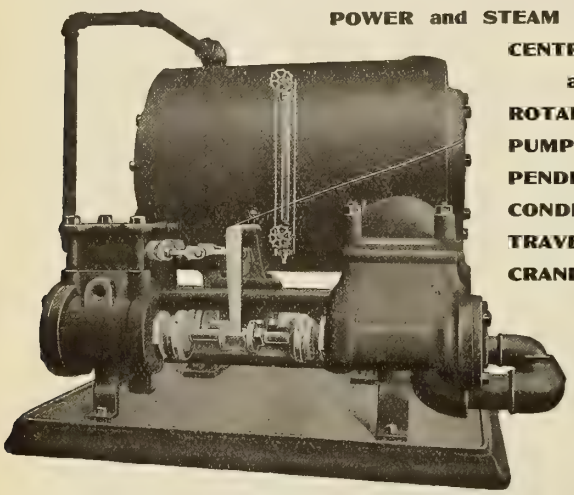
This device possesses great strength and adapts a Hoist to the heaviest class of work.

WE STOCK THE SMALL SIZES.

ARE YOU INTERESTED

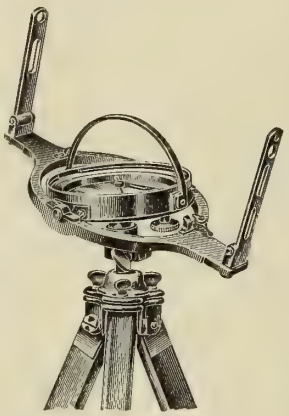
The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.



POWER and STEAM PUMPS, CENTRIFUGAL and ROTARY PUMPS, INDEPENDENT JET CONDENSERS, TRAVELLING CRANES, ETC.

THE SMART TURNER MACHINE CO., LIMITED, HAMILTON, CANADA.



DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 BEAVER HALL HILL, - MONTREAL

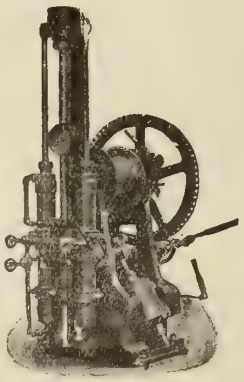
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN
HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, April 15, 1910 No. 8

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 225
(a) The Ontario Public School Text-Books 225
(b) The Springhill Situation 226
(c) A Protest from Cobalt 226
(d) The Davis Handbook of the Cobalt Silver District 227
(e) Editorial Notes 227
Notes on Portland Canal Mining District, B.C. by Wm. W. Rush 228
Canadian Iron and Steel. By Watson Griffin 231
The Use of Coke-Oven Gas as Fuel 234
Mining and Smelting Conditions in British Columbia 236
Our London Letter 240
Statement by Temiskaming Mine Managers' Association .. 241
Canadian Mining Institute 242
Personal and General 242
Working Cost Production 242
The Fixation of Atmospheric Nitrogen and the Food Supply. Leo Frank Guttmann 243
New Mine Telephones 245
Correspondence 246
Special Correspondence 247
General Mining News 249
Mining News of the World 250
Company Notes 252
Statistics and Returns 255

THE ONTARIO PUBLIC SCHOOL TEXT BOOKS.

A small storm is raging in Ontario educational circles. Our readers will remember that eight months ago we alluded editorially to the fact that "the new Ontario Readers, excellent though they be in many regards, still conform to the outworn and artificial standards of thirty years ago. While they are probably the best school books that we have yet seen, still they fall very far short of what they should and could be." In general our editorial dwelt upon the evident paucity of descriptive and informational matter pertaining to Canada. We emphasized particularly the absence of any allusion to the industrial life of this country, and pointed out that the books contained not one reading concerning such an important industry as mining.

These animadversions the compilers answered by claiming that the school books were intended to be "inspirational" and not "informational." In this argument we can see little sense. Children derive inspiration of the proper kind from information interestingly presented. Canadian children should know something about Canada, about our forests, mines, farms, and industries. And knowledge of these things need not be acquired through pages of statistics, nor through dry didactic dissertation. In the discovery and exploitation of our mining regions, for instance, there has been developed much true romance. What could be more "inspirational" than the story of Silver Islet, or of the early labours of Canadian geologists, or the thousand and one incidents of pioneer life connected with the history of mining all over Canada! Surely it is well for the Canadian child to learn something of what Canadian citizenship means. The one crying need that faces our nation to-day is the evolution of a new brand of Canadianism. It strikes us as being rather piffling to prescribe large doses of conventional and hackneyed literature to "inspire" the rising generation.

We notice that the teachers of Ontario have given expression to their disapproval of the new books. They, and other critics, have not been answered by the Department of Education. The sole (and quite inadequate) response has come in the shape of a characteristic explosion from the impetuous Sir James Whitney. In the absence, through illness, of the Hon. Dr. Pyne, Sir James occupied the position of Minister of Education. When asked for his opinion concerning the aspersions cast upon the new books, Sir James erected himself into a volcano. This, while interesting, is not instructive. Neither is it inspiring. Vesuvius and other established centres of volcanic activity can do the trick far better.

Meanwhile we shall reiterate our former opinion to the effect that there will always be something lacking in

school books that teach the child nothing about the country in which all of us live and move and have our being.

THE SPRINGHILL SITUATION.

If we remember correctly, the number of strikes that have occurred at the Springhill collieries of the Cumberland Coal and Railway Company approximate roughly twenty-three in the last score of years. During this period the collieries have been under the management of one person.

The present strike, declared some eight months ago, had for its ostensible cause the refusal on the part of the management to recognize the U. M. W. A. In this instance the management has our entire sympathy. We believe that official recognition of the U. M. W. A. would be inimical to the interests of mining in Nova Scotia. Nevertheless we cannot but be impressed by the fact that the miners of Springhill, good and responsible citizens, have readily accepted this as a bone of contention.

Strikes are costly luxuries. They are the most wasteful means devised by man for settling industrial disputes quite irrespective of the merits of the questions involved. Moreover, strikes are distinctly bad business. Their occurrence generally argues a sad lack of tact and foresight on the part of the management. Generally also it may be safely said that the employees make unreasonable demands. But it is hard to imagine that the men are uniformly to blame. In the case of Springhill we are inclined to believe that the management is at least equally to blame. Under Manager Cowans' administration strikes have been the order of the day. Nowhere else in Canadian mining districts have industrial disturbances occurred with such regularity. We must therefore conclude that the present management is not free from blame. In fact, we can go further and state our conviction that in other hands the Springhill collieries would have been producing peacefully to-day.

We are unqualifiedly opposed to the pretensions of the U. M. W. A. This attitude, however, cannot prevent us from recognizing the failings of employers. In short, we can see nothing that can sufficiently justify the unenviable record of the Springhill collieries during the regime of the present management.

A PROTEST FROM COBALT.

The Canadian Mining Journal voiced the first protest against the inaccurate statements issued by the Conservation Commission regarding the fatality rate in Cobalt mines. Later the Canadian Mining Institute passed a resolution correcting these inaccuracies. One more protest, this time from the Temiskaming Mine Managers' Association, appears on another page of this issue of the Journal.

In an editorial published on February 15th, we referred thus to Mr. Sifton's speech:—

"In his exceptionally forceful address, delivered at Ottawa on January 18th, Mr. Sifton covered a great deal of ground. . . . Mr. Sifton made certain specific references to mining and minerals. Several of these are absolutely incorrect, one or two are absurdly wrong, and others are tinctured with error. Before discussing these in detail, it is well to state that we are perfectly in accord with the spirit that pervades Mr. Sifton's address. It is obvious, however, that in facts and figures relating to mining some one has been leading him very much astray. For various good reasons, including strong internal evidence, we believe that Dr. Haanel is responsible."

The protest of the Temiskaming Mine Managers' Association deals with an article written by Dr. Haanel, and published in the February number of "Industrial Canada." In the course of the article Dr. Haanel uses precisely the same figures that were used by Mr. Sifton, and makes the same disparaging remarks concerning Canadian metallurgical practice. And, as pointed out in the Association's protest, he has made no formal correction of these inexcusable misstatements, although their erroneousness has been brought to his notice, not once, but many times.

It is appropriate here to remark that ample and prompt apology should be demanded of Dr. Haanel as Director of the Mines Branch. Gratuitous criticisms from a public official are offensive enough; but when those criticisms are based upon inaccurate information and are spread broadcast over the country, they constitute a grave breach of decorum. In the words of the Temiskaming Mine Managers' Association, the episode "has done much to undermine the faith of mining men in its statistics and suggestions." This is literally true. How can the public be expected to place confidence in a department whose official head is permitted, without rebuke from his Minister, to discredit Canadian mining and metallurgical practice!

We are sincerely glad to have the entirely unsolicited support of the Cobalt mine managers. Our own earlier remarks concerning Dr. Haanel were written only after mature deliberation. That these remarks were not uncalled-for is now sufficiently evident.

Before leaving this painful subject we must take exception to one paragraph in the "Statement of the Temiskaming Mine Managers' Association." While we have every reason to believe that good results are now being obtained at Copper Cliff, Thorold, and Deloro, yet we cannot accept this as proving that present processes for treating cobalt-silver ores are not susceptible of material improvement. There is nothing final in metallurgy. Improvements are being made weekly and daily. Radical changes may be introduced at any time. But these changes and improvements can only be arrived at by experienced specialists. The Mines Branch will meet with nothing but encouragement and support in any sane efforts that it makes in furthering this branch of metallurgy. On the other hand, the Mines Branch will irrevocably lose its usefulness if its official head is per

mitted to disparage the work of men who are infinitely his superiors in technical attainments.

Incidentally, it may be well to refer to a letter, signed by Mr. Louis Simpson, that appeared without comment in our issue of April 1st. This letter illustrates admirably the evil effects that have followed Dr. Haanel's unwise strictures. Otherwise the letter calls for no special comment.

In closing we wish to state that we regret profoundly that it ever became necessary for us to attack the Mines Branch. That department is capable of good work, if it followed the footsteps of the corresponding branch of the United States Geological Survey. But as long as its energies are in any degree devoted to anything but furthering the interests of mining, just so long will the Mines Branch be a menace to the mining industry of Canada.

THE DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT.

After many delays, occasioned largely by difficulty in obtaining the latest data as to each incorporated company, "The Davis Handbook of the Cobalt Silver District" has made its appearance.

Heretofore it has been a singularly arduous matter to secure without unreasonable loss of time full facts bearing upon the capitalization, directorate, management, equipment, and financial standing of any given Cobalt company. In the "Davis Handbook" all these data are set forth. Complete statistics of dividends paid, ore outputs, etc., are given in tabular form. Also, a list, corrected up to date, of all Cobalt incorporations is presented.

We know that for our own use Mr. Davis' book will prove a blessing. We believe that to Canadian and foreign investors and professional men it will be a time-saver. More especially will the overworked editor, to whom everyone looks for information, rise up and call the book blessed.

It is worthy of remark that this is the first attempt to gather into one volume all necessary facts concerning Cobalt. The Davis Handbook is the crystallized result of several years of hard work. As such it deserves the support of all interested in Canadian mining.

EDITORIAL NOTES.

The Willett Cobalt Silver Mines, Limited, is a recent incorporation. In the literature published by that company statements are made to the effect that native silver discoveries of some importance have been made on their claims. We are informed, from reliable sources, that no silver discoveries have been made on these claims. This kind of superfluous bad faith is too common. It is high time that the laws bearing on such misdemeanours were made automatic.

Many guesses have been made as to the actual motives that incited the Forget-Osler group to put up such a costly fight for control of the Nova Scotia Steel & Coal Company. In the fullness of time, no doubt, the inside history will leak out. Meanwhile the old directorate has been stirred into a state of unnatural activity.

In Great Britain the violent craze for shares in rubber companies continues unabated. The ordinarily phlegmatic Britisher is capable of wild indiscretion when once he has made up his mind to speculate. An English contemporary, after gathering statistics concerning the leading rubber properties, calculates that on nominal capital the average value of each rubber tree is only £0.31, whilst at the present market valuation the value is inflated to £2.09.

"Dr." Hugo Von Hagen, to whom we paid some attention last year, has placed his mining enterprises in the hands of a receiver. Von Hagen's action against the Colliery Guardian, of London, England, has been dismissed. The worthy Von Hagen failed to deposit security for costs. It is high time for this fakir to be placed under lock and key.

According to the annual report the Dominion Coal Company's net earnings during 1909 were $1,113,091.09. Total dividends paid amounted to $810,000. The carry-forward was $394,419.42. It may be noted that the net earnings during 1908 were $2,686,202.

Granby directors announced on April 5th that, in view of unfavourable reports being circulated regarding the condition of the Granby Mines, they have decided to engage competent mining engineers to examine and report exhaustively upon the properties. The examination will cover several months.

Available silver reserves in Bombay are reported to be much reduced. General trade is so flourishing in India that it is believed that the Indian Government will shortly make large purchases of silver for coinage.

The perennial rumour of the discovery of coal in Northern Ontario is now going the rounds. We notice that the finds are always announced when the snow is still on the ground. Yet, in the present case there appears to be more than ordinary hope. The seam of lignite that has been discovered shows an excellent analysis and a very respectable thickness. Therefore, in the absence of full facts, it is only just to say that the new discovery may mean much to the Province of Ontario.

NOTES ON PORTLAND CANAL MINING DISTRICT, B.C.

Written for the Canadian Mining Journal by William W. Rush.

The Bear River Mining district, situated at the head of Portland Canal, B. C. occupies a strip of land about 25 miles long by 5 wide, drained by Bear River. The country is rugged and but for its proximity to tidewater would be difficult of access. The Bear River bars afford a natural highway into the heart of the district, and the Provincial Government has been generous in the matter of roads and trails. A 50 foot roadway has been cleared and partially graded for twelve miles up Bear River with tributary horse trails into the hills. Bear River has been spanned by a 1400 foot bridge and a dock has been built at Stewart, the port and distributing point for the district. A railroad and extensive additions to the systems of roads and trails are assured for the coming season.



George E, Tunnel—Glacier Creek Mining Co

The recurrent psychological phenomenon known and vituperated as the "mining boom" was responsible for the beginnings of the camp as it is for the latest phase in its development. It was the Klondike excitement of .98 which attracted gold seekers to the Canal to look for placer diggings at the head of Bear River and Naas. Their search was unsuccessful, but the presence of base metals was noted, and as a result of their explorations the first lode claims of the district were staked—the "Roosevelt" in 1899, and the "Stewart" property on American Creek in 1902. The fame of these discoveries and the explorations carried on by M. K. Rodgers and associates, attracted numerous other prospectors to the district and in 1905 important discoveries were made on Glacier Creek.

The district lies on the eastern flank of the Coast Range granites and the mineral deposits occur for the most part in slates, quartzites and silicous limestones (or argillites). These rocks are often schistose but the schistosity is not so general or so marked as on the western flank of the granite. Diabase and other ig-

neous rocks occur but their relation to the ore bodies has not been determined. As the proximity of the Coast Range intrusives would suggest, the metamorphism of the sedimentaries is universal. No fossils have been found.

Discoveries made thus far indicate that the predominate products of the district will be silver and lead, but deposits of gold and copper are also found. The



Miner's Cabin.

most notable exception to the ordinary type of deposit is the "Red-Cliff" on American Creek, a large irregular deposit of iron and copper-iron sulphides with primary gold values. The Red Creek Mining Company after proving the existence of a large ore body is at present engaged in driving a long crosscut at a low level to work as a working adit. A compressor and machine drills are being installed. A very promising cop-



Bridge on Bear River.

per prospect is found on M. K. Rodgers' Northern Belle claims situated on the Middle Fork of Glacier Creek. Other copper locations have been made near the head of Bear River but little developement work has been done.

Five miles above the "Red Cliff" on American Creek lies the Stewart property to which previous reference has been made. The mineral deposits on these claims have been described as a succession of sheer zones. At the tunnel the stains of copper carbonate and the absence of pyrite and limonite are conspicuous features . The mineralization consists of galena and other argentiferous sulphides in a quartz gangue. High silver values are reported. This property has attracted much attention among mining men for a number of years. A company financed by D. D. Mann and associates, of Toronto, will begin its exploitation next summer.

But by far the greatest amount of prospecting and developement work has been done on Glacier Creek. In this section the Portland Canal Mining Co. has opened up a strong vein following the formation along the contact between a sill of porphyry and the slate. The dip is southwest from 20° to 40°. Development has been progressing for several years on this property and there is a large quantity of ore blocked out and



Tunnel on Sunbeam Claim—Stewart Mining and Development Co.

ready for stoping. A mill and aerial tramway are in course of construction. The same vein or vein zone has been traced from the "Jumbo" and "Eurus" on the southeast to the works of the Stewart Mining and Development Co. on the northwest, a distance of 3 miles. On the latter property three parallel veins outcrop at an altitude of about 1100 feet. A tunnel is being driven on the "George E" to crosscut these veins at a depth of 180 feet. Two of the veins have been encountered thus far. The mineralization along this vein zone consists of galena, pyrite, zinc blende, argentite and native silver in a gangue of quartz and brecciated slate. Parallel blanket veins in similar geologic conditions and with similar minerals and gangue occur over a considerable area.

On the Middle Fork of Glacier Creek a series of veins occur that cut the formation at varying angles and dip vertically or nearly so. The usual vein minerals are galena, blende, pyrite, arsenopyrite, stibnite, and grey copper in a gangue of barite, quartz and sericitized rock. The Columbia-Evening Sun vein is a conspicuous example of this class. The Excelsior-Eagle

vein has a similar strike and identical vein minerals. The galena and grey copper of these veins carry uniformly high silver values. Most of the property in this section has been acquired by a syndicate organized by



Tunnel on George E.—Stewart Mining and Development Co.

R. G. Edwards Leckie of Vancouver. It is understood that development work on an extensive scale will begin as soon as the season opens.

Seven camps have been working in the district this



Lulu Tunnel—Glacier Creek Mining Co.

winter and of these the Portland Canal Mining Co. will be the first to emerge into the producing stage. With the energetic development that this season will bring several others will follow in close succession. Natural conditions are on the whole by no means unfavourable to mining operations. Timber and water power are abundant. Owing to the influence of the sea, winters are less severe than in many districts of the States. On the other hand in certain localities there are dangerous slides that must be reckoned with.

Several steamship companies will each provide regular passenger service between Vancouver and



Head of Portland Canal.

Stewart this summer and local boats will leave Prince Rupert almost daily. Some of the usual discomforts incident to new mining camps may be expected, but



American Creek, flowing into Bear R v

food ,fuel and water are abundant and there will be no hardships comparable to those encountered by stampeders in the desert camps or in the frozen Yukon.

Many years ago, when the Woodstock mine in New Zealand was worked as an independent proposition, many pounds of cyanide of potassium were used to treat a ton of ore. It was found that in roasting the ore a considerable quantity of wood ash got mixed in the ore. As the cyanide had a greater affinity for the wood ash than for the gold, it was neutralized, and resulted in a large cyanide consumption. Lime burnt in open kilns often contains partially burned coal or wood ash, which has an adverse effect on the cyanide. Where lime burned in retorts cannot be obtained, that fed into the cyanide plant should be in the form of a solution or as a thin emulsion. In cases where the pulp is excessively acid wood ash may become useful for neutralizing acidity. The ash should, however, be leached rather than fed into the pulp, on account of the precipitations caused by the unburned charcoal.

CANADIAN IRON AND STEEL.

By Watson Griffin.

II.

The Dominion Iron and Steel Company.

The largest iron and steel plant in Canada is that of the Dominion Iron and Steel Company, whose works are located on a site 440 acres in extent in the city of Sidney, Cape Breton, in the province of Nova Scotia. The company's deep-water frontage on Sydney harbour available for docks accommodating large vessels is 2,400 feet. The works at present include four blast furnaces, having a capacity of over one thousand tons daily, when all are in operation, ten 50-ton open hearth furnaces, two Bessemer converters in connection with the open hearth department for the purpose of shortening the process of steel making in the open hearth furnaces by the elimination of silica and some of the other impurities in the pig iron previous to treatment in the open hearth furnaces, a 36-in. blooming mill and pit furnaces, a 28-in. rail mill of 1,000 tons daily capacity, a rod mill of over 7,000 tons capacity monthly, a continuous billet mill of 600 tons daily capacity, 500 Otto Hoffman coke ovens, coal-washing, sulphuric acid and by-product plants, and a large machine shop and foundry.

The output of the whole plant has been restricted in the past owing to the fact that the capacity of the coke ovens is not sufficient to supply enough fuel for the blast furnaces. The capacity of the steel plant, taking into consideration its present equipment of coke ovens and blast furnaces, is about 300,000 tons of steel ingots per annum, but extensive enlargements and improvements are under way which will increase the capacity of the plant from one-third to one-half. The chief additions are two large batteries of Otto Hoffman coke ovens, a 300-ton blast furnace, two 50-ton open hearth furnaces, and a plant for briquetting waste metal and reducing it to a form more adaptable for use as a boiler fuel.

The capacity of the rail mill and rod mill have never been fully tested because the company has never been able to make sufficient steel owing to the cause already explained. However, about 152,500 tons of rails and 73,000 tons of rods have been produced in one year, besides about 22,000 tons of other rolled material. When the present additions to the steel-making plant are completed these figures will, no doubt, be largely increased.

In October, 1903, this company entered into a contract with the Dominion Coal Company whereby the coal company undertook to furnish the steel company with all the coal required for the operation of four blast furnaces and the conversion of this product into various forms of steel manufacture at the price of $1.24 per ton, with four cents additional for the use of the cars, or $1.28 per ton laid down at the works. This contract is to be in force as long as the coal company's leases from the Government, which have still over eighty-two years to run, but once in five years there is to be an arbitration to determine whether there has been any increase in the actual cost of mining coal, and the price may be increased to the extent of any increase in the cost of mining. There was a legal dispute as to the meaning of this contract, but it was decided in favour of the steel company. The relations between the steel and coal companies are now of a very friendly nature, the steel company and its friends having become the owners of a very considerable part of the common stock of the coal company. At present the two companies are maintaining their independent existence, although they have a president, general manager and superintendent of mines in common and ultimately a closer merger of interests is likely to be brought about.

The Dominion Iron and Steel Company has immense deposits of iron ore of good quality in Bell Island, Conception Bay, Newfoundland, about 400 miles from Sydney. English mining engineers have estimated that there is enough ore in the areas already opened up by the company to supply a plant larger than that now in existence at Sydney for over a hundred years to come, and there are outer areas belonging to the company which, if the seams are continuous, as is supposed, would probably yield a much larger quantity of ore than the areas now being worked.

The ore has a good percentage of iron. It is low in sulphur, but rather high in phosphorus. It can be mined very cheaply and as the mines are close to deep water docks, while the blast furnaces of the Dominion Iron and Steel Company are close to Sydney Harbour, the ore can be transported at very low cost.

The company owns a very large limestone property in Marble Mountain, on Bras d'Or Lake, about 70 miles from Sydney, where there is a practically unlimited supply of high grade limestone available for shipment by water. There are also limestone and dolomite quarries at George's River, near Sydney.

The capital of the Dominion Iron and Steel Company is $20,000,000 common stock and $5,000,000 seven per cent. cumulative preferred stock. The bonded indebtedness of the company is $13,332,000.

The directors of the Dominion Iron and Steel Company are:—Mr. J. H. Plummer, President, Sir H. Montague Allan, Geo. Caverhill, Hon. Geo. A. Cox, H. F. Dimock, Hon. L. J. Forget, Hon. Robt. Mackay, Hon. David Mackeen, Wm. McMaster, Frederick Nicholls, Elias Rogers, W. G. Ross, and Sir Wm. C. Van Horne.

The Dominion Coal Company Board is as follows:—J. H. Plummer, President, F. L. Wancklyn, Lord Strathcona, Sir Henry Pellatt, Hon. Geo. A. Cox, Hon. L. F. Forget, H. F. Dimock, James Crathern, W. D. Matthews, and Jas. Reid Wilson, with two vacancies to fill.

The Nova Scotia Steel and Coal Company.

The Nova Scotia Steel and Coal Company has works in Cape Breton Island and Pictou County, Nova Scotia. The Cape Breton Island plant, which is located at Sydney Mines, about two miles from the port of North Sydney, operates under much the same conditions as the Dominion Iron and Steel Company as regards raw materials. It has now its own coal mines close at hand and like the Dominion Iron and Steel Company it gets iron ore from Bell Island. H. Kilburn Scott, an eminent English engineer, estimated last summer that in the Wabana iron areas at Bell Island owned by the Nova Scotia Steel and Coal Company there were 206,000,000 tons of iron ore practically proved and of iron ore reasonably supposed to exist more than twice as much. Nearly all this ore is under the sea, but the company reports that it has been driving tunnels and slopes in it without any inconvenience on that account. The ore is about the same quality as that of the Dominion Iron

and Steel Company. When the ore reaches the company's docks at the port of North Sydney it is transported to the blast furnace at Sydney Mines, about two miles distant, on the company's own railway, which is also used for carrying coal to the shipping pier.

Besides the Newfoundland mine the Nova Scotia Steel and Coal Company has iron areas in Cape Breton, Pictou and Guysborough Counties in Nova Scotia, but at present none of them are being worked and the value is uncertain. This company formerly had a blast furnace at Ferrona in Pictou County, which ran successfully for some years on Pictou County ores. Wabana ore from Bell Island was also used in this furnace, but as this ore, which was practically unlimited in quantity and very cheaply mined, could be laid down at Sydney Mines much more economically than at Ferrona the Pictou County furnace was finally shut down. The company had five collieries at Sydney Mines besides the Marsh Mine near New Glasgow in Pictou County.

H. Kilburn Scott, the same English engineer who estimated the value of the iron areas of the company, estimated that its coal areas contained of coal practically proved 270,000,000 tons and of coal reasonably supposed to exist 1,068,000,000 tons. These coal areas are largely submarine. The present output is 900,000 tons per annum and can easily be increased to 1,000,000.

The limestone properties of the company at present operated are situated at Point Edward about ten miles from the blast furnace. They contain about 2,000,000 tons of limestone of very high grade, which is transported by rail to the works. This company has other extensive limestone deposits somewhat farther away but situated at a point where the limestone can be easily transported by water. These deposits are of exceptionally fine quality and are said to contain over 98 per cent of carbonate of limestone and magnesia.

The blast furnace at Sydney Mines has a capacity of 200 tons per day. There are three batteries of coke ovens of forty ovens each of the Bernard Retort type, and one battery of thirty ovens of the Bauer Retort type. The coal washing plant has a capacity of fifty tons per hour. The company has three 40-ton steel furnaces, the basic Siemens-Marten process being used. The capacity is 400 tons of ingots per day.

The works at Trenton, near New Glasgow, in Pictou county, consist of rolling mills, forges and various finishing machines for the production of spikes, bolts and nuts, polished shafting and other finished material, having a capacity of 50,000 tons of finished material per year, in addition to 50,000 car axles weighing about 15,000 tons. The fuel is nearly all obtained from the surrounding collieries at Westville and Stellarton.

The company has issued $1,030,000 preferred stock, $6,000,000 common stock, $1,000,000 six per cent. debenture stock, and $3,500,000 of five per cent. first mortgage bonds, while $2,500,000 five per cent. mortgage bonds remain in the treasury.

The directors of the Nova Scotia Company for the past year were: Robt. E. Harris, K.C., President; Hon. James D. McGregor, Vice-President; Thomas Cantley, General Manager; J. Walter Allison, Robert E. Chambers, James C. McGregor, Hon. Robert Jaffray, George F. McKay, John McNab, Hon. J. S. Pitts and Robert Reford. A dispute has arisen regarding the recent election of the same Board of Directors, Mr. Rodolphe Forget, of Montreal, who favours a change, claiming that he and his friends control a majority of the shares.

The Canada Iron Corporation.

The Canada Iron Corporation is a merger of the interests of the following companies:

The Canadian Iron and Foundry Company, Limited.

The Canada Iron Furnace Company, Limited.

John McDougall & Company (Drummondville Works).

The Annapolis Iron Company, Limited.

The corporation has blast furnaces at Midland, Ont., Radnor Forges, Que., and Drummondville, Que., with a total capacity of over 125,000 tons of coke pig iron and 14,000 tons of charcoal pig iron per annum, while it has large foundries and well equipped machine shops at Midland, Fort William, Hamilton and St. Thomas in the Province of Ontario, Three Rivers in the Province of Quebec and Londonderry in the Province of Nova Scotia. These six factories have a total daily capacity of 70 tons ingot moulds, 115 tons castings, 150 tons car wheels, and 205 tons of cast iron water and gas pipes.

The Midland works are located on the north side of the harbour of Midland, the corporation having a large acreage along the water front, with ample room for the construction of a large iron and steel plant. The docks have a length of 2,400 feet, with about twenty feet of water.

Midland was selected partly because of its central position in Ontario, which is the chief iron consuming province of the Dominion, having a large number of manufacturing towns which can be conveniently reached from Midland, and partly because, having one of the finest harbours, on Georgian Bay, it is a convenient point for the assembling of raw materials by water from Northern Ontario and Michigan, while the rail haul from the iron mines of Eastern Ontario is short. At present there is one blast furnace in operation at Midland with a capacity of 150 tons per day, but when the new furnace now nearing completion, is in operation, the plant will have a capacity of over 125,000 tons per annum.

Coke from Connellsville, Pa., is used, and the limestone is obtained from quarries belonging to the corporation on the eastern shore of Midland Bay about five miles from the furnace.

The furnaces at Radnor Forges and Drummondville make an exceptionally fine quality of charcoal iron especially adapted for the manufacture of car wheels and high grade special castings. Local bog iron ores, which are remarkably free from phosphorus and sulphur are chiefly used although some high grade iron ore is brought from Eastern Ontario. The furnace at Radnor Forges has a capacity of 9,000 tons and that at Drummondville 5,000 tons.

The mineral areas owned by the corporation are:—The Drummond Iron Range located at Bathurst in the County of Gloucester in the Province of New Brunswick, comprising five square miles of non-Bessemer hematite and magnetic ores of good quality.

The Annapolis Iron Areas in Annapolis County in the Province of Nova Scotia, covering an area of seven square miles containing a non-Bessemer ore, low in sulphur and moderately high in phosphorus.

The Eganville Iron Mine in Renfrew County, Ontario, containing high grade magnetic ore of non-Bessemer quality.

Development work is being proceeded with at the Drummond Iron Range in connection with which the corporation is now constructing the Northern New Brunswick and Seaboard Railway from the mines to Bathurst, a distance of about 26 miles. This line will

be completed to connect with the Intercolonial Railway within the next few months and shipments of ore will then be made to Newcastle, where extensive ore docks, with facilities for handling upwards of 3,000 tons of ore per hour are under construction and will probably be completed soon after the opening of the shipping season this year.

Extensive development work has been done at the Annapolis mine and in connection with this the corporation and Messrs. Mackenzie, Mann and Company are jointly converting the dock at Port Wade, N.S. into an up to date ore handling and shipping dock. This dock will have a capacity of 3,000 tons per hour and is expected to be ready to make shipments on the opening of the coming shipping season.

The directors of the Canada Iron Corporation are:—Thos. J. Drummond, President, Edgar McDougall, Vice-President and General Manager, Geo. E. Drummond, Vice-President, Geo. Gudewill, H. Cockshutt, A. E. Dyment; London Committee of Directors,—Sir James Heath, I. Hamilton Benn, R. W. Cooper, J. R. Tennant; Secy-Treas., F. G. O'Grady; Controller A. K. Fisk.

The Londonderry Iron and Mining Company.

The Londonderry Iron and Mining Company has at Londonderry, Colchester County, Nova Scotia, a blast furnace of 100 tons capacity, an ore crushing and mixing plant, coal washing plant, and ninety-seven coking ovens with a capacity of 150 tons per day. It owns in Colchester County 30,000 acres of freehold on which are iron ranges containing large quantities of ore very low in sulphur, much lower in phosphorus than most of the Nova Scotia ores and free from titanium. There are a number of varieties, including hematite, limonite, ankerite, siderite and specular ores. At the blast furnace ankerite (limestone containing a small percentage of iron) is used as a flux and coal is brought from Springhill, in Cumberland County, and from Pictou County.

The furnace has been out of blast for some time owing to the miners' strike at Springhill.

The company has recently completed a first-class steel casting department, with a capacity of 5,000 tons per annum.

The authorized capital of the company is $1,000,000. The officers and directors are: T. J. Drummond, president; Edgar McDougall, Vice-President; George E. Drummond, John J. Drummond, and James T. McCall; Secretary-Treasurer, F. G. O'Grady.

The Lake Superior Corporation.

The Algoma Steel Company, the Lake Superior Iron and Steel Company and the Algoma Iron Works are all subsidiary companies of the Lake Superior Corporation, which, through other subsidiary companies, also owns the famous Helen Iron Mine at Michipicoten, and other mines, extensive timber limits, the great electric power plants on both sides of the Soo, the street car lines in the Soo towns, an extensive electric lighting system, a ground wood pulp mill, a sulphite mill, reduction works, a copper-nickel converter plant and nickel matte smelter, an electric furnace, a saw mill, a veneer mill, a brick plant, the Algoma Central and Hudson Bay Railway, the Manitoulin and North Shore Railway, and a number of steamships.

The present iron and steel plant includes two blast furnaces, having a capacity of 300 tons each per day; a Bessemer steel department with two converters, having a capacity of 800 tons ingots per day; three 40-ton basic stationery open hearth furnaces, with a capacity of 300 tons ingots per day, a 34-inch blooming mill and 24-inch rail mill, with a capacity of 1,000 tons of steel rails per day; a foundry and machine shop. There are now under construction, and will be completed this summer, new blast furnaces with a capacity of 500 tons per day; one 12-inch rolling mill; one 18-inch rolling mill; three additional open-hearth furnaces of 40 tons capacity each; a rod mill, billet equipment, complete machinery for the manufacture of spikes, bolts, nuts, railway fastenings and tie plates, and two batteries of the Koppers' by-product coke ovens, with a capacity of 1,300 tons of blast furnace coke per day, with a complete by-product plant for the production of tar and ammonia sulphate. In connection with the construction of the new blast furnaces, four gas blowing engines of 2500 H.P. each, operated on blast furnace gas, are being installed to replace steam blowing engines and four gas engines of the same capacity with 1500 K.W. generators to supply electric power to operate the two new rolling mills, and power for direct current motor, 1500 H.P. which is being installed to operate the blooming mill in place of steam engine, it being the intention to have all mills operated electrically. New ore and coal docks are being constructed, equipped with the most modern ore handling and coal unloading machinery, and new machinery for the loading of steel rails on vessels. The total length of the ore docks is 2,000 feet and coal docks 1,200 feet; all being connected with deep water above the Soo rapids.

The Helen Iron Mine is about 11 miles from the Lake Superior port of Michipicoten with which it is connected by a railway belonging to the corporation. From Michipicoten the ore is carried on the corporation's own boats to the works at the Soo which are about 125 miles distant. Considerable quantities of the ore are sold to other companies in Canada and the United States. The ore bed from which shipments have been chiefly made is a hard, red hematite containing about 60 per cent. of iron, low in sulphur and containing about .125 phosphorus. Dr. Bell of the Geological Survey, some years ago said it contained at least 26,000,000 tons of ore and probably many millions more. The corporation recently drove out under Lake Boyer, adjoining the Helen mine, and struck into a body of Bessemer ore of exceptionally good quality carrying about .02 to .03 phosphorus. Development work has been begun and there are believed to be large quantities of this ore.

The works at the Soo use in addition to the Helen ore a considerable quantity of Bessemer ore from Minnesota and Michigan, which is brought across Lake Superior by boat at a very low rate. The corporation owns large areas of limestone property on St. Joseph Island and Cockburn Island, a distance of about forty miles from the works, which can be brought in by boat at a very low cost. In addition they are interested in large limestone deposits in Northern Michigan, forty miles from the works, the limestone being shipped to the Soo by rail at a low freight rate. This limestone runs about 98% in fluxing qualities. The property also contains a high grade dolomite, which is used in the open hearth furnaces. Coal has to be imported from the United States and is handled from Lake Erie ports to the works by boat during the season of navigation.

The capital stock of the Lake Superior Corporation is $40,000,000 and its bonded indebtedness $13,000,000. The directors are:—T. J. Drummond, President, J. Tatnall Lee, W. K. Whigham, J. Fraser Taylor, T. Gibson, F. McOwen, H. M. Price, R. L. Austin, Jos. S. Dale, H. M. Coppell, John T. Ferry and J. S Lovell.

The Hamilton Steel and Iron Company.

The works of the Hamilton Steel and Iron Company are at Hamilton, Ont. The plant includes two coke blast furnaces with a capacity of 550 tons per day, four open hearth steel furnaces with an annual capacity of 100,000 tons located on the shore of Burlington Bay at the east end of Hamilton, and puddling furnaces, rolling mills and forging department on Queen Street near the Grand Trunk Station at the west end of the city.

The coke comes from Connellsville, Pa., the iron ore from Michipicoten and the Michigan iron ranges, the limestone from Dundas, Ont., a few miles from the works.

While all the materials except limestone have to be brought from a distance, Hamilton is very favourably situated for the assemblage of coke and iron ore from outside points, having first class rail and water communication. Cheap electric power can be obtained from Niagara or from the Cataract Power Company which transmits power to Hamilton from De Cew Falls, a few miles from St. Catharines. Cheap natural gas is available, being brought to Hamilton from wells in the vicinity.

The capitalization of the Hamilton Steel and Iron Company is $3,000,000. There are no bonds or preferred stock. The directors are: Charles S. Wilson, President; Robert Hobson, Vice-President and General Manager; William Southam, John Milne, George Lynch Staunton, Charles E. Doolittle, H. H. Champ, E. B. Osler, M.P. and W. D. Matthews.

The Atikokan Iron Company.

The Atikokan Iron Company is one of the Mackenzie and Mann enterprises. The works are located on the water front at Port Arthur, Ont., and include a blast furnace having a capacity of 100 tons per day, but so constructed that the capacity can at small cost be increased to 200 tons, 100 beehive coke ovens, with a total daily capacity of 150 tons of coke, and 16 Roberts ore roasting furnaces.

The ore used is all brought from the Atikokan Iron Mine of the company on the line of the Canadian Northern Railway, about 130 miles from Port Arthur. It has been proven that there are at least five million tons of ore and the quantity available is believed to be very much larger. The ore is magnetite. There are three veins, two of which are said to contain no phosphorus, while the third contains too much phosphorus for Bessemer use.

The high percentage of sulphur in the ore was at first considered very objectionable, but it has been found that in the Roberts roasting furnaces the sulphur can be reduced from 2.5 per cent. in the raw ore to .75 in the roasted ore at a cost of less than ten cents per ton, and the moisture is expelled from the ore in the process. Experiments in roasting have been made for three years with most gratifying results and the company are so well satisfied with the success of the process that they propose in the near future to increase their blast furnace capacity, using only Atikokan ore. This Roberts roasting plant was the second installed, but there are now several in successful operation in the United States and England.

The plant can roast 600 tons of ore per day and as the blast furnace at Port Arthur cannot use nearly that much considerable quantities of the roasted ore will be sold. It has been found that it can be profitably exported to the United States in spite of the duty. Owing to the moisture having been expelled in the process of roasting, the magnetite ore can be smelted as easily as hematite ore. A very fine quality of foundry pig iron is produced at the Port Arthur furnace from the roasted Atikokan ore.

Gas from the blast furnace is used for the blowing engines and for roasting the ore.

Coal is brought from West Virginia because it is very low in sulphur, while Kelly Island in Lake Erie supplies the limestone, low rates of transportation being secured on ore boats which would otherwise return empty, from lower lake ports to Lake Superior iron ore shipping ports.

The capital of the company is $1,000,000. The directors are:—William Mackenzie, President, D. D. Mann, Z. A. Lash, Hugh Sutherland, A. S. White, and J. Dix Fraser, General Manager.

THE USE OF COKE-OVEN GAS AS FUEL.

Paper Read Before the Mining Society of Nova Scotia By Thomas J. Brown, General Superintendent of the Nova Scotia Steel & Coal Co., Sydney Mines, N.S.

Greater economy in the use of fuel is a question always of the utmost interest to consumers. As our coal mines grow larger, haulages become longer, shafts deeper, and the many drawbacks in connection with the extraction of coal become more extensive and expensive, this question of economy in fuel becomes each day a more important one to all concerned.

In the early history of coal mining in this country, very little attention was paid to this very important item. Particularly was this true at the different collieries; as they were producing the fuel themselves, it was natural for them not to place the same amount of importance on the question of economy in the use of fuel as other consumers who had to pay more for their fuel.

Strange to say, these conditions are greatly changed, and I believe to-day that the coal operators are doing as much as anyone, if not more, towards introducing economical methods in connection with their operations, and towards the introduction of the most modern equipment as regards their power-plants, to enable them to make use of all the heat units possible, and to consume the lower grade fuels that were at one time so generally consigned to the waste dumps.

The most up-to-date and modern water-tube boilers have taken the place of the old exterior fired, egg-end, cylindrical type. High steel stacks and forced or induced draft fans have taken the place of the old 60 to 80 ft. square brick stacks so evident some years ago. Selfstokers, travelling chain grates, feed-water heaters, economizers and all the other contrivances so well known to the modern engineer, have been introduced, all with a view of further economizing the use of fuel. And, personally, I think a still greater change has taken place in the fact that nearly all plants in the early days did not have sufficient boiler power to efficiently do the work required; and that to-day engineers see the great advisability of having more power than is necessary to do the actual work, and in this way enable them to use inferior fuel, and to do the work with greater ease and less strains on the power plants than was the custom in former days.

Not only does the engineer of to-day see this, but he has, after a great deal of opposition, been able to make the governing bodies of nearly all the big cor-

porations to-day see the advisability of the great saving to be made by making the original investment for power-plant large enough to put in place a plant of sufficient power to enable them to avail themselves of the economies to be made in this way.

If a stranger visits any of the great metallurgical centres of the United States, and particularly the State of Pennsylvania, he is at once struck by the enormous quantities of escaping gas from coke-ovens, to be seen all through the country. To the man who appreciates the power and the commercial value contained in this escaping gas it is appalling. When one thinks of the ridiculously small percentage of efficiency that is extracted from each pound of coal, and when one sees this enormous waste, one cannot help but wonder why we have not reached the point where the use of this waste gas has become more general.

It is pleasing to note that a great many of what are known as by-product coke-ovens are replacing the old form of beehive ovens, and by the manufacture of by-products some of the valuable qualities of these escaping gases are being extracted. Statistics show that the United States has yet in operation 90,000 beehive ovens, and in 1907 but 4,000 by-product ovens. The coke from the improved ovens in 1907 was valued at $21,000,000 and the by-products at $7,500,000. The beehive ovens in the same year produced coke worth $89,000,000, and in this manner absolutely wasted $55,000,000. Is it any wonder a stranger is astounded at this enormous waste, which can only be accounted for as due to the presumed abundance of their resources? Even with the modern oven as in use in Cape Breton to-day, the waste from poorly sealed oven doors, if thoroughly appreciated, should receive closer attention.

Very little coke-making was done in the Province of Nova Scotia in the early days, and any that was made was with beehive ovens. The Nova Scotia Steel & Coal Company, which had its pig-iron furnace at Ferrona, Pictou County, was the first in Canada to introduce the use of what is known as the modern retort oven. In connecton therewith was also built the first washery in Canada for the cleaning of slack coal.

About the year 1900, by-product coke ovens were built by the Dominion Iron & Steel Company in Sydney, and about the same time the Nova Scotia Steel & Coal Company built at Sydney Mines ovens of practically the same type: 30 at what is known as No. 1 Colliery, and 120 at its blast furnace, which is situated about half a mile from the colliery. Instead of utilizing the waste gases from these ovens for by-product purposes, this company chose to use it under its boilers as fuel, and the object of this paper is to give the members of this society an idea of how this was accomplished and the success it has met with.

This company is rather fortunate in having, what some people would call as a whole, "a self-contained enterprise;" that is, they own their own ore, limestone, coal, and metallurgical plant. By using these gases as a fuel, the result brought about a very peculiar and unique condition of affairs. It was found that, after supplying all the power that was necessary at the metallurgical end of the plant, some surplus power was available; this power was conducted back to the coal mines in the shape of electrical current, and is now being successfully applied in the underground hauling and raising of coal, and in furnishing power for the ventilating of the mines, forming what might be termed an endless chain in the operations.

The details of this plant will no doubt prove very uninteresting reading to a great many of our members, but, we hope, will be appreciated by persons who are directly interested in this class of work. Of course, there is no claim made by any officer of the Nova Scotia Steel & Coal Company that this undertaking was original or unique; but it is so surprising that such a small proportion of coke-makers have availed themselves of this method of treating with waste gases, that it was suggested to the writer that a paper of this nature might be of some value.

In connection with this plant, there are two independent installations of coke ovens: those near the blast furnace, known as the Bernard type, the surplus gas from these being used in connection with the production of steam for the electric power plant; the second installation of ovens of the Bauer type, located at No. 1 Colliery, the surplus gases being used in generating steam for general colliery use. These two installations are widely different in many respects, and between them they cover in many details the use of coke-oven gas under boilers.

In the case of the Bernard ovens, there are a number of small ovens situated at about an average distance of 200 feet from the boilers, so that the frictional resistance of this flue becomes an important factor when considering the amount of draft necessary. The gases pass through boilers of an ordinary fire-tube type, and here again the resistance of a number of small tubes is met with.

In the original design of this plant, the arrangement was such that the gases from 80 of these ovens were to pass through nine fire-tube boilers, and thence from a flue at the rear of the boilers to a brick stack 150 feet high, 6 feet 6 inches diameter, and with a stack temperature of 800 degrees F. a draft of 1½ in. water-gauge was produced. This stack would not produce sufficient draft to allow the ovens to work up to their full capacity, and this condition was further aggravated if it became necessary to take one or more boilers off for repairs, and it was finally decided that it would be advantageous to install an induced-draft fan between the rear flue of the boilers and the brick stack, and at the same time a number of the boiler settings were altered so that in the present arrangement there are nine plain fire-tube boilers, 15 ft. long, 8 ft. diameter, having thirty-nine 5 in. plain tubes and sixteen 5 in. screwed stay tubes.

The setting was altered on four of these boilers by building a brick wall longitudinally under the centre of the bottom of the boiler shell, so that the gas, after passing through the tubes from the front to rear, flows from rear to front under one-half of the shell, and through a port from the front to rear of the other half, and then from the flue at the rear of the boilers through the induced-draft fan to the stack.

This fan is of the regular type used for induced draft for boilers, having water-cooled bearings. The fan wheel is 108 inches diameter, 54 inches wide, and runs usually at about 220 r. p. m., and at this speed produces a draft equivalent to 1⅞ in. water gauge.

In the furnace of the boilers the draft is usually about 13-16 in., and in the main flue in front of the ovens is further reduced ¼ to 5-16 of an inch. The draft in the coking chamber of the ovens varies between ⅛ and 3-16 of an inch.

The 1⅞ in. draft at the fan, with the 9 boilers under steam, gives very satisfactory results; but if it is necessary to take off one or two boilers, the fan is speeded up until about 2⅛ in. water-gauge is produced.

The gas from any number of boilers can be cut off by dropping a damper between the main gas flue and the boiler. This damper consists of an iron band, the centre of which is filled with fire-brick; and as it works in a slot, the outer edges of the damper and the iron band do not come in contact with the hot gases, and the whole arrangement as a damper gives complete satisfaction.

Each of these batteries of 40 ovens was designed to produce 100 tons of 48-hour coke per day of 24 hours; but their capacity has been cut down by putting in an additional 2 in. fire-brick pavement in the bottom, so that their ordinary maximum capacity is now 90 tons. They can be charged with 7 tons of washed coal, containing about 8 per cent. of moisture, when properly levelled. This coal has an average analysis of about as follows:—

Ash	5.1%
Sulphur	1.2
Vol. matter	39.2
Carbon	56.7
Moisture	10.6

Under ordinary working conditions, before the change in the setting was made, the boilers would develop about 100 h.p. each; but, after returning the gas under the lower shell of the boiler, this was increased to about 112 h.p.

As a direct result of the use of the gas from two batteries of these ovens, the steam necessary for generating the electric power of the entire plant is produced, amounting to an average of some 260,000 k.w. hours per month, with engines of high-speed Corliss type having a steam consumption of about 16 lbs. of steam per 1 h.p.

At the Bauer coking plant the ovens are much larger and are located alongside the boiler-house, so that the gas flues are comparatively short, and the gas is used under Babcock & Wilcox water-tube boilers, offering very little resistance to its flow. These boilers are also fitted with an induced draft fan and discharge the gas into a stack 110 ft. high, 5 ft. diameter. In this case it is only necessary with three boilers on to produce a draft of 1¼ inches water-gauge; but if the gas is used under two boilers only, it is necessary to have a draft of 1½ inches.

With the same coal used for coking purposes, a test run on one boiler gave the following results:—

Average h.p. per hour	331
Maximum h.p. per hour	436
Minimum h.p. per hour	179
Coal charged into ovens during test	804,000 lbs.
Number of ovens charged	15
Evaporation from and at 212° per pound coal charged into the ovens	1.18 lbs. water
Coal charged into ovens per boiler h.p.	29.23 lbs.

The operation of this plant is giving very good results. And as these boilers have each 3,140 sq. ft. of heating surface, and generally the flue temperature at rear of boilers is between 600 and 700 degrees, it would seem that this proportion of about 9.5 sq. ft. of heating surface per h.p. developed, is about right for this class of fuel.

The electric power thus generated is used to operate lifting cranes at the blast furnace, trolleys that convey coke from the ovens to the blast furnace, electric coke-oven pushers, open-hearth cranes for handling all material for open-hearth purposes, electric open-hearth furnace charging machine, all the power necessary in the foundry, machine and car shops, electrically driving the coal washery plant, crushers, etc., ventilating No. 1 and No. 5 Collieries, operating haulage plant north and south at No. 5 Colliery, knocking screens and picking-belts at the collieries, lighting the whole plant, and in the many various ways that electric current can be used about a plant of such nature.

When one considers that this power only a few years ago was allowed to escape into the air, and at too many places is still allowed to escape, and when one considers the enormous amount of work that is being done by this power at the small plant described above, it is no wonder that the question of the utilization of this power is forcibly appealing to the engineers of to-day.

MINING AND SMELTING CONDITIONS IN BRITISH COLUMBIA.

On March 22nd Mr. Thomas Kiddie, a metallurgist long and favourably known in the Northwest, was the guest of honour at a luncheon of the Canadian Club of Vancouver, British Columbia. There was an attendance of about 130, including many men prominent in financial, mercantile and industrial circles in the City of Vancouver. The chair was filled by Mr. Ewing Buchan, manager of the Vancouver branch of the Bank of Hamilton, president of the Vancouver Board of Trade, and vice-president of the local Canadian Club. Other invited guests interested in the progress of the mining industry were Mr. E. Jacobs, mining journalist, and secretary of the Western Branch of the Canadian Mining Institute, and Mr. Robert R. Hedley, formerly manager of the Hall Mines smelting works, at Nelson, B.C.

After the toast of "The King" had been honoured, the chairman called upon Mr. Kiddie, who on rising to address the meeting was given a very hearty reception. He read the following address:

Mr. Thomas Kiddie's Address.

Mr. Chairman and Gentlemen: The mining industry of British Columbia is a subject to which it is not possible to do even scant justice within the limited time at my disposal in which to address you to-day, so that what I shall say to you will be more in the nature of a brief review of this important subject that in any way a presentment to you of the facts and figures necessary to adequately convey an idea of the very considerable advances made in mining and smelting in this province during the last ten years, and the proportions to which mineral production has attained.

Of the present condition of mining many here are fully cognizant from personal experience, from long residence on the coast, and from a general knowledge of the subject.

Those of you who have graduated from the school of experience in mining recognize at once its great possibilities, its attractiveness, its fascination, and its extensive

scope for the acquisition of wealth. In order to realize this we have but to visit any of our western cities to see the monuments of successes achieved in mining, to see the business blocks, banks, hotels and residences built with money made by men interested in mining, to be convinced of the very substantial results which follow the successful pursuit of mining. These successes are primarily due to a class of men whom we may well stop to honour—the prospectors. These men, after years of persistent effort, generally under the great disadvantage of insufficient means, are in too many instances rewarded only by a pittance of the actual worth of their mineral discoveries. You, gentlemen, who represent the financial end of mining, would do well to foster the acquaintance of the prospector, and see to it that he gets a just reward for his work, protecting him against his possible ignorance of the many ways in which his property may slip through his fingers, always remembering that every mine was once a prospect, and that without the prospector the expansion of mining, in this or any other country, would speedily come to an end.

Conditions Affecting Mining.

As to the conditions affecting mining operations, you are all aware of the fact that the physical and economic conditions prevailing in the districts in which our mining operations are carried on are important factors in realizing on the value of an ore. It is therefore important to note some of the great advantages we enjoy in this direction.

First, the coast between Vancouver and Alaska is cut into by rivers, inlets and canals, stretching far into the interior, and giving easy access to the different mining centres; so that by means of aerial tramways the products of the mines are easily and cheaply transported to tidewater, where, with storage bunkers, even large vessels may be quickly loaded. Transportation by water ensures delivery of the ores to the different coast smelters at the lowest cost, or the tramways may deliver the ore direct into the mills to be treated by concentration, smelting or other processes, the product of these mills in the form of concentrates, matte, or bullion, to then be delivered by water transportation to the nearest railway.

The larger the cargoes handled, the cheaper the freight rates are, and I think we only realize this great advantage fully when we compare this free trade by water transportation with railway transportation, even under its best conditions. As an illustration, I may mention the fact that copper ores are being freighted from Alaska to coast smelting points, a distance of 1,000 miles, at $1.50 per ton.

Water Powers Being Utilized.

Another physical advantage which we enjoy is the numerous smaller water-powers usually found in our mining regions. These are being more and more conserved and utilized for mining and smelting purposes. Electrical energy generated from these water-powers is readily and cheaply distributed from the generating stations to the various points where power is required for mining, milling or smelting purposes, and once installed, power is provided at a minimum of cost, without the vexations attending the production of steam for steam power plants.

In due time we hope to see more of our larger water-powers on the coast utilized for industrial purposes other than mining.

The achievements in electrical engineering have been so rapid and the results so astounding that it may be no idle fancy to predict that the wireless transmission of high tension electricity may be an accomplished fact in the not too distant future. What such a consummation would mean for power, manufacturing, and lighting purposes, is well nigh beyond comprehension.

Great Areas of Coal.

Another prominent asset which we possess toward favourable mining and smelting conditions, and indeed toward all our industrial conditions, is our great coast coal areas. The established coal industry of Vancouver Island has been especially successful, both as regards development and management. On that island to-day prospecting for more coal is being vigorously carried on, no less than eleven diamond drills being at work for this purpose.

The development of the coal and coke industry of the province has been marked by a steady yearly increase, beginning with 81,547 tons in 1874, to a gross production of 2,400,000 tons in 1909. This satisfactory progress is largely due to the fact that the industry of coal mining has been carried on on better business principles than that of lode mining; in other words, it has not been the victim of such frenzied finance as has characterized so many of our metal mining ventures. Further, we have the fact that the coal areas are larger, more constant, and less subject to change than lode mines are.

In addition to the Vancouver Island coal measures, we have another great coal area on one of the Queen Charlotte Islands, which, ere long, will rank as one more of our valuable assets. The time appears to have arrived when the coal measures on Graham Island, of the Queen Charlotte group, will be developed to their fullest extent, to meet the growing demands for coal for steamship, locomotive and general industrial purposes, consequent upon the increase of business which will follow the opening up of the interior of the province by new railway systems now being established, and the increase of population by immigration.

Production of Coal.

The coal mines of the province have produced in all 1836 to 1909) about 30,000,000 tons of coal, valued at nearly $92,000,000, and rather more than 2,000,000 tons of coke, valued at $11,000,000, or in round figures a total value of $103,000,000. The net production of coal for 1909 was about 2,000,000 tons, and of coke 250,000 tons, together valued approximately at $8,500,000. A substantial proportion of this was from the coal mines of the coast district.

In addition to these coast coal resources, Mr. D. B. Dowling, of the Geological Survey of Canada, estimates that the coal areas of the Crow's Nest Pass district, southern and northern portions, contain the enormous quantity of 36,600,000,000 tons of workable coal.

Large Deposits of Iron Ore.

Following the coal, we also have large iron ore deposits, though as yet undeveloped. The recent sale of the Iron Mine, on Texada Island, with its estimated 33,000,000 tons of ore, to Duluth capitalists, and the prospective building of an iron and steel plant on this coast in the near future, are matters for congratulation as tending toward the establishment of an industry such as in other countries is taken as the index of industrial progress. What the successful introduction of iron and steel making means to the coast and the province generally, you, gentlemen, are well qualified to judge.

In addition to these coal and iron resources, we have prospective new mining camps to the north, and judging from public and private reports from Portland Canal district, we will have a large mining camp there, for already the ore veins have been proved to a depth

of 300 feet, the ores being of two kinds, lead-silver and copper-gold.

Injurious Effects of Wild-Catting.

While I am optimistic as to the future of Portland Canal district, we must not blind ourselves to the probability, almost the certainty, that the wildcatter will be there in all his glory. Already he is gathering in his victims while the snow covers the ground to a depth of ten feet. Those of you gentlemen, who had the pleasure of listening to an able address in this hall two weeks ago, will recall the remarks of Mr. J. G. Colmer, when he said that while British capitalists appreciate "Canadian investments" they do not want "Canadian wildcats." The mining journals of this and every other country are constantly exposing wildcat mining schemes, and I venture the opinion that this same wildcatism has done as much to damn legitimate mining enterprise in this Province as anywhere else.

Insufficient Cash Capital.

Another cause of the failure of so many of our mining ventures—I refer especially to the orthodox $1,000,000 mining companies—is the lack of cash capital subscribed to do the necessary and actual development work, and provide the machinery requisite to make the enterprise a commercial success.

According to the best authorities on the subject, it is estimated that only three per cent. of the $1,000,000 capital is used for the actual development and equipment of a mine. In other words, the sum of three cents is expected to pay ten to twenty per cent. interest on one hundred cents.

It is almost a consensus of opinion among mining men, that the want of capital with which to prosecute the initial stages of mining is the most prolific cause of failure, and just why mining stocks should be sold for five or ten cents on the dollar is as incomprehensible as why a man should seriously invest in mines without any personal knowledge of the subject, professional advice, or knowledge of the character of the men at the head of the promotions. Let us hope the time is not far distant when these pitfalls in mining will be remedied either by common consent or by law.

Prospects of the Mining Industry.

Of the prospects of mining in the coast district, I invite your attention to the fact that some of the older mines on Texada Island continue to ship ore regularly with profit to their owners, and that the ore bodies which a few years ago were considered "pockets" have been proved to a depth of 1200 feet, and, in one case —that of the Marble Bay Mine—there is enough ore blocked out to last three years without doing any more development work. At Hidden Creek, in Portland Canal district Mr. M. K. Rodgers, has opened large bodies of copper ore, and it is fairly safe to say that his mine can at any time enter the list of shipping mines while in other directions along the coast some very promising properties are also being brought forward.

As to the prospects of mining in the upper country, the large additions made, or to be made, to the smelting works at Trail, Grand Forks, and Greenwood, will undoubtedly result in a substantial increase over last year's production as regards both mining and smelting.

Improvements in Smelting and Other Conditions.

It would be entirely out of place at this time for me to go into the technology of this subject, so it must suffice that I point out that substantial progress has been made in smelting during the past ten years. This advancement is seen most clearly when it is considered from the financial standpoint. An example of a copper ore that was sold to a smelter ten years ago is an illustration. The ore contained 6.3 per cent. copper, it yielded just $1 per ton to the seller after having paid a smelting charge of $6 per ton. To-day this ore would net $8.60 per ton, the smelting charge now being $2, and other deductions in proportion. A second case was where an ore assayed 6.3 per cent. copper; it was charged $7.25 per ton for smelting, which left a deficit of 25c per ton. To-day, owing to much reduced smelting, refining and other charges, this ore would net the mine owner $9.74 per ton. I think, gentlemen, these actual examples forcibly explain and illustrate the metallurgical advances which have taken place in smelting during the past ten years.

These improvements are due entirely to the metallurgist and the smelting companies, and the benefits derived from this advance have been applied to a reduction of the smelting charges, and so entirely to the benefit of the mine owners, as it enables them to ship at a profit low-grade ores which ten years ago would have been thrown on the dump as waste, or as a concentrating ore, to be treated at some more convenient season, after the requisite facilities shall have been provided. In view of the reduced cost of smelting, it follows that probably many of the prospects which ten years ago could not be made to pay would yield profits under our present more favourable conditions.

Improvements in ore dressing and concentration have also made great strides toward higher recoveries, both of the precious and the base metals, as well as reduction in operating costs.

Higher Percentage of Metals Recovered.

I remember, in 1890, when a recovery of 50 per cent. of the value of an ore was an average quantity. To-day, by means of improved methods, an average of 80 per cent. recovery is not at all uncommon.

In addition to the higher mineral values being recovered to-day as compared with the past, the time may not be far distant when other metals, such as zinc, which heretofore have been looked upon as an impurity and a detriment, will become sources of revenue. Already the Provincial Government has done a great deal toward a solution of this problem, while the Dominion Government now has under consideration a practical investigation of the subject of zinc separation. The latter, if successful, will add materially to the value of the mineral output of the province, and to the profit of the mine owners, who instead of being penalized $2 per ton for 12 per cent. zinc as at present, will receive a fair value for their zinc as they do to-day for their gold, copper and lead.

Relative Importance of the Mining Industry.

At the present time, more especially in the coast cities, the abnormal activity in real estate appears to overshadow mining and other legitimate industries, which go to develop the natural resources of the province, but it is only reasonable to presume that capitalists must sooner or later turn their attention to the further exploitation of these resources, which, aided by modern means of transportation have built up the Province of British Columbia until the combined annual value of its timber, minerals, fish and agricultural products amounts to $82,500,000. As still further proving the intrinsic value of the mining industry to the Province, I have only to point out that its production

almost equals that of the lumber, fishing and agricultural industries combined.

Figures of Comparative Production.

In order that you may better realize that great progress has been made, and that the average annual value of the mineral production of the province during recent years has been quite large, I submit the following facts and figures:—

British Columbia's mineral production in the year 1885 was of a total value of only about $2,000,000. Reviewing the increase in periods of five years each, during twenty years, 1889 to 1908, inclusive, the following results are obtained:—

Five Year Periods.	Average Annual Value.	Percentage of Inc.
1889 to 1893 inclusive.....	$3,700,000	85%
1894 to 1898 "	10,750,000	190%
1899 to 1903 "	17,500,000	62%
1904 to 1908 "	24,000,000	37%

It should be noted that lode mining did not begin to be of importance in the province until the second five year period above shown.

The aggregate value of the mineral production of Canada for 25 years to the end of 1909 was 1035 million dollars. For the first year of this period, namely 1885, the total was approximately $10.000,000; for last year, (1909,) it has been estimated by the statistician of the Dominion Department of Mines, at $90,000,000. During all years to date the aggregate production of minerals in British Columbia is of a value of $350,000,000. During the 25 years period above mentioned British Columbia has contributed about $285,000,000, or nearly 28 per cent. of the aggregate for the whole Dominion. The production of this province in 1909 constituted in value rather more than 25 per cent. of that of the Dominion, so that, notwithstanding the large increase recently made by Ontario, British Columbia continues to well maintain a prominent position in regard to its proportion of the mineral production of Canada.

In conclusion, gentlemen, it is not so much what we think of our province and its immense possibilities, but what those on the outside think. It is well to "see ourselves as others see us," to which end I quote the opinions of a Canadian, an American, a Welshman, a canny Scot and an Englishman, each of whom is highly qualified to give an opinion. The following are the comments of prominent visitors who were on this coast with the Canadian Mining Institute Summer Excursion party in September, 1908:—

By Mr. J. McLeish, statistician, of the Dominion Department of Mines, Ottawa: "Perhaps the most vivid impression left with the writer will best be expressed by the words 'magnitude' and 'possibilities.' By 'magnitude' I do not mean so much the absolute magnitude of our mineral production, although it is an important feature of our industrial economy, but rather the vast extent of the country throughout which mineral production and prospecting is being carried on, and the still greater area not yet even prospected; and this vast extent of territory at once suggests the great future possibilities of the mining industry which must unquestionably accompany the growth of population. As an illustration of this idea we saw..... in British Columbia the great copper deposits of the Boundary district, the gold-copper ores of Rossland, and the silver-lead and zinc ores of Slocan and East Kootenay, which are but the forerunners of an enormous mineral development that will extend throughout the length of the province from the United States boundary, on the south, to the far Yukon, on the north. At Frank, Coleman, Fernie, Bankhead, and Nanaimo we saw great coal-mining operations.....enormous areas of fuel resources. What may not be the future of these, as well as those other coal areas of whose values we are only just beginning to learn—the Brazeau, the Peace River, the Bulkley Valley, the Queen Charlotte Islands, and the coal fields of the Whitehorse district in Yukon Territory."

By Dr. Heinrich Ries, Professor of Economic Geology, Cornell University, U.S.A.—"No one thing or feature of the trip can be singled out for emphasis, for I was impressed from beginning to end with the wonderful mineral resources which we passed in review, and the intelligent energy with which they were being developed, factors, all of them, insuring a great future for the territory which we visited."

By Mr. Roger Beck, Swansea, South Wales:—"At Rossland and Phoenix, not blessed with rich ores, it was particularly noticeable how ingeniously the management of the mines and smelters had combatted the poorer grade by cleverness of appliances dealing with it. The automatic competing with labourer, and water with fuel in motive power. Wherever the conditions were unfavourable, ingenuity had done and was doing all possible to counterbalance."

By Mr. Sam Mavor, member of the Institution of Mining Engineers, Glasgow, Scotland:—"Canada has a great place, present and potential, as a mineral producing country. In addition to the minerals now in sight is the certainty of other similar discoveries, and beyond these lies the vast expanse of unprospected and even unexplored territory. The features which most forcibly strike the observer are the modernity of the important mineral industries, the energy and rapidity with which the great coal, iron, and copper mines are being developed, the courage exhibited in attacking low-grade ores, and the technical and administrative skill which have established sound industrial concerns upon low-grade ore bodies."

Mr. Hugh E. Marriott, at Vancouver (luncheon to C.M.I. party) Sept. 25, 1908:—"After all, what do **you** know of your own country? You know intimately the history of each camp that is now established and you can size up their chances more effectually than can be done by the stranger though he spend months of investigation instead of days. But when you look at these known spots on the map, they are but a very small section of that great stretch that remains unknown alike to you and me .....it must not be considered for a moment that your pioneers have chanced upon the only valuable mines or even the best. There must be hidden beneath that carpet of peat and verdure many a mineral deposit waiting the lucky chance of the prospector's pick or shovel. The question is; how are these to be found, so that at the earliest opportunity they can be made to assist in the building up of the nation and in advancing the prosperity of the land?"

After a hearty vote of thanks to Mr. Kiddie, whose address was listened to with close attention and frequently applauded, the proceedings terminated.

The average cost of diamond drilling per foot, with the drills operated by the Department of Mines of Nova Scotia was, during 1909, 79 cents; the corresponding cost per foot for calyx drills was $2.17.

OUR LONDON LETTER.

The Colliery Situation in Great Britain—Profits Still Falling, but not yet Below the Ante-Boom Level—Gas Perception Training for Colliery Firemen—British Miners Discuss the Royal Commission on Mining — Streamers in Cornwall — Rhodesian Shares on the London Market and the Revival in Chartered — Lessons of the Transvaal Complete Year.

London, March 18th, 1910.

A survey of colliery profits in this country shows extraordinary fluctuations in net profit figures comparing the last two years' accounts, and also urges upon the attention of the observer that the coal industry is one confronted with many difficulties. In the first place there has been no slackening in the fall in prices which commenced in 1908 after the last boom. In some collieries there has been a decline of thirty per cent in price, whilst the average decline of values in the export trade has been over ten per cent.

On the top of everything else has come the Miners Eight Hours Act considerably increasing the cost of production, and causing all kinds of delays pending the adjustment of working conditions to the new situation last year. Of course, the act was only in partial operation both as to time and districts in 1909, and it has further to be borne in mind that what is usually meant in the coal trade when a restriction of production is spoken of is that it has not increased at so rapid a rate as would have been the case if there had not been parliamentary interference.

A survey of the accounts of fourteen collieries, mainly in South Wales, shows that nine companies are worse off than previously, three are better, the remaining are showing no change. The Albion Steam Coal Company drops in the two last years from a net profit of $129,000 to a loss of $105,000, and of course passes its dividend. Andrew Knowles & Sons show a net profit reduction from 251,000 to $119,000, and the Cambrian Collieries' net profits fell from $835,000 to under $200,000. The Powell Duffryn Steam Coal Company shows a reduction in net profits from $1,350,000 to $921,000. These are typical of the losses.

The few companies which show increased net profits cannot compare in any way with these figures. Of these three companies one maintains its dividend unchanged, one advances it from 12 1-2 per cent to 17 1-2 per cent, and the other actually dropped from 10 per cent to 5 per cent, but slightly increases its carry forward. From these average results the result is arrived at that the aggregate profit is down about 40 per cent as compared with twelve months ago, and 50 per cent as against two years ago. In that year 1907, however, it has to be remembered distributable earnings went up nearly 90 per cent on the previous year, so that all these concerns are still comfortably above the level of the period immediately preceding that extremely remunerative season.

Whilst on the coal question mention might be made here of a rather important meeting of the National Association of Colliery Managers held at Manchester University on March 4th. The chief business was the description by Mr. George H. Winstanley of apparatus designed to meet the recommendation of the Royal Commission on the need for some means of training colliery firemen in accurately estimating the presence and quantity of gas. Mr. Winstanley said the development of deep mines meant high temperatures and considerable dust, and it was from the presence of dust that danger of disastrous explosions arose. There was one certain way of avoiding explosions of gas, that of full ventilation. The improvement of ventilation had reduced explosions of gas to very small affairs, but there was considerable danger of those small affairs leading to explosions of dust far more disastrous than the biggest gas explosion on record.

The experiments at Northallerton had shown that a small explosion of gas made it easier for an explosion of dust to occur, and it was with the desire to prevent the small disturbances that he had arranged an apparatus which supplied a known amount of gas to an ordinary safety lamp. It was easy for any one to take observations of the "cap" to the flame formed by the combustion of gas, but under ordinary conditions the varying power of different individuals to distinguish colors made accurate estimation of the quantity of gas very difficult. When known quantities of gas were supplied, however, a few experiments gave the power of judging very accurately what percentage of gas gave a given "cap" to the flame.

Leading representatives of the workmen's side of the British mining industry met in special convention in London on March 15th to consider the report of the Royal Commission on Mining. The conference was held with closed doors, but an official report issued declared that the conference was in complete agreement on the questions which were discussed. It was generally agreed that the sittings of the Royal Commission on Mines should be continued, and that their investigations should be specially directed to the dangers attending upon coal dust and the use of electricity in mines. It was stated that the special representatives of the Miners' Federation appointed to attend the inquiry into the West Stanley colliery disaster, by which 160 lives were lost, had reported that in their opinion this disaster was attributable to the use of the electrical installation.

On the important questions which the Royal Commission have already reported the conference was agreed in supporting the claim of the colliery enginemen for a statutory eight-hour day in the same way as the underground workers, and also in their demands that all enginemen filling these responsible positions should hold certificates of competency. It was stated that the responsibilities of the enginemen had been enormously increased by the deeper working of the pits and by the larger number of men employed. The working in some of the pits of two and three seams of coal at different levels, with the requirement to control the engine working at the various levels, has made the work more difficult, the slightest error involving the loss of human life. It is thus felt that no man should be employed in charge of the engines who has not previously obtained a certificate of competency. With the heavy demands now made upon the enginemen they should have the same statutory protection as the miner of a legal eight-hour day. At present some of the enginemen work eight hours, while others work longer.

A curious small mining industry in this country is carried on in the Cornish tin district on the Red River. There a class of individuals called streamers are at work recovering black tin. Each streamer holds a section of ground. The waste tailings and slimes from the Camborne mines pass into the river and leave a concentrate of black tin, with its attendant minerals, of which it is

the business of the streamer to recover as much as possible from his holding. There are sixteen different firms or individuals at work, and these recover about 800 tons of black tin annually. The residuals pass into the sea, to be still further concentrated by wave action, and at low tide these concentrates are collected by the streamers. Nature, therefore, acts as a more complete concentrator than the elaborate machinery of the mines, and proves the need for greater efficiency to prevent this loss to them of valuable metals.

The mining market in London has been endeavoring in recent weeks to obtain a share of the speculative activity aroused in the first place by the extraordinary boom in rubber shares. The Rhodesian section has made progress but not enough to satisfy that faithful following which has been hoarding Rhodesian shares for years past, in the hope that one day they will get back to the prices they originally paid for them. All the same it is truly surprising to find Chartered again over $10 a share. This share is the mining description in which the average British mining investor is more fully interested than in any other. Its present authorized issued capital is nearly $31,000,000. In the great old palmy days of Cecil Rhodes, most of these shares were unloaded on the public here at all kinds of high figures up to $40 per share—a share having a face value of $5. After years of decline the bottom was reached two years ago, when the shares were quoted no higher than $2.50.

The figures now to hand dealing with the complete mineral production of the Transvaal for last year are calculated to revive any flattened interest our investors may have had in South African Gold Mines. The gold yield of the Witwatersrand does not show so great an increase as was anticipated a year ago, but, production was hampered by the abnormal rains which fell in the early months, and by an insufficiency of native labour in later months. Nevertheless, it must be admitted that the advance in the gold output is both substantive and satisfactory, and when the details of the work are examined there is little room to complain of the future prospects of the industry.

The salient features of the year's work are a larger tonnage crushed by a larger number of stamps and tube mills operated by practically the same number of persons, though a larger proportion of whites to colored were employed in 1909 than in 1908, according to the December returns for each year. A higher average stamp duty of 52 tons per stamp per day was obtained from an increase in the average number of stamps operated of 567, and an increase of 45 in the average number of tube mills.

The average value of the tonnage treated throughout the year for the Transvaal was twenty-nine shillings and one penny per ton as compared with thirty-one shillings and sixpence per ton for 1908, a decline of two shillings and fivepence per ton, while for the Witwatersrand the figures read:—1908, thirty-one shillings and fivepence; 1909, twenty-eight shillings and elevenpence, or two shillings and sixpence per ton less for last year. It has been frequently explained that the continuous fall in grade is very largely intentional through the reduction in working costs, bringing rock previously classed as unpayable, and hence allowed to remain untouched, into the payable margin. This fall in the grade of ore treated will naturally follow the fall in working costs, for that is the sole factor which governs the economic position. As an illustration of the gradual decline in the value of the ore treated, the figures for January show that the average value of rock sent to the mill on the Rand was twenty-nine shillings and ninepence per ton, while for December it was no more than twenty-eight shillings and fivepence per ton.

The total Transvaal working profit for 1909 was $60,371,510, a slight decrease on the previous year, but notwithstanding this the mines were able to set aside a bigger sum for dividends, distribution for the two periods being, for the whole of the Transvaal, $47,523,105 in 1909 as against $43,756,410 in 1908. In face of the fact that the total working profits for 1909 were $1,250,000 less than the preceding year, it is a distinct tribute to the improved efficiency and economy with which the mines have been worked that $3,750,000 more has been returned by the Transvaal in dividends and the still larger sum of $3,865,000 more by the Rand.

It may very properly be objected that there is a limit to the reduction of working costs and to the improvement in efficiency of treatment plants, as well as the quantity of ore to be won at a profit. But so far these three factors have not yet been determined. Nearly all competent authorities agree that working costs still offer a reasonable margin for attack; that treatment plants, notwithstanding that the latest installed have reached a high pitch of excellence, leave room for still further improvement; and that the quantity of payable ore yet to be exploited is not calculable, in other words, is unlimited.

STATEMENT BY TEMISKAMING MINE MANAGERS' ASSOCIATION.

An article by Dr. Eugene Haanel, Director of Mines Branch, Department of Mines, Ottawa, in the February number of "Industrial Canada," reflects disparagingly on the mining and metallurgical industries of the Cobalt region. The Temiskaming Mine Managers' Association makes the following specific comments on Dr. Haanel's statement:—

The statement "and in the Cobalt region . . . the mortality was simply astounding, the death rate per 1,000 men employed being 24.8," is absolutely without foundation or fact. Its incorrectness was known by those responsible for it, two months previous to its publication in the above periodical.

Notice of their error has still more recently been brought to their attention, both publicly and by the Ontario Department.

In issuing no formal correction, those responsible for the statement are to be condemned for their silence and for their defensive attitude.

The official figures on fatality, as determined by the Ontario Bureau of Mines, are:—

	Per thousand.
Cobalt producers, underground	12.
Cobalt producers, underground and surface	5.38
Cobalt area (proper), underground and surface	5.25
Area tributary to T. N. O. Ry., underground and surface	5.45
Province of Ontario, underground and surface	5.2

The figures given for Cobalt, in the report for 1909 of the Ontario Bureau of Mines, refer only to producing mines. We cannot see why Dr. Haanel has seen fit to divide the number of underground fatalities in the entire area tributary to the T. & N. O. Ry. by the number of men working underground in the Cobalt producers, and officially announcing the resultant 24.8 as the astounding rate of fatality in the Cobalt region.

The statement, "The cobalt-silver ores certainly

need investigation, with a view of discovering a more rational method of treatment than is at present practised," is based, not on personal observations, but "on the report of a manager some years ago," and is entirely unwarranted, in view of the splendid results now being obtained at Copper Cliff, Thorold, and Deloro.

In making the above statements Dr. Haanel has falsely put the Province of Ontario in an unenviable position as regards her mining and inspection laws, which are well known to be the most rigourous and complete on the continent.

Recent criticism of the Mines Branch, in connection with the above statements, has done much to undermine the faith of mining men in its statistics and suggestions.

H. PARK,
President.
J. G. SHEWAN,
Secretary.

CANADIAN MINING INSTITUTE.

The following gentlemen were elected to membership of this Institute at the regular April meeting of Council, held on the 1st instant:—

Ex-Officio Members.

Dresser, John A., Geological Survey, Ottawa, Ont.
Frechette, H., Department of Mines, Ottawa, Ont.
Lindeman, E., Department of Mines, Ottawa, Ont.
Malcolm, W., Geological Survey, Ottawa, Ont.
Malloch, G. S., Geological Survey, Ottawa, Ont.

Members.

Carmichael, H. Graham, 515 Wellington St., Montreal, Que.
Chambers, A. R., Nova Scotia Steel & Coal Co., Trenton, N.S.
Gaul, Alfred J., 34 Yonge St., Toronto, Ont.
Hoffman, Bertram F., Cobalt, Ont.
Howell, Edgar N., Box 996, Cobalt, Ont.
Leslie, James, Supt. Cobalt Central Mines, Ltd., Cobalt, Ont.
McKay, Robt. B., Cobalt, Ont.
Plate, H. R., Box 474, New York City, U.S.A.
Raynor, Geo. W., Thorold, Ont.
Robinson, A. H. A., 497 Gilmour St., Peterborough, Ont.
Smith, W. H., Mgr. Bell Asbestos Mines, Thetford Mines, Que.
Sproule, Gordon St. G., 106b Stanley St., Montreal, Que.
Williams, Percy, 524 Mineh Block, Vancouver, B.C.
Wilson, Eugene B., Scranton, Pa., U.S.A. (Ed. "Mines and Minerals.")

Associates.

Graham, Robt., Giroux Lake, Ont.
McGregor, D. M., Junior Turf Club, 3 St. James St., London, S.W., Eng.

Student.

Cumming, James D., 114 Bedford Road, Toronto, Ont.

PERSONAL AND GENERAL.

Mr. T. Jones, representing the Buffalo Mine interests, has purchased one Nissen stamp for installation at Porcupine.

Mr. James Hargreaves, formerly superintendent of the Alberta Consolidated Coal Company, near Taber, Alberta, is in Toronto.

Dr. Richard V. Mattison has resigned from the Board of Directors of the Amalgamated Asbestos Corporation, Limited. Dr. Mattison is president of Bell Asbestos Mines.

WORKING COST COMPARISONS.

At the annual meeting of the Mine Managers' Association held at Johannesburg the following reference was made by the President to working costs on the mines of the Witwatersrand:—"Our present basis of comparison between mine and mine and month and month—namely, the 'cost per ton milled,' which is dependent on so many factors, such, for instance, as whether or not it has been possible to keep the mill supplied with rock; whether the first day of the month happens to fall on an early or late day of the week, for on this depends whether more rock has been crushed in relation to the quantity mined or vice versa; and whether or not the machinery has run well. There is another grave disadvantage in this basis of comparison and that is the inducement to bring down costs illegitimately by the carrying of stopes wider than need be for maximum profit, or the skimping of sorting, and the hundred and one other things on which good mining really depends, merely to be able to show low working costs. If a system were generally adopted whereby a comparison of profit derived from areas exploited were made the basis of comparison, we would, I know, show higher cost per ton crushed, but the Rand would also, I believe, show a greater profit per area denuded of its valuable product, and that, I feel sure, is the thing we are all, or should all, be striving for. The scheme outlined above is, I understand, being introduced into the Corner House mines at once at the suggestion of Mr. H. F. Marriott, and we may therefore hope that before long the bogey of 'cost per ton milled' will have permanently scotched, to be replaced, as a 'divisor' by the much more accurate 'square fathom exploited.' But when all is said and done as regards basis of comparison the main thing to remember is that no two mines, or even the same mine at different periods, are really similar conditions, and that therefore comparison on a cost or a profit basis is most dangerous, except to those fully informed of the circumstances of both, and that the financial inclusion of two mines under one control does not of itself make comparison possible where conditions remain dissimilar."

The Engineering and Mining Journal, April 9, 1910.—In the course of a very sane editorial entitled "The Coal Miners' Demands" strong exception is taken to the miners' request that coal be paid for on a run-of-mine basis. This "from every standpoint, and especially that of economy and safety, . . . is to be severely condemned. For years coal has been paid for on a screened-coal basis, and this has been an incentive to the better preparation of the daily output. To go back to a mine-run basis would encourage shooting from the solid, with its resulting waste and dangers."

The Mining World, April 9, 1910.—"The 'Factor of Safety' in Mine Sampling" is the text of a symposium of opinion published in the current number of our contemporary. In response to questions put before them by Professor Arthur J. Hoskin, of the Colorado School of Mines, expressions of opinion were elicited from certain students, and in these opinions there is much diversity. That arriving nearest the truth, and nearest also the average of what each is driving at, is one opinion that concludes thus: "No general rule can be followed in discarding exceptional assays, including them as they stand, or applying to them a factor of safety. It is safe to say, however, that the wise course to follow is to take all possible precautions and then trust to common sense."

THE FIXATION OF ATMOSPHERIC NITROGEN AND THE FOOD SUPPLY.

LEO FRANK GUTTMANN,

In 1896 when addressing the British Association for the Advancement of Science, Sir William Crookes drew the attention of the entire civilized world to the question of food supply. He first of all pointed out that the increase in populations was so rapid that in a few years there would not be sufficient land available to grow the wheat required to feed them. In order to feed the coming millions, it would be necessary to increase the yield of wheat per acre, by the use of artificial fertilizers containing nitrogen. But the main supply of these, the sodium nitrate or Chile saltpetre beds of South America could not last forever, in fact their exhaustion was predicted in a short number of years, say 40 to 50, and where would we be then? The importance of this question can best be illustrated by quoting from Sir William's presidential address, the facts adduced in 1898 requiring little alteration for present purposes.

"The present acreage devoted to the world's growth of wheat is about 163,000,000 acres. At the average of 12.7 bushels per acre, this gives 2,070,000,000 bushels. But thirty years hence the demand will be 3,260,000,000 bushels, and there will be difficulty in finding the necessary acreage on which to grow the additional amount required. By increasing the present yield per acre from 12.7 to 20 bushels, we should, with our present acreage secure a crop of the requisite amount. Now from 12.7 to 20 bushels per acre is a moderate increase of productiveness, and there is no doubt that dressing with nitrate of soda will give this increase and more.

"The action of nitrate of soda in improving the yield of wheat has been studied practically by Sir John Lowes and Sir Henry Gilbert on their experimental field at Rothamsted. This field was sown with wheat for thirteen consecutive years without manure, and yielded an average of 11.9 bushels per acre. For the next thirteen years it was sown with wheat, and dressed with 5 cwt. of nitrate of soda per acre, other mineral constituents also being present. The average yield for these years was 36.4 bushels per acre—an increase of 24.5 bushels.

"At this rate, to increase the world's crop of wheat by 7.3 bushels, about 1½ cwt. of nitrate of soda must annually be applied to each acre. The amount required to raise the world's crop on 163,000,000 acres from the present supply of 2,070,000,000 bushels to the required 3,260,000,000 bushels, will be 12,000,000 tons distributed in varying amounts over the wheat-growing countries of the world.

"If we assume a liberal estimate for nitrate obtained from the lower-grade deposit (the Chile saltpetre beds are meant,), and say that it will equal in quantity that from the richer quality, the supply may last, possibly, fifty years, at the rate of a million tons a year; but at the rate required to augment the world's supply of wheat to the point demanded thirty years hence, it will not last more than four years."

One other illustration, from French statistics, to illustrate the vital importance of the problem. The crops harvested in France abstract annually 600,000 tons of nitrogen from the soil. It is proved that the nitrogen returned as stable manure, supposing it were all taken back to the fields, would not amount to more than 327,000 tons. Now France consumes only 230,000 tons of Chile saltpetre per annum, representing 31,200 tons of nitrogen, whilst the deficiency is 273,000 tons. The amount imported is thus only 11 per cent, of the deficiency produced by the removal of the crops.

The address of Sir William Crookes having called general attention to a vital problem, inventors at once set to work to obtain this necessary nitrogen, and turned to the enormous amount of nitrogen in the atmosphere for their source of raw material. The amount of nitrogen in the air over a field of nine acres is about 280,000 tons, i.e., the same amount which is contained in the 1,740,000 tons of Chile saltpetre exported in 1907. The practically inexhaustible supply of nitrogen in the air totals about 4,041,000,000,000,000 tons.

In their classical researches on the constitution of air, Priestley and Cavendish in 1775 caused oxygen and nitrogen to combine by passing an electric spark through the mixture for a continuous period of about forty hours. The nitrous acid thus formed, was absorbed in a solution of caustic soda, forming nitrate and nitrate of soda. Over one hundred years later, in 1897, Lord Rayleigh and Sir William Ramsay isolated the new gas, argon, by treating large quantities of air in a glass vessel, with the electric spark. Priestley had treated 100 cubic centimetres of air (about 7 cubic inches) for forty hours with an electric spark, obtained by turning an induction machine by hand. Rayleigh and Ramsay "sparked" twenty litres, two hundred times as great a quantity, in an hour by means of an automatic induction coil. On this principle the modern method of fixing nitrogen as nitric acid is based, but enormous quantities are involved, the work situated at Notodden in Norway treating 75,000 litres, (nearly 3,000 cubic feet) of air per minute.

The principle having been established, practical means had to be devised. Of these, I shall only mention five. The problem in the combination of nitrogen and oxygen is twofold, the mixed gases have first to be heated to as high a temperature as possible, up to 3,500° Centigrade (6300° Fahrenheit) by passing through an electric flame, and they have then to be cooled as rapidly as possible, to minimize the decomposition which unfortunately sets in at an intermediate temperature of about 600° C. (1080° F.). To accomplish this, Bradley and Lovejoy at Niagara Falls, devised an ingenious apparatus consisting of a cylinder studded internally with platinum points, inside of which revolved another cylinder, studded externally with platinum points. Each cylinder was connected to the electric circuit, and the effect of the arrangement was to produce a countless number of small electric arcs, an arc being formed each time two platinum points came in contact. About 414,000 arcs per minute were thus produced in an apparatus using only a small amount of electric energy, and thus a large volume of air could be successfully subjected to the effect of the electric spark. Although a fair yield of nitric acid was obtained, this process did not prove a commercial success.

The other processes to be described, make use of the electric arc instead of the spark. If a current of air is rapidly blown through an electric arc, the oxygen and nitrogen combine, but the yield thus obtained is small, the concentrated heat of the arc offering only a small

surface of action to the gases. Means had therefore to be devised to increase the area of the electric arc, and this problem seemed almost impossible of solution, till Birkeland and Eyde in Norway, showed how it could be done. They took an ordinary electric arc, of enormous energy (up to 1,300 horsepower) and allowed it to play in a space set equatorially, i.e., in a plane at right angles—to the poles of a powerful electro-magnet. The effect of this is to spread out the electric arc to an enormous flat disc of flame, the actual electric flames used being 7-12 feet in diameter. Each flame is surrounded by a chamber of fire-brick, forming a furnace, and resembling a huge cheese standing upright. Air is blown in through perforations in the brick lining at the rate of 1,000 cubic feet a minute, and withdrawn laden with oxides of nitrogen through another opening. The arc electrodes are of copper, cooled by circulating water through them, and the working potential is 5,000 volts with a current of 200 amperes. The flame, when burning, emits a loud noise, but requires very little attention to keep it in good order. The subsequent treatment of the air laden with oxides of nitrogen, will be described further on. The Birkeland and Eyde process is at work at Notodden, Norway, where large amounts of water power or "White coal," are available at the cheapest rates in the world. The yield of the process is good, and the price of production low enough to compete with Chile saltpetre. The power at present used in Notodden amounts to 30,000 horse power.

Another commercially successful process is that of H. and G. Pauling, worked by the Saltpetersaure Industrie Gesellchaft. Their works are situated at Patsch near Innisbruck, in the heart of the Tyrol, and utilize 15,000 horse power. I had the privilege of spending three days last summer in this charming spot, investigating the process. The factory lies in a little valley, surrounded by high and picturesque mountains, the Brenner railway passes over a viaduct on the other side of the valley, the river Sill runs through it. The water is taken from the Sill, conducted through a canal six miles in length, and utilized at a fall of 600 feet. In this process air with a high velocity is blown through a nozzle between two horn-shaped iron electrodes, these being water-cooled. The effect of this is to blow out the electric arc into a great roaring sheet of flame, over 3 feet long, and thus offering a large surface of contact between the flame and the air. The sight of this huge flame is terrifying but harmless. The flame plays inside an ordinary brick furnace, the air laden with oxides of nitrogen being drawn off by a fan to the absorption towers. This process was working on a manufacturing scale at a time when the Birkeland and Eyde process was still in the experimental stage.

It is exceedingly difficult to obtain any accurate information regarding the actual yields and working costs of the various systems described, these being kept secret, but it may be mentioned that the Birkeland and Eyde, the Pauling process and the Cyanamide process have been proved to be successful on a large manufacturing scale; and sums of $50,000 for an option on the process in a particular country with royalties of upwards of $100,000 a year, seem to tell the same tale. The Pauling process is exceedingly simple and the yields are said to be as good as those obtained by the more complicated Birkeland Eyde process. Factories utilizing 50,000 horse power are in course of erection. The treatment of air, carrying oxides of nitrogen being the same in these processes, and in that of Schonherr (see below) will be described at this point. The air is cooled by suitable means, and passed up 3-5 large towers, 6 feet in diameter, 30 feet high, built of granite or volvic lava, and filled with quartz pebbles, over which trickles a continuous stream of water. In contact with the water, the oxides of nitrogen are converted into nitric acid, and by constantly circulating the water, nitric acid of 30 to 40 per cent. strength is obtained. To be made into a merchantable product this has to be concentrated. Concentration at 60 per cent. is easy, further than that it is very difficult, and yet the chief consumer of nitric acid, the explosives industry, requires acid of 99 per cent. strength. It is this that constitutes the weak spot in all these processes. At the Notodden works the nitric acid is treated with limestone, and the resulting nitrate of lime sold as an excellent fertilizer, competing with Chile saltpetre. But freight charges are heavy. In all the processes the final absorption of the oxides of nitrogen is made with sodium carbonate solution, or milk of lime, nitrate of soda, or nitrate of lime respectively, being obtained. But the market for nitrate of soda, is exceedingly limited, the world's total consumption being about 2,000 tons. Incessant attempts are being made to obtain more useful products, and will doubtless prove successful.

The most recent process of this class is that due to Schonherr, of the Badische Anilin and Soda Fabrik. He forces the electric arc to take a spiral path, and thus increases its length to six feet and more, the air blown in being made to travel along the arc. The yields of this process are very good, the subsequent working up of the products being as already described. An amalgamation has taken place recently between the Birkeland and Eyde, and Badische companies, joint works will be built and in a short time 400,000 horse power will be utilized in the fixation of atmospheric nitrogen by these processes.

We will now consider a process of quite a different type, that of Professors Frank and Caro, of Berlin. If atmospheric nitrogen, freed from Oxygen, be passed over calcium carbide heated to about 600° Centigrade, (1,100° F.) absorption takes place, no further heating being required, and a compound called calcium cyanamide is formed. The reaction is simple, requires very little heat expenditure, and calcium carbide is a cheap electrical product now manufactured on a large scale. This calcium cyanamide contains fixed nitrogen, and contains about 22 per cent of this element, that is, about the same amount as is present in ammonium sulphate. And of ammonium sulphate 600,000 tons were manufactured in 1907, in England alone, for use as a fertilizer. It remained to be seen whether calcium cyanamide could be directly utilized as a fertilizer and large scale experiments were made on spring wheat, winter wheat, winter rye, oats, Indian corn, potatoes and sugar beet. In every case the fertilizing effect of calcium cyanamide was proved to be equal or superior to that of ammonium sulphate or Chile saltpetre. All three, of course, produce very much greater crops than when no manure is employed. The product has been manufactured on a large scale for several years, and is sold under various names: e.g., nitro lime, lime nitrogen.

Nitro lime was not at first manufactured for direct use as a fertilizer. It can readily be split up chemically into ammonia, or salts of ammonia, and it was intended to use these salts of ammonia as an equivalent for the rapidly-diminishing amounts in sight. The idea, however, occurred to the inventors to let these chemical changes take place directly in the soil, instead of in the laboratory, and to use calcium cyanamide as a fertilizer, with the excellent results quoted.

The manufacture is simple. Thanks to the genius

of a Canadian, T. L. Willson, of Ottawa, the prime material, calcium carbide, is now obtainable in unlimited quantity and at a low price, he having been the first to make the manufacture of carbide a commercial success. The calcium carbide is ground fine and heated in a furnace, whilst nitrogen is passed in. Absorption is complete in about forty hours, and since the reaction is an exothermic one, very little heat is required to keep it going when once started. The finished product is ground, and when packed in suitable sacks, is ready for the market. The nitrogen required has been obtained in various ways; originally nitrogen was obtained by systematically fractionating liquid air manufactured according to Claude's of Linde's patents. Patents have now been taken out for the manufacture of nitrogen from producer gas, and by burning petroleum residues in air.

The utility of nitro lime does not stop here. It can be converted into sodium cyanide, and large quantities of this material are already manufactured from it, and exported to the Transvaal and other gold-producing countries. The process has proved a commercial success and this is again shown by the large prices paid for options and manufacturing licenses. In brief, the process consists in fusing the calcium cyanamide with coke and salt, thus obtaining a mixture of calcium chloride and sodium cyanide. This mixture is sold as a "surrogate," and claimed to be cheaper and more efficient than pure sodium cyanide. To obtain cyanide, the mixture is treated either with sulphuric acid or with sodium bisulphate, and the prussic acid distilled off and absorbed in caustic soda. On evaporating, sodium cyanide is obtained. It is manufactured in the form of briquettes, which are more readily soluble than fused cyanide, and is sold as 125. per cent. cyanide on the potassium cyanide basis. Calcium cyanide can also be converted into numerous other products, such as urea and its derivatives, ammonia, etc. It is the most formidable competitor of the Birkeland Eyde Badische Pauling systems, and we shall see why. All these latter require much larger quantities of electrical energy at a very cheap rate, and the works have therefore to be located in Norway. You can thereby manufacture cheaply, but freight charges are heavy, and the product on that account can barely compete in European markets with Chile saltpetre. This Norway saltpetre will, however, ultimately be the substitute for Chile saltpetre. Calcium cyanamide however, seems destined to replace ammonium salts, and works aggregating 160,000 horse power are in course of erection, not in out of the way places, but wherever needed. 40,000 tons of nitro lime are at present manufactured yearly, and about 5,000 tons of sodium cyanide.

To sum up, for our rapidly-diminishing stocks of nitrate of soda or Chile saltpetre, we have as a substitute, fixed nitrogen from air, in the form of calcium nitrate or Norway saltpetre. For a like purpose, and as a substitute for the limited amount of ammonium salts at present available industrially, we have calcium cyanamide or nitro lime. All these products being manufactured by the aid of a power at present unutilized, the "white coal" of the world's waterfalls which will last as long as the sun gives us light, no apprehension need now be felt as to the world's food supply failing for lack of a fertilizer. A little reflection will show how gloriously Canada is provided with the acres to grow the world's food, and with the "white coal" wherewith to fertilize them. The warning uttered ten years ago by Sir William Crookes, has been heeded, and remedies devised in the incredibly short time since elapsed.

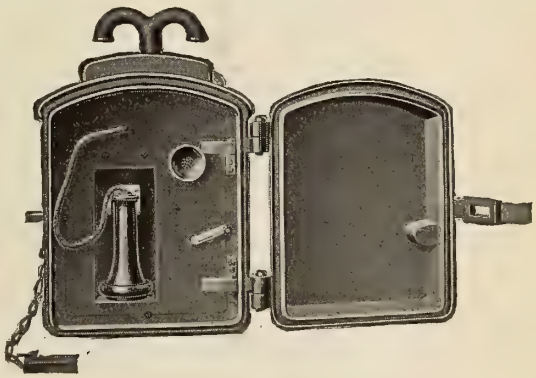
NEW MINE TELEPHONES.

The accompanying illustrations are views of newly developed telephone sets designed especially for use in mines. This apparatus is the result of many months of careful experimenting and testing on the part of expert engineers. The announcement of this new apparatus

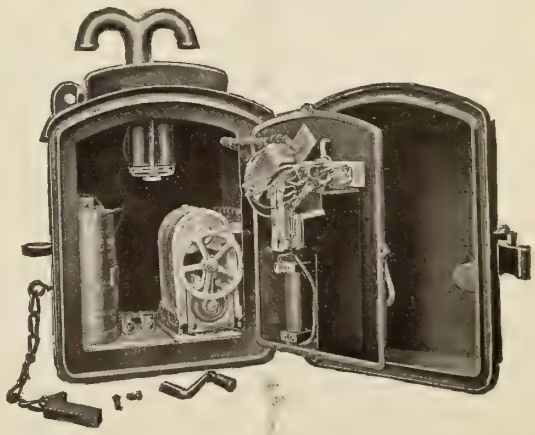


comes at an appropriate time, as the many disasters of the past year in underground shafts have focussed attention upon the problem of safeguarding life in the mines.

Working in co-operation with mine operators and officials, the Western Electric Company in the design



of this new equipment has been careful to meet all the requirements of mine service. The quality standard of the "Bell" telephones, all of which have been made by this company, has been observed in the design of these new mine sets. The telephones are of two types—



No. .336-E, a metal set, and No. .337-E, a wooden set.

Three views of the metal mine telephones are shown in the accompanying illustrations. The wooden sets possess the same general features of arrangement and

operation. The cuts demonstrate the compactness and convenient arrangement of these telephones. All of the apparatus inside the case is accessible, yet at the same time it is carefully protected. The parts are easy to get at with a screw-driver. No soldering irons or torches are necessary in maintenance work.

The line wires to these sets may be brought in either at the top of the case or at the bottom. A feature in the wiring of the sets when connected to the line from the top is the curved connector shown in the illustrations. This connector prevents water and moisture from following the wires into the apparatus. It will be readily seen that as the wires come down to the set they make a curve into the connector, so that any moisture or water will drop from this point and not follow the wires into the set. When the line wires are brought into the bottom of the set the curved connector is not necessary, and the opening for it is closed by a suitable plug provided for the purpose.

The gongs used with these telephones give a loud, clear ring, which can be heard a long distance in the mine. They are protected by a hood, so that it is impossible for a falling body to injure them or interfere with their action.

Each set is equipped with the No. 48 5-magnet generator, recognized as the most efficient hand generator for telephone use on the market. Transmitter and receiver are of the familiar "Bell" grade type. Windings of receiver, ringer, induction coil and generator have been especially treated to protect them from acid fumes, gases and moisture.

That coal mining is the most hazardous industry in America is a statement that has often been made. The telephone, though nothing new for mine use, has recently been urged as imperative for proper protection against fires, and has always been found an invaluable aid to the conducting of business in the mines. The new telephones are important in that they represent a development through many tests and applications in the attempt to arrive at the complete instrument.

Correspondence.

The Editor, "Canadian Mining Journal."

Sir,—In your issue of April 1st I notice a paper by Mr. James Rennie treating of "Claims Assessment Work in the Province of Ontario." The question raised is a timely one,, and if your space will permit I should be glad to add a few remarks.

Under the present system the Act calls for a given number of days' work during the years until patent issues. Each day is to be of eight hours duration, and it is assumed than an honest day's work will result. Provision is also made for the inspection of this work by the Recorder. It is, however, manifestly impossible for the Mining Recorders to inspect all the claims in the various divisions, and I believe any inspection for work is rare. From a variety of causes then, it is possible to evade the just requirements of the Act. Under the system proposed by Mr. Rennie the claim holder will be required to record actual work performed, expressed in cubic feet. In short, the system of the present calls, in effect, for the putting in of time: the new system proposes a check on mere loafing, and dishonesty, and calls for work expressed in cubic feet—if not in foot-pounds.

Anyone who has travelled extensively through the northern part of Ontario will realize that the Mines Department is, in too many cases, being cheated of its moderate requirements in the way of assessment work. Many capitalists are letting out their assessment work on the contract plan, and though they are not getting their properties developed in any true sense, the system answers their purpose, because the contractor makes affidavit of the performance of the work, and thus the requirements of the Mining Act are fulfilled, too frequently at the price of a false affidavit! There are many honest contractors, it is true, but these are largely put out of competition by their dishonest brethren who assume the responsibility at a price which manifestly precludes the possibility of supplying honest days' work.

I recall, in particular, a case where I was asked to look over five claims. Sixty days' work was supposedly done on each claim, by one of these enterprising contractors. The owners had paid a ridiculously low price for the work, and they got in return a total of about thirty days' actual work distributed over all the claims. Even this total was hardly to be considered effective work since it consisted mainly in pulling moss from the rock outcroppings. Apparently this gentle exercise had grown monotonous, for the contractor appears to have found relief in a little light trenching. Needless to add that the properties were quite valueless and the owners perhaps rather innocent. The point is, that the contractor recorded the days put in and received his cheque on production of the Recording Office papers.

The instance I have cited is a particularly bad one, but there are many similar cases and it is high time the matter was looked into. The premium upon false affidavits should be removed, and the suggestions of Mr. Rennie, along these lines, are worthy of study and further elaboration. The recording of actual work would tend to systematize effort, destroy graft, and render the mere shovelling of snow non-effective.

I observe that Mr. Rennie has not given us any standards of what should constitute a day's work, but no doubt it was at the back of his mind, since the system is capable of elaboration to the point of fixing suitable, and equitable standards. Thirty days trenching, for example, may eventually be expressed as so many cubic feet and perhaps finally recorded in that way rather than as thirty days' work.

It may be objected that many prospectors are not capable of measuring up their work, and recording it in the prescribed form. The retort is, that similar plans are now required for the purpose of recording claims—the proposed requirement is no more complicated than the old.

Any valid objections that might be urged against the adoption of Mr. Rennie's proposals would probably be prompted by a fear of too great elaboration. Moderation is, of course, assumed, for it is easy to foresee that such regulations might be carried to the point of becoming a burden, and a cause of mere vexation.

It is to be conceded that the "wild-catter," and the legion of the "blanketers" and schemers would find the passing into law of Mr. Rennie's proposals very burdensome in their most simple form; it is just this fact that makes them so valuable and altogether desirable.

JOHN HANDLEY,
Mining Engineer,
New Liskeard.

From Oct. 1st, 1908, to Feb. 18th, 1909, inclusive, the Government paid the Dominion Iron and Steel Company and the Nova Scotia Steel and Coal Company sums aggregating $40,908, in bonuses on coal used in the manufacture of iron and steel in the province.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—The Coal Conspiracy Case.—The walking delegate from the United States must often put his tongue in his cheek and smile to himself at the complacency with which Canadians allow their country to be plundered and its peace to be disturbed by the itinerant apostles of discord sent here by the international labor unions. One of the most glaring instances of the undefended state of our industries in this regard is the so-called coal conspiracy case, in which the Grand Jury of the Supreme Court of Nova Scotia found "no bill." It is almost inconceivable that such a judicial farce could have been enacted. In Nova Scotia we are more largely dependent on the coal industry than on any other, as from it we derive much of the provincial revenue, and large industrial populations are entirely supported by it. In the best market for our coal product, namely, the St. Lawrence ports, our coal exports have to face an unrelenting competition from United States coal, which the protective duty alone enables us to meet. Simultaneously with great activity on the part of the United States coal operators in the St. Lawrence markets, there appears in Cape Breton great activity amongst emissaries of the United Mine Workers of America. This body allows a specially low rate to enable that district to send coal into Canada. The United Mine Workers then call a strike, without rhyme or reason, to embarrass the largest coal company in the province. The strike is not successful, and then the United States organization, which is doing the work of the United States coal operator, commences to prosecute the Canadian coal operator for attempting to sell his coal at too high a figure, and uses the powers of the law to compel the Canadian operator to produce in court for the edification of the world at large, and the United States sales agent in particular, his most valuable and guarded private data. The coal companies were asked to publish their mining cost sheets, and their sales price-books, their freighting costs, their profits and their correspondence. All this was done at the request, not of citizens of the province, but of alien agitators engaged in injuring the business of the men they were using the machinery of the Canadian law to prosecute. Not a tittle of evidence was adduced which proved the justice or accuracy of the information laid against the coal operators; the money to defray the legal costs of the prosecution came from the U. M. W. treasury at Indianapolis, and the whole business was evidently a vexatious persecution instituted without serious hope of success or adequate grounds, and was intended to be a lever to compel the Dominion Coal Company to abandon its prosecution of the U. M. W. leaders for libel. It is extraordinary that our courts of justice can be employed by aliens in this manner. The city of Halifax is to have the pleasure of paying witness fees amounting to some $2,00 in connection with this case. In Cape Breton it has long been recognized that the U. M. W. A. is a dangerous menace to our prosperity and progress. Eventually it may dawn upon other parts of the province that the U. M. W. A. is a nuisance, although it is probable that Halifax obtained fully two thousand dollars worth of amusement from the protracted enquete, and it is only fair that they should pay for the diversion.

The Dominion Coal Company have recently obtained a number of Ackroyd & Best's safety lamps, fitted with Messrs. Cunninghame & Cadman's asbestos attachment for detecting firedamp in mines. These lamps are of the usual magnetically locked and electrically lit type, but are of peculiar construction, inasmuch as the body of the lamp is of aluminium, while the oil attachment has been explained in the Transactions of the Institution of Mining Engineers and in the columns of the "Colliery Guardian." It consists of a small piece of asbestos blue-board, so constructed that it can be lowered on to the flame. The asbestos is treated with a solution of hydrochloric acid and soda, which gives a clear and easily defined cap in a mixture of gas and air. A perpendicular meter is attached to the asbestos graduated in tenths, by means of which the exact percentage of gas in the air can be estimated. The lamp can be used by the examiner in the ordinary way, and will give exact results without the necessity of carrying a specially constructed testing lamp such as the Pieler lamp. A great deal of attention is being devoted at the present time in England to more exact methods of testing for gas in mines, and to the construction of safety lamps.

The Workmen's Compensation Act, which has been introduced as a Government measure by the Nova Scotia Government, is not favourably viewed by the members of the Colliery Relief Societies. It is recognized that a measure like the Compensation Act, particularly the very crude draft which is now before the Nova Scotia Commons, brings with it many penalties, one of which would be the extinction of the Relief Societies and the benefits at present obtained by the miners through the operations of these self-supporting bodies. Some interesting figures have been presented to the committee which is dealing with this proposed measure as to the dissection of the disbursements of the Relief Societies. It may surprise many people to know that 54 per cent. of the benefits paid out by these societies is for sick relief, and that only 35 per cent. is disbursed for accident relief. The Relief Society gives its members protection all the time, and is in fact the miner's sheet-anchor. Probably the weakest feature of these societies is the small payment at death, but here again the Relief Society operates most beneficially where the family left is largest. The widow receives a monthly payment for one year, but for each child she receives a monthly payment until they attain a certain age, generally thirteen years. Under the operation of the Compensation Act the dependents of a man killed at work would receive a comparatively large sum in one payment, often with a disastrous result to the recipients, who are unused to the possession of much money at one time, and do not know how to use it to best advantage. The Relief Societies are supported by contributions from the workmen, the Government and the companies, and this mutuality of support and control works for the best interests of all concerned, and is an admirable check on that bugbear of the Compensation Act, namely, malingering. The accumulated funds of the Relief Societies at the mines of the Dominion Coal Company alone amount to over $45,000, but these funds are not invested to the best advantage, only earning the ordinary 3½ per cent. paid by the banks. Properly invested, these funds should bring in at least twice the amount of interest they now earn. The members of the Relief Societies do not like any interference with their independence, but it could easily be arranged that a "merger" of the general funds should take place, without interfering with the individual management of each society. The collieries are so inter-related, and their workmen move about from one mine to another in such a way, that a common fund for the reserve or surplus would net at least $1,500 per year additional interest. The conclusion arrived at by the commission which investigated the Relief Societies some time ago seems to be confirmed by the present attitude of the members, namely, that the best and most beneficial method of providing relief for the victims of accident and disease around the collieries is by an enlargement and consolidation of the present Relief Societies, which even in their present state have been probably the most powerful influence for good around the colliery villages. The Relief Societies afford relief to those who need it most and are also most deserving. They protect the miner in sickness as well as in the event of accident, while at the same time they discourage malingering. The Compensation Act, however, tends to drive the weakest to the wall, and enforces upon the employers in self-protection the necessity of dispensing with all aged or defective employees, while at the same time it puts a premium on malingering, de-

stroys the independence of the employees, and causes endless litigation.

Glace Bay.—The output of the mines of the Dominion Coal Company for March was 243,763 tons, or an average daily production of 9,370 tons. There are two new producers, namely, No. 15 and No. 6 Collieries. No. 15 is the newest mine, and is situated on the Lingan seam. No. 6 mine has not worked for about a year, owing to the pleasantries of the United Mine Workers, but during April it will become a perceptible addition to the steadily increasing total output of the company. Under the rules of civilized warfare, no blockade is recognized that is not effective. How ineffective the U. M. W. A. strike is as a blockade of the company's operations at Glace Bay may be judged from the comparative figures of monthly outputs for the first quarters of this year and last, which are as follows:—

	1909.	1910.
January	200,176	212,073
February	209,656	204,521
March	253,622	243,763
	663,454	660,357

The men employed daily at the mines alone (all subsidiary and transportation employees excluded) number 4,300. The number of men now out on strike is 1,200, about 500 men having returned to work since the strike commenced. These figures should carry their own significance. New men are arriving at the mines every day, and by the opening of navigation, barring serious accidents, the absolute failure of the strike will be apparent even to the most biased sympathizer with the U. M. W. A.

In face of the foregoing facts, it is amusing to read an interview which the local president of the U. M. W. A. gave to the Halifax Herald recently. It was gravely stated that the number of men who came out on strike last July was 5,000, of which number 2,000 had gone West, leaving 3,000 men on strike at the mines. The funny part of the matter is that the Coal Company never employed more than 5,000 men in their mines, and that the number of men belonging to the Provincial Workmen's Association who remained at work at the time the strike was called outnumbered the strikers by two to one. It is a little late in the day for the leaders of the U. M. W. A. to rehash all their stock misrepresentations, but there seems no limit to their mendacity. At one time, before the public were properly informed, there was some purpose to be served by their lies, but to-day, when the general untruthfulness of these men has been exposed, it is but foolishness on their part to persist further, as it merely serves to confirm the public in their suspicions that the U. M. W. A. is an untruthful organization, and that its officers will stick at no amount of misrepresentation to serve their own ends.

ONTARIO.

Cobalt.—The majority of cases against the Cobalt high graders have been held over till May, when those implicated will again come up for trial. The information in all of the charges has been changed, so that now the defendants are charged with having ore in their possession which is the legal property of the Crown. This is to conform to the statute that declares that any ore for which an owner cannot be found lays in the name of the King. By this means it is hoped to get around the old law, which throws the onus of proof of ownership on the complainant.

A few days ago the ore-house at the Trethewey Mine was broken into and 200 pounds of nuggets, valued at approximately $1,000 was stolen. So far, no trace has been found of the stolen ore.

The new mill at the Silver Cliff is now ready to run, and all the machinery has been turned over, and is in good working order. It is estimated that there are about 18,000 tons of ore on the dumps and in the stopes. The work done below tunnel level has proved up the veins, to a depth of at least sixty feet, and the values in the bottoms of the workings are very encouraging.

Work has been resumed on the Silver Lode property, which lies to the east of Cross Lake. A new shaft-house is being built, and as soon as power can be obtained the shaft, which is at present down 120 feet, will be sunk to greater depth. There is a vein of calcite and cobalt showing in the bottom of the working.

Good ore is now being obtained from the new shoot opened up on the Ophir property. The vein shows about eight inches of calcite and smaltite, and carries some native silver.

The Nipissing has declared the regular dividend of 5 per cent., with a 2½ per cent. bonus, payable April 20th, to shareholders of record April 1st. The La Rose has also declared a 2 per cent. dividend, payable April 20th. Up to date for the present year Cobalt companies have paid and declared dividends amounting to $2,324,527. This does not include the profits returned to the owners of the private corporations, the O'Brien and the Drummond. During the month of April six companies will disemburse to their shareholders dividends amounting to $970,293. The companies that have declared dividends for the present year are as follows:—

Nipissing	15%	$900,000
Crown Reserve	30%	530,644
Kerr Lake	10%	300,000
La Rose	4%	300,000
Buffalo	8%	80,000
McKinley-Darragh	5%	112,346
T. & H. B.	600%	46,566
Right of Way	2%	29,971
Haileybury Silver	50%	25,000
		$2,324,527

The Haileybury Silver is paying the dividend out of money raised by the sale of the south half of its property to the Haileybury Frontier Company. This latter company recently struck high-grade silver ore on the 65-foot level on what is supposed to be a continuation of the Keeley vein.

The famous Cobalt Gem nugget has been purchased by the Ontario Government for the sum of $5,054. This nugget, which is the largest piece of float ever found in this district, was discovered on the property of the Cobalt Gem Mining Company, a Philadelphia organization, and with the exception of a few small pieces of float, constitutes all the ore that has been taken from the claim. The nugget weighed 1,640 pounds, ,and was 40.62 per cent. pure silver, containing 9,715 ounces. It now forms part of the collection of the Bureau of Mines at Toronto.

The Lewisohns, who control the Kerr Lake Mine in Cobalt, have made the second payment on their option of the Wettlaufer Mine in South Lorrain, thus giving them the control of this property. The Wettlaufer is the best known and most important property in the South Lorrain district, and has been the bonanza mine of that camp, having had high grade ore from the grass roots down. Since the Lewisohns took an option on the property, development work has been pushed, and the results obtained were most satisfactory. The ore on the lower levels was found to be fully as rich as nearer the surface. Although several shipments have been made, no stoping has been done, all the ore having come from development work. The mine is equipped with an up-to-date plant, but it has been found insufficient to carry on the work, so a new twelve-drill power-driven compressor has been ordered. The Mines Power Company will have power in there some time this summer.

The Hargraves Mine has entered the list of shippers, having sent out 21 tons of high-grade ore. This is the first time this company has shipped since it was reorganized. In the early days of the camp one 28-ton car was shipped with ore taken from the surface.

As the winter roads into Elk Lake are now impassible, it is probable that there will be no more shipments made from Gowganda until next winter. The tonnage that came from there is in

excess of what was estimated, and the shipments were also exceedingly high grade. As was expected, the Blackburn or Millerett was the heaviest producer, sending seven cars, containing an aggregate of 198 tons. The Reeves-Dobie shipped 62 tons, the Boyd-Gordon 30 tons, the Miller Lake O'Brien 11 tons, the Welsh 1¼ tons, and the Burke-Remey 2 tons, the two latter being sample shipments. The amount of ore that has come from this district is very creditable, considering the difficulties under which mining operations are carried on, and has done much to restore public confidence in the future of the camp. A new discovery has been made at the Boyd-Gordon, and the ore is reported to be almost pure silver. The Bishop Mine has four veins showing silver and an ore shoot carrying about 1,000 ounces has been opened up at a depth of 70 feet. S. D. Epplet has found a vein carrying good values in silver on one of his properties near Hanging Stone Lake. He now has 40 men working on the different claims. As a whole, the district is looking better than formerly, and all indications point to a renewal of activity this summer. At present things are hung up on account of the early break-up, and it is stated that there are nearly fifty cars of supplies of various kinds at Charlton that it will be impossible to send in.

The Elk Lake district has also helped to swell the list of shippers, the Lucky Godfrey having sent out a twenty-ton car of high grade ore. This camp has suffered in comparison with Cobalt and Gowganda, but has notwithstanding made a very good showing. There are practically a dozen mines in that section that have pay ore, and as they will be more actively developed than formerly, better results may be expected.

The Large property, situated on Cross Lake, which has been in litigation for two years, was purchased by the Valentine Mines, Limited, immediately upon the settlement of the case in the courts. As soon as sufficient money is raised by the sale of stock, development work will be started.

The T. & H. B. has declared another dividend of 300 per cent., or $3.00 per share, this making the third dividend for 1910. When this last dividend is paid, the company will have disembursed to its shareholders $160.00 per one dollar par value share in dividends.

The City of Cobalt is now having its dump treated at the rate of 50 tons of ore a day, and it is estimated that there are about 14,000 tons available. The Northern Customs Concentrator, which has the contract for milling the ore, is now running by electric power throughout.

The long-heralded compressed air has at last reached Cobalt, the Mines Power Company having begun giving commercial service on April 4th. There had been air in the pipes at different times for a week before that date, but the service was not continuous. They are also supplying electric power, and several plants are now in operation. A good many other plants will be using this same air and electricity in a few days, because a number of mining companies would not sign a contract for their supply until they saw which power company was first in the field. The Hydraulic Power Company is rapidly getting in shape to turn the water down the shafts. There is, however, a certain amount of work to be done, and it is hard to say just when they will be ready to deliver air. The Cobalt Power Company is giving electric energy to some plants, but this is from a unit that has been installed at Ragged Chutes, at the plant of the Hydraulic Company. Their main plant will soon be ready, as they are now installing the last of the machinery.

Porcupine.—The early break-up of the winter has caused consternation in many parts of the district, because as it was not expected for about a month, many companies will now be unable to get in their supplies. The roads are now impassible for teams, and men going in or coming out have to do so on foot. Fortunately the principal operating companies managed to get in the greater part of their supplies and machinery. The biggest deal that has yet been made in Porcupine claims was consummated a short time ago, when the famous Wilson and Edwards properties passed into the hands of a syndicate of which Mr. A. Montell is the head. Some of the people who are heavily interested in the Buffalo Mine in Cobalt belong to this syndicate. The original Wilson claim is generally conceded to have the most sensational showings of free gold of any in the district, but so far practically no work has been done on it. The owners received many flattering offers, but did not seem at all anxious to dispose of their claims until Mr. Montell's syndicate entered the field. A complete plant, including two 60-horsepower boilers and a six-drill compressor, was ordered, and it is understood is now on the property. As the roads were getting in very bad shape, a special train with fifteen teams was sent up from Cobalt to help rush the supplies in. There were, all told, about seventeen carloads of supplies and machinery, and a large gang of men is at work. In order to test the values on the surface, shots were put in in different places, and with one or two exceptions, all the broken rock showed free gold. The Scottish Ontario Gold Company are installing machinery, which they expect to have running soon. Their shaft is now down about 35 feet, and the values in the bottom are exceptionally good. The ore is being carefully sampled, and the samples sent to Scotland to be tested in the company's laboratories. The Higginson veteran claim has been purchased by a New York syndicate, and a gang of men is being sent in to open it up. Machinery will be installed later, as it was impossible to get it in before the break-up. The Timmins have their buildings up and are installing the plant, which includes a six-drill compressor. They have sunk two shafts, one of which is down 60 feet, and has free gold in the bottom. They are also getting more sulphides with depth. A sample car has been shipped from this property to a mill in New Jersey, in order to have a test run made. Care has been taken to make the car as representative as possible. The Crown Chartered Company, which purchased the Reamsbottom claims, has part of its plant on the ground. They are putting up a small sawmill, and expect to cut lumber for other concerns as well as their own. The Foley-O'Brien properties are looking well, and free gold has been struck at the bottom of the shaft. They are operating on the Wright and Forneri claims, and also have a veteran claim near the south end of Porcupine Lake. During the coming summer there will be three compressors in operation and probably six plants. When these are working it will be possible to sink the shafts to greater depth, which is, of course, necessary to determine the extent of the deposits. Arrangements have been made to run a line of boats on the lakes as soon as the ice is gone, which will be a great aid to transportation in the summer months. The greatest need, however, at the present time is for a summer road. The Government has been petitioned to build this, but so far has shown no decided inclination to carry it out. Several roads are projected, but these are as yet up in the air.

GENERAL MINING NEWS.

NOVA SCOTIA.

North Sydney, April 5.—The Nova Scotia Steel Company's steamer Wobun sailed from North Sydney on April 5th for Montreal with 2,450 tons of coal. The Wobun is the first coal steamer to go up the St. Lawrence this season.

The steamer Kronprinz Olav, Captain Neilson, sailed yesterday afternoon from the Dominion Coal Company's pier, coal laden, for Montreal. The Kronprinz will be the first ship to sail up the river with coal cargo from the Dominion Coal Company for 1910.

Halifax, N.S., April 8.—The bill to amend the Nova Scotia Steel Company's charter passed the Legislative Council yesterday with the directors' residential clause eliminated, and was sent down to the House of Assembly last night in that form.

This morning the House Committee gave a hearing on the bill and was addressed by Mr. H. A. Lovett, K.C., representing the upper provincial interest, and Mr. Mellish, K.C., and Mr. Cantley, of the Scotia directorate, in favour of the bill.

Mr. Lovett urged that shareholders who invested money in stock on the face of the charter had rights and interests to be considered. There was no necessity of an amendment to permit an increase of capital. The company now has one and a half million in bonds, so an increase could be of no immediate necessity, and, if so, the shareholders' wishes can be learned at ten days' notice. He claimed that the clause would be capable of becoming effective for other purposes. Any directors wishing to retain office could, the day before the annual meeting, count up the list and if things did not look favourable, create three millions of new capital and subscribe for it themselves or have friends do so, and thus it could be voted on at the meeting.

Mr. Mellish submitted that it was not a general practice in the Legislature to restrict an issue of additional stock in the manner suggested, as statutes showed. Nor was it the general policy to restrict the power to issue new stock to majority shareholders. The chairman of the committee asked if the present directors were unanimous in favour of the bill. Mr. Lovett said some were not.

Hon. Mr. Rogers said that under the by-laws it was not necessary to notify those outside the province of meetings to be held. The concern has been managed by resident directors.

Mr. Lovett said that under the by-law recently made, no matter how many directors reside outside the province, the president can call a meeting without notice. Four is then a quorum and could authorize the introduction of a bill.

Mr. Cantley said in regard to a quorum that the question of the by-law was not a recent one. Directors in the province were all in favour of the act. The management of the concern had been left entirely to the efforts of those directors.

Reference has been made to outside interests in the company. At the recent New Glasgow meeting the present management had the support of 27,830 votes, representing 537 shareholders; the opposition had 9,480 shares, representing 75 holders. Allowing them six shareholders in dispute, they had 81 as against 537. The province is vitally interested in underlying securities. At this moment the province holds 85 per cent. of debentures and $2,750,000 of bonds. Upper Canada took $700,000 out of $3,500,000 bonds. When the first bond issue was made the company looked to Nova Scotia for money and was not disappointed.

Halifax, N.S., April 1.—In the Supreme Court to-day in the action brought by the U. M. W. A. against Messrs. J. R. Cowans and Alex. Dick, charged with conspiracy, the Grand Jury reported no bill, thus ending the coal conspiracy cases.

ONTARIO.

Cobalt, April 7.—After many vexatious delays the Government have at last signed the royalty reduction agreement with the Chambers-Ferland. All the other reductions concerned companies paying tribute to the T. and N. O., and they have been ratified a long while ago. The Chambers-Ferland pay direct to the Ontario Government. The old royalty was on ore at the pit's mouth, 25 per cent, of the output, the new rate is 25 per cent on the profits.

ALBERTA.

Lethbridge, April 7.—J. N. Greenshields, of Montreal, has purchased the controlling interests in the Lethbridge collieries. The original owners, among whom were Hon. Colin Campbell, of Winnipeg; Jos. Griffin, of St. Thomas, Ont.; Isaac Cockburn, of Winnipeg, and the late George Rogers, of Lethbridge, will retain their interests. It is understood that the Grand Trunk Pacific is behind the deal, and will spend $400,000 in development.

BRITISH COLUMBIA.

Fernie, B. C. April 2.—The general strike ordered in the bituminous coal districts in the United States is not liable to cause any disturbance among the miners of the Crow's Nest District or Southern Alberta coal field. Neither the mine workers' officials nor those of the coal companies are looking for more trouble here. The year's agreements which were entered into a year ago have been giving general satisfaction, while in those camps where no agreements have been arrived at the feeling is mutually conciliatory and in no place is there any friction of consequence.

At Frank, where the Canadian Coal and Coke Company operates, the agreement expired yesterday, and the men are out as a result of the company refusing to discuss a new agreement, except on conditions that a reduction of five cents per ton be allowed on pillar work, together with the discontinuance of the closed shop principle, and that the jurisdiction of the United Mine Workers of America is not to include men working in and around the shaft house. There are from 175 to 200 men involved in the dispute.

The output of the Crow's Nest Company's mines for the month of March made another record, totalling 112,000 tons, the first time in its history when the hundred thousand mark was passed. The same conditions prevail at all the camps and the demand is always for more.

The total tonnage for the district from Taber to Fernie is now fully 10,000 tons per day, the Fernie mines furnishing fully one-quarter of the amount.

Rossland, B. C.,—A second strike has been made in the War Eagle mine at Rossland, B. C., now the property of the Canadian Consolidated company. Like the last it is an entirely new ore body, hundreds of feet north of the War Eagle vein proper, and like it, too, is exceedingly rich.

The first big strike was made about a year ago in a crosscut 500 feet to the north from the 11th level, 1650 feet from the collar to the shaft. The ore shoot then found has been tapped on both the ninth and tenth levels, and has been found so far to have a height of 375 feet, a length of 400, and a width approximating 50. Aside from its size, its most notable feature is the high grade of ore it contains, shipments for months past having averaged $40 per ton in gold, and about four per cent copper, much higher values than were ever obtained for a similar tonnage from either LeRoi or War Eagle mine during the days of bonanza production.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

Early reports of the mineral production of the United Kingdom show that the coal output for last year was 263,758,562 tons, as compared with 261,512,214 tons during the previous year. Oil shale figures went up from 2,891,564 tons to 2,966,937 tons; iron ore output stood at 9,713,284 tons; black tin ore at 7,381 tons of dressed ore. Ores of copper declined to 3,678 tons; lead ore increased slightly, showing an output of 29,688

tons; zinc ore dropped almost 40 per cent., returns showing an output of 9,902 tons. Tungsten ores increased to 368 tons, the previous year's output being only 229 tons. Arsenic increased from 1,919 tons to 2,865 tons.

The Miners' Conference resumed its sitting in London on March 30th, for the further consideration of the proposals for the settlement of the South Wales dispute. Mr. Enoch Edwards, M. P., again presided over the 150 delegates present, and Mr. Isaac Mitchell, of the Board of Trade Labor Department, also attended.

The employers had stipulated that a definite answer should be given to their proposals before noon on March 30, and in case the reply was favorable contracts were to be continued from day to day until 9th April, in order to allow a ballot to be taken.

The conference sat for nearly four hours, and at the end the official report stated that the following proposition was submitted to the conference on behalf of the Executive Council:—

"After having carefully considered the whole position in South Wales, we strongly urge the conference to advise the workmen to accept the terms of settlement put before the conference as the outcome of the negotiations between the coal owners and the miners' representatives,, as we do not think the points of difference are sufficient to justify either a sectional strike in South Wales or a national struggle, with all the tremendous issues involved. This not to be taken as committing other districts of this federation to support an amendment of the Eight Hours Act."

A long discussion ensued upon this being proposed and seconded on behalf of the council, in which representatives from nearly all the districts in Great Britain took part, after which the resolution was carried.

Mr. T. Richards, M. P., in the course of an interview, stated that the owners had agreed not to press the clause with regard to abnormal places, but were prepared to leave matters as they stood at present on condition that the rest of the proposals were agreed to.

Mr. Alfred Onions, one of the leaders of the South Wales miners, stated that it was now the intention to take the ballot of the miners immediately. This ballot, he said, will be confined to the workmen in the South Wales coal fields.

AUSTRIA

A special report furnished from Vienna to the "Frankfurter Zeitung" sets the position of the Galacian oil industry in a very unfavorable light, and in fact points to the tactics of the Standard Oil Company in that country having been crowned with so full a measure of success that the very existence of the home industry is seriously threatened.

"The Austrian petroleum industry," says the writer of this report, "is to-day literally fighting for its very existence. While the Vienna Bourse has been dreaming of an understanding being come to, not merely within the ranks of the home industry, but also between the groups contesting the pre-eminence in the world's markets, competition has become more acute than at any previous date. The Standard Oil Company has gradually depressed both wholesale and retail prices in Germany to such a low level that the Austrian export refineries are only getting an average price of 3¾ marks,, as compared with 5 or 6 marks of a year or two ago. At the same time, in Austria, the Vacuum Oil Company and the refineries attached to it are attracting buyers more and more by offering their product at prices entailing a loss at present prices of crude oil, which is appraised at just the same value as the finished product. The Vacuum Oil Company is now in a position to meet about 20 per cent. of the Austrian consumption of petroleum. Allied with it is the French refinery in Limanova, and it is becoming more probable every day that the "Austria," also with its refineries in Mahrisch-Schonberg and Drohobycz, is also controlled by the Standard Oil Company.

"It is not believed that the 'Austria,' which is not very strongly capitalized, could afford to lose 2 to 3 kronen per cwt. on the refined oil it is selling—as both it and the Vacuum Oil Company are actually doing—unless it had the Standard Oil Company at its back."

"Already," continues the report, "some of the large refineries have considerably reduced the number of their hands, and this gives colour to the statement made recently that the Austrian oil export trade would be now restricted on a systematic plan. Of course, refineries and plant generally had been erected on a scale to facilitate the largest possible export, but now, in view of the continued policy of depressing prices both for oil and all bye-products indulged in by the Standard Oil Co., increased exports only mean increased losses. This development shows how short-sighted was the policy of the Austrian Government, which was entirely based upon a rise in prices. It has only been playing the game of the Standard Oil Company, which on account of its boundless pecuniary resources can sacrifice millions for a series of years with equanimity if it can thereby either drive the Austrian petroleum industry from the international market or make it merely a vassal of its own. It is suspected that an alliance of the various oil districts in the European Petroleum Union against the Standard Oil Company is under discussion, and this may be joined up with the establishment of a Government monopoly in Germany. All this, however, can only be a long way off, and at the present moment the actual situation and the prospects of the Galician oil industry are perhaps the most unfavourable yet recorded in its annals, which have been rich enough in critical occurrences."

SOUTH AFRICA.

Johannesburg.—Mr. J. G. Hamilton, presiding at a recent meeting of the Chamber of Mines, said that the State Mining School would be discontinued, and instead of it fifty youths, under ordinary contract conditions, would shortly be instructed at the Wolhuter mine under State supervision. The chairman remarked on the improvement in the supply of native labour, and stated that February's recruiting was a record. He announced that a miners' phthisis sanatorium would be established immediately.

Johannesburg.—Strenuous endeavours are being made by the principal members to continue the existence of the Transvaal Coal Owners' Association in order to prevent serious price-cutting and the disappearance of profitable operations. In order to allow of further negotiations to that end the placing of the contracts for the supply of coal to the Eckstein group of mines has been postponed for a week.

Speeches at recent company meetings have been chiefly noteworthy for disclosures of further record schemes of development and announcements of large increases in the tonnages to be milled. On the Simmer Deep crushing is to be increased to 72,000 tons monthly, its ore reserves totalling 1,300,000 tons worth 5.2 dwts. The Jupiter crushing is to be increased to 48,000 tons monthly, the ore reserves totalling 1,215,000 tons worth 6 dwts. Knight Central's crushing is to be increased to £90,000 in hand. The Geduld Proprietary expect to raise the monthly crushing to 17,000 tons.

The crushing by the Vesta mill, on the Black Reef, has resulted in a recovery of 8 dwts. per ton, whilst the resulting sands and slimes are expected to produce other 4 dwts. The management express themselves as highly satisfied with these figures.

Natal.

The output of coal from the Natal collieries during the year 1909 amounted to 1,786,583 tons—the highest figures reached since the start of the industry. In the year 1889 the output was only 25,609 tons and in 1908 the amount mined was 1,669,774 tons. During 1909 vessels replenished their coal bunkers at Durban to the extent of 835,496 tons, while 404,322 tons were exported from Durban by sea. The output for January last forms another record, the amount being 192,145 tons. Durban is

rapidly establishing itself as one of the leading coaling ports of the world, and additional rolling stock has been forwarded to the colony to meet the growing requirements of the port.

UNITED STATES.

Nederland, Col., April 8.—The activity among tungsten miners will be augmented by the recent rise of 50 cents per unit and the fact that the output of the past few months has at last attracted the attention of General Manager Hayes, of the Denver, Boulder & Western road, who has submitted plans to run the road from the Sulphide spur into town, to be put into operation within 30 days.

While mine owners generally assert they cannot operate their own properties to advantage at less than $11 per unit, leasers are doing well.

Marquette, Mich.—The great ore fleet is beginning to fit out for the year's work. The vessel owners have a big job to do, and are bestirring themselves. They plan to move 50,000,000 tons of ore before the ice again locks up the lakes. This is by all odds the biggest contract the lake carriers have ever undertaken, and the big fleet of ore-carrying ships will soon be in trim to start on it. It must be accomplished between the middle of April and the first of next December—seven months' time—so there are no days to be wasted.

In Marquette and at every port on the lakes there will soon be bustle on the decks and in the holds of the ore carriers. The first motion was noticeable in the local harbour fully two weeks ago, when the advance guard of men arrived and began the work of fitting out the Pathfinder and Warner, which have laid in the horbour all winter. Additional arrivals since have swelled the crews. Those now at work are connected with the engineering department of the ships, and some of the superior officers. They are overhauling the machinery, making other minor repairs, and thoroughly examining the vessels so there will be no hitch when they are about to take on their first cargo.

It is the intention to have these boats ready in time to be loaded and start out as soon as the insurance takes effect, April 15. The ships at the lower lake ports and at the head of the lakes are also getting ready, and will be waiting at the Soo locks prepared to pass through as soon as they are given opportunity.

The ore fleet numbers between 200 and 300 big ships, owned by the Steel Corporation, the Cleveland Cliffs Iron Company and several other companies and individuals. The Steel Corporation owns 102 of these vessels, and is the heaviest ship owner in the world, as well as the largest owner of iron mines and iron works.

Goldfield, Nev., April 4.—Preliminary estimates, issued Saturday afternoon by Manager Finlay of the Goldfield Consolidated the gross value of the ore at $1,015,000. The recovery value is Mines Company, bearing upon the production for March, places placed at $950,000, and the net profits at $730,000. During the month the mill treated 26,717 tons, thus establishing a new record. It will be recalled that March a year ago was the heaviest month of that period.

The annual report of President Lockhart of the Goldfield Florence Mining Company, accompaning the dividend checks just mailed shows the last year's profits to have been $232,050. The company paid two dividends totalling $210,000.

COMPANY NOTES.

DOMINION COAL COMPANY, LIMITED.

Report of the Board of Directors to be Submitted at the Annual General Meeting of the Shareholders on the 12th April, 1910.

To the Shareholders of the Dominion Coal Company, Limited:

Your Directors submit herewith a statement of the affairs of the company as at 31st December, 1909, and of the earnings of the year then closed.

The year opened with great promise, but early in July a strike was called by the United Mine Workers' Association, an American organization which had recently sought to establish itself in Nova Scotia; the object of the strike being to obtain recognition. The refusal of your Directors to grant this was sustained by a Board of Conciliation held under the Lemieux Act.

A large proportion of the company's employees were members of the provincial organization, and these, with many others, have remained steadily at work. The reduction of output consequent on the strike, the increased cost of mining, and the direct expenses incurred for police protection, etc., all had a serious effect on the company's earnings for the latter half of the year, but the output is now nearly normal, and it is hoped that the additions which are being weekly made to the company's working force will place its operations on their usual level by the opening of navigation.

The output of the collieries for the year 1909 amounted to 2,734,774 tons, as compared with 3,555,068 tons in 1908.

Collieries: Plant.—Your Directors are pleased to be able to report that, notwithstanding the disturbances caused by the strike, the collieries are in good condition. Development work is still well in advance of mining operations, and the plant and machinery throughout have been well maintained. The new collieries in the Lingan district are being steadily pressed forward to completion, and full mining operations are now in progress at No. 12.

Sydney and Louisburg Railway.—Your Directors have caused application to be made for an Act to incorporate a railway company, to which the valuable railway property belonging to and now directly operated by the company, may be transferred. Your Directors are of opinion that this railway can be more successfully carried on by an independent company operating under the railway laws of the province, and will ask you to sanction an arrangement which, while retaining full control in the hands of your company, will place this part of your business on an independent basis.

Relations with Dominion Iron & Steel Co., Ltd.—The arrangement proposed by your Directors for a settlement of the matters in dispute with the Steel Company, mentioned in the last Annual Report, was duly carried out. The contract of October 20th, 1903, has been reinstated, the excess cost of coal received under the temporary contract repaid, and within the last few weeks a friendly settlement was reached as to all other matters in dispute between the two companies. The balance at credit of Profit and Loss Account, which was largely created by the payments from the Steel Company, was drawn on for this settlement, as appears from the accompanying statements.

Negotiations respecting the new price of coal are proceeding satisfactorily. The cost of mining and delivering coal, during the periods which govern in fixing the new price, has been ascertained by Messrs. Marwick, Mitchell & Co. on behalf of your company, and their figures are now under examination by the Steel Company's accountants.

Proposed Merger with Steel Company.—It is understood that a plan to unite the interests of the shareholders of the Coal and Steel Companies is under consideration, and will shortly be submitted to their respective representatives. Your Directors will

promptly consider and report to you on any scheme that may be placed before them.

Changes in the Board.—In December last the President, Mr. James Ross, sold 50,000 shares of the common stock of your company, which were acquired by the Dominion Iron & Steel Company, Limited. Mr. Ross subsequently resigned as President and Director, and at the same time Messrs. R. B. Angus and Graham Fraser retired from the Board.

Mr. J. H. Plummer, the Honourable L. J. Forget and Sir Henry M. Pellatt were elected Directors in their stead, the first named becoming President in place of Mr. Ross.

Of the other members of the Board, Mr. W. B. Ross, K.C., and Mr. J. Kerr Osborne, having sold their shares in the company, have ceased to be Directors, but their places have not been filled.

Management and Staff.—In January, 1910, Mr. G. H. Duggan, 2nd Vice-President and General Manager, resigned his office, and Mr. M. J. Butler, C.M.G., was appointed in his stead. Mr. John Mackay, Secretary and Treasurer, also retired from the service of the company, and Mr. C. S. Cameron was appointed to both these offices. Mr. D. H. McDougall was added to the staff as Assistant General Manager, with special charge of the practical work of the company. All these officers reside in Cape Breton.

Mr. F. L. Wanklyn having accepted an important public office, will be no longer available for the duties he has hitherto performed, but the changes made in the administration of the company's affairs will enable your Directors to divide his duties among the other officers.

Your Directors have pleasure in bearing testimony to the zeal and energy with which the general staff of the company have performed their duties during a trying year, and in expressing their confident belief that the shareholders may look for continued loyal and efficient service from the company's officers and employees under the new management of its affairs.

On behalf of the Board of Directors,
J. H. PLUMMER, President.

Montreal, April 4th, 1910.

Profit and Loss Account for the Year Ending 31st Dec., 1909.

Net earnings from operations after payment of all expenses and current repairs		$1,113,091.09
Appropriation for depreciation and renewals		350,000.00
		763,091.09
Interest on Bonds	$281,652.93	
Interest on Loans	30,912.37	
		312,565.30
		450,525.79
Balance from previous year, viz., amount shown at credit of Profit and Loss—		
Account 1st January, 1908	4,253,471.03	
Appropriations in 1907-8 not now required	50,422.60	
	4,303,893.63	
Less amount due Steel Company as since settled	3,550,000.00	
		753,893.63
		$1,204,419.42
Less:		
Dividends on Preferred Stock 2 half-yearly payments of 3½% each	210,000.00	
Dividends on Common Stock, 4 quarterly payments of 1% each	600,000.00	
		810,000.00
Balance carried forward		$394,419.42

Balance Sheet, December 31st, 1909.

Assets.

Properties and Investments		$24,562,611.16
Current Assets:		
Inventories	$660,557.93	
Accounts Receivable	568,041.59	
Cash on hand and at credit	450,748.63	
		1,679,348.15
Deferred Charges to Operations:		
Insurance, Taxes and Steamship hire paid in advance		20,164.98
		$26,262,124.29

Liabilities.

First Mortgage 5% Bonds: Total Issue		$6,175,000.00
Cape Breton Real Estate Debentures:		
Total issue	$480,000.00	
Less matured and paid	319,835.52	
		160,164.48
Dominion Rolling Stock Debentures:		
Total issue	$480,000.00	
Less matured and paid	272,516.33	
		107,483.67
Mortgages		50,000.00
Total Bonds and Mortgages		6,492,648.15
Current Liabilities:		
Accounts payable, royalty on coal, etc.	334,302.32	
Bond Interest accrued	51,450.01	
		385,752.33
Dominion Iron & Steel Co., Limited:		
Balance of claim as settled		800,000.00
Reserve Accounts:		
Accrued dividend on Preferred Stock	87,500.00	
Sundry Reserves	101,804.39	
		189,304.39
		7,867,704.87
Capital Stock:		
150,000 Shares of Common Stock $100.00 each	15,000,000.00	
30,000 Shares 7% Preferred Stock $100.00 each	3,000,000.00	
		18,000,000.00
Profit and Loss Account		394,419.42
		$26,262,124.29

Certified correct,
R. GORDON, Comptroller.

NOVA SCOTIA STEEL & COAL COMPANY—PRESIDENT'S ANNUAL REPORT OF PROGRESS.

"In moving the adoption of the report of the directors and of the accounts which have been laid before you, I wish to avail myself of the opportunity to make a few remarks upon the business of the company. Throughout the greater part of the year 1909 the iron and steel business was anything but satisfactory, looked at from the standpoint of the shareholders. Prices in many cases with us were lower than they have been at any time during the past twenty-five years. Fortunately during the last quarter there was some improvement, which, I am pleased to say, still continues.

"The shareholders may, I think, congratulate themselves upon the fact that the profits of the year have amounted to $907,949. This is a large sum to make in a year such as I have spoken of, and it has required the greatest care and foresight on the part of the management and our official staff to produce this satisfactory result.

"In this connection I want to say that I think we are particularly fortunate in having such a careful and competent man as Mr. Cantley in charge as general manager, and also fortunate in having under him a competent staff working harmoniously for the best interests of the shareholders. It is perhaps opportune that I should at this time call your attention to the growth of this company during the past five years.

"I became president of the company in March, 1905, and all of the present board (with two exceptions, were then directors. In the previous year, 1904, the earnings were $501,337.24. For 1909 they were $907,949, an increase of over 50 per cent. In 1904 we mined and shipped from Wabana 246,022 tons of ore, and in 1909, 460,387 tons, an increase of 67 per cent. In 1904 the total coal raised at Sydney mines was 476,521 tons, and in 1909, 613,000 tons, an increase of 70 per cent. In 1910 we expect an output of 900,000 tons, an increase of 423,459 tons over 1904, equal to 88 per cent. In 1904 the output of pig-iron was 31,567 tons; in 1909 it was 58,676 tons, or an increase of 85 per cent.

"In 1904 the open hearth plant produced 30,000 tons of ingots; in 1909 the output was 64,240 tons, an increase of 114 per cent. In 1904 our cogging mill rolled 30,223 tons of ingots; in 1909 the output was 64,240 tons, an increase of 114 per cent. In 1904, our finishing mills and forge department made and shipped 25,958 tons; in 1909 the product was 56,515 tons, an increase of 126 per cent. During this period we acquired the submarine iron ore deposits at Wabana and very extensive coal areas, and have largely developed the iron ore areas. The acquisition of the submarine iron ore and coal areas and the development of the iron ore property have added many millions to the assets of the company, which do not show in our statement of assets because we have only added the bare actual cost of the areas and the amount actually spent in their development. From two collieries in 1904 we have now five well equipped, and we are well prepared to look after the expanding coal trade of the company. We have erected a new forge at New Glasgow, and have also greatly increased the capacity and efficiency of our mills there. From an output in 1904 of 30,223 tons to 52,931 tons in 1909 is a large increase, and further extensions now being made are expected to give us next year an output of, say, 70,000. When it is considered that during all the period under review the company suffered from insufficient working capital, and that all the property I have spoken of was acquired and the extensions and betterments of plants were effected without any new capital available, I think the board can properly claim some credit for having carefully, wisely and successfully administered the property committed to their hands by the shareholders. As the accounts show, our finances are in a very satisfactory condition. I am, however, pleased to be able to tell you that since the report was distributed, we have disposed of a further $1,500,000 of our bonds in London on favourable terms, and we have now ample funds on hand to provide for all improvements and extensions to our plant at New Glasgow, Wabana and Sydney Mines, contemplated for some years, and have, as well, ample working capital, for the company, as regarded from a financial point of view or from the standpoint of its physical condition, was never better than it is at the present time.

"The remaining $1,000,000 of bonds the directors consider it unnecessary to sell, as the money is not now required. In addition to this $1,000,000 of bonds in the treasury, we have power to dispose of $6,000,000 of debenture stock if and when it is required for future developments or extensions or other purposes of the company. During the past few years when we were developing our coal and iron areas we were handicapped by not having any securities in the treasury which could be issued to provide for such capital expenditure. Having experienced this difficulty, your directors determined when reorganizing the finances of the company that ample provision should be made for its future requirements. The importance of this cannot be over-estimated. Another very gratifying feature of our report is the fact that we have not added one dollar to our property account by reason of the premiums paid on the redemption of our old bond issues nor the discount on the sale of the 3,500,000 of debenture stock disposed of and referred to in the report.

"The substitution of the new 5 per cent. fifty-year bonds with a sinking fund of one-half per cent., in place of the previous bond issues upon which we were paying 6 per cent. interest and 2 per cent. sinking fund, will effect a large saving in interest has given us a large capital for further developments of our property and provided us with ample working capital, and, notwithstanding the additional capital thus secured, our fixed charges will not be materially increased. In 1904 the company sold its consolidated 6 per cent. bonds at 87½ per cent. of par, so that the company then paid interest at the rate of 6.86 per cent. for its money. In 1904 our 5 per cent. fifty-year bonds realized 94 per cent. of par, making our interest rate 5.32 per cent., or a little over 1½ per cent. less than on the loan made in 1904. You are all aware that during the year we issued to our shareholders a stock bonus of 20 per cent., thus compensating for the dividends which we considered it unwise to pay out during the years when we were using so large a proportion of our earnings for capital expenditure.

"I feel that you are to be congratulated on the improved financial condition of the company, and the prospects for the future. There has been a marked improvement in the iron and steel business in Canada, and unless something unforeseen happens, we believe that 1910 will be the best year in the company's history. The development of the submarine iron ore properties at Wabana has verified our expectations in regard to it, and there is no longer any doubt as to the enormous value of the areas.

"With regard to the important question of future dividends on the common stock of the company, I can see no reason, in view of the present financial position of the company and the power we possess to issue securities to provide for any extensions of our business, why a reasonable proportion of the earnings of each year should not be paid to the common shareholders.

"The board have already declared a dividend of 1 per cent. for the first quarter, and if the earnings of the company for the balance of the year prove to be as large as they now promise I think a substantial increase should be made before the end of the year to the present rate of dividends on the common stock. I do not think there are any other matters in the report which call for further remarks from me at this time, and I therefore move the adoption of the report and financial statements."

NIPISSING ANNUAL.

The annual meeting of the Nipissing Mines Company will be held in Augusta, Me., on April 25th, at 2 p.m.

On April 1st the Buffalo paid 5 per cent. to its shareholders and will pay a bonus of 3 per cent. on May 16th. These disbursements will make total return to shareholders of 73 per cent. of the capital stock.

DOMINION IRON AND STEEL.

The output of the Dominion Iron & Steel Company for the month of March was very heavy, and the shipments also were heavy for that month.

The March figures follow:—

	Tons.
Pigs	22,320
Ingots	25,809
Blooms	22,870
Rails	13,680
Rods	7,730
Shipments	25,180

STATISTICS AND RETURNS

STATISTICS AND RETURNS.

The shipments of the Hill Crest Coal & Coke Company for March amounted to over 16,000 tons. Mr. Brown, the new manager, is on the way to take charge of the property.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending April 8, and those from January 1, 1910, to date:—

	April 8. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	52,900	522,528
City of Cobalt	.....	300,445
Chambers-Ferland	.....	58,000
Cobalt Central	.....	295,186
Cobalt Lake	.....	132,000
Colonial	43,000	107,260
Coniagas	.....	434,096
Crown Reserve	62,500	1,507,570
Drummond	.....	664,200
Hargraves	.....	41,800
Hudson Bay	.....	123,695
Kerr Lake	240,190	1,919,079
King Edward	.....	134,506
La Rose	146,400	2,147,570
McKinley-Darragh	.....	725,441
Nipissing	252,817	2,953,004
O'Brien	61,700	453,006
Peterson Lake	.....	170,450
Right of Way	61,178	509,717
Silver Cliff	.....	66,010
Temiskaming	.....	238,300
Trethewey	61,673	254,650
Waldman	.....	63,992

Ore shipments for week ending April 8 were 982,958 pounds, or 491 tons.

Total shipments from Jan. 1 to April 8 were 15,066,984 pounds, or 7,533 tons.

The total shipments for 1909 were 30,098 tons.

TRAIL SMELTER.

The Consolidated Mining & Smelting Company of Canada, Limited, report ore receipts at Trail Smelter for week ending April 2nd and year to date, in tons, as follows:—

Company's mines—		
Centre Star	4,775	50,198
St. Eugene (concentrates)	128	4,775
Snowshoe	3,298	49,676
Richmond-Eureka	58	1,278
Sullivan	108	2,270
Other mines	1,257	23,554
Total	9,624	131,751

B. C. ORE SHIPMENTS.

The ore shipments for week ending March 26th are slightly below the average this week owing to decline in tonnage from the Granby mines. Appended are the details:—

Boundary.

	Week.	Year.
Granby	23,582	308,838
Mother Lode	8,000	106,805
Oro Denoro	360	3,480
Snowshoe	3,240	46,378
Wellington	.....	11
Other mines	11	152
Total	35,193	465,664

Rossland.

Centre Star	3,822	45,423
Le Roi No. 2	708	7,312
Le Roi	259	3,277
Le Roi No. 2, milled	300	3,600
Other mines	.....	248
Total	5,089	59,860

Slocan-Kootenay.

St. Eugene, milled	2,775	33,300
Whitewater, milled	600	7,200
Van Roi, milled	800	9,600
Bluebell, milled	1,000	12,000
Kootenay Bell, milled	10	840
Granite-Poorman, milled	250	3,000
Queen, milled	420	5,040
Nugget, milled	110	1,320
St. Eugene	369	4,647
Richmond-Eureka	76	1,220
Blue Bell	183	1,054
Whitewater	86	613
Rambler-Cariboo	23	250
Emerald	19	1,092
Molly Hughes	20	161
Sullivan	245	2,162
Silver King	61	965
Utica	20	57
Second Relief	16	37
Lightning Peak	21	21
Other mines	.....	5,327
Total	7,164	89,906

SMELTER RECEIPTS.

Granby	23,582	308,958
Consolidated Company	9,559	122,125
B. C. Copper Co.	8,360	110,285
Total	41,501	541,368

MARKET NOTES.

New York, April 8.—The foreign visible supply of copper during March showed a falling off, the decreases totalling 4,524,000 pounds, making the foreign visible as of April 1, 249,625,600 pounds. For the preceding 10 consecutive months the visible supply increased monthly, beginning at 114,068,800 pounds, as of May 1, 1909, and reaching the high mark of 254,150,400 pounds at the end of February.

The decrease in the foreign visible permits of an increase in the United States stock for March of 4,500,000 pounds without

changing the statistical position of the market.

Exports for March were larger than the earlier government figures indicated, totalling 43,771,840 pounds. It is expected that the producers' statistics for March will show at least 45,000,000 pounds shipped to the other side, which improves the prospects for a small decrease in the United States stocks, provided production declines and domestic deliveries are up to expectations.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.

Amalgamated Asbestos	28	28½
Dominion Coal Company	68⅝	69
Dominion Steel Company	67	67¼
Nova Scotia Steel	83½	84½
Granby	42	44
Consolidated Smelting	82½	86
Crows Nest Pass	..	86

Cobalt Stocks.

Amalgamated	.06⅜	.06⅝
Beaver Consolidated	.36⅝	.36⅞
Buffalo	2.75 offered	
Chambers-Ferland	.38½	.39½
City of Cobalt	.33	34¾
Cobalt Central	.12½	.15
Cobalt Lake	.28⅛	.28½
Coniagas	5.20	5.60
Crown Reserve	3.45	3.55
Gifford	.11¾	.12
Foster	.23¾	.24½
Green Meehan	.07	.08
Great Northern	.09¼	.09¾
Hudson Bay	105.00	109.00
Hargraves	.39¾	.41
Kerr Lake	8.62½	8.87½
La Rose	4.25	4.35
Little Nipissing	.24⅝	.24⅞
McKinley-Darragh-Savage	.93	94½
Nancy Helen	.11½	.12½
Nipissing	10.07	10.25
Nova Scotia	.40½	41¾
Otisse	.07	.08
Peterson Lake	.26	.26⅜
Rochester	.18½	.19
Silver Leaf	.09	.09⅛
Silver Bar	.10	.13
Silver Queen	.14	.18
Temiskaming	.74½	.75
Trethewey	1.38½	1.39½
Watts	.11	.13
Ophir	.47	.65
Wettlaufer	.98	1.01

New York Curb.

Boston Copper	17	19
British Columbia Copper	6⅜	6½
Butte Coalition	22	23
Chino Copper	13¼	13⅝
Davis-Daly Copper	23⅛	25⅛
Ely Consolidated	1¼	1⅜
Gila Copper	6⅞	7⅛
Giroux Mining	8	8⅛
Goldfield Consolidated	7¾	7 13-16
Greene-Canadian	8⅞	9
Inspiration Copper	7⅝	7¾
Miami Copper	23⅜	23⅝
New Baltic Copper	7	9
Nevada Con. Copper	20⅞	21
Ohio Copper	3¾	3⅞
Rawhide Coalition	29½	30
Ray Central	3 3-16	3 7-16
Ray Consolidated	19½	20
Union Mines	1¾	1 13-16
Yukon Gold	4 5-16	4 7-16

SILVER PRICES.

		New York. Cents.	London. Pence.
March	22	52⅛	24
"	23	51⅞	23⅞
"	24	52	23 15-16
"	25	..	..
"	26	52⅜	24⅛
"	28	52	..
"	29	52¼	24 1-16
"	30	52⅜	24⅛
"	31	52½	24 3-16
April	1	52½	24⅛
"	2	52½	24⅛
"	4	52½	24⅛
"	5	52⅜	24 1-16
"	6	52⅜	24 1-16

TORONTO MARKETS.

Metals.

April 8.—(Quotations from Canada Metal Co.)
Spelter, 5¾ cents per lb.
Lead, 3.70 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 34.50 cents per lb.
Copper, casting, 14.10 cents per lb.
Electrolytic, 14.10 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

April 8.—Pig Iron—(Quotations from Drummond, McCall Co.)
Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee No. 2, $23.00 (f.o.b. Toronto).
Midland No. 1, off the market.
Coal, Anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50 for 1¼-inch lump.

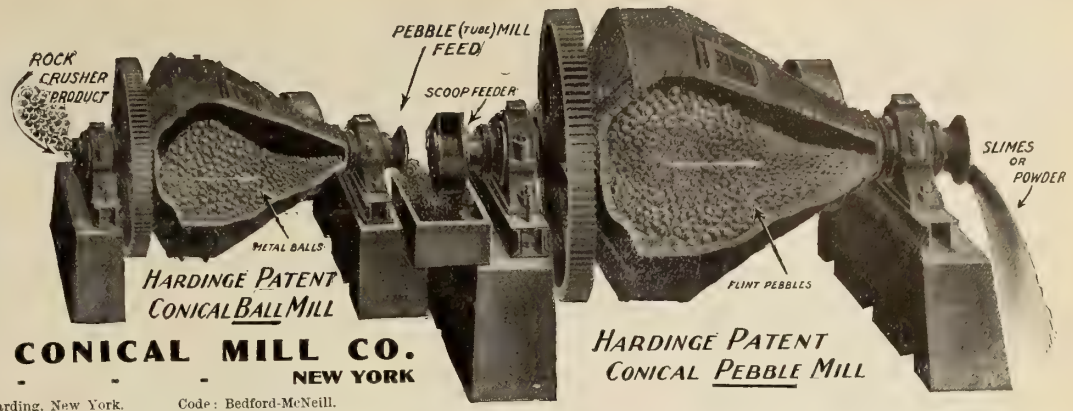
Coke.

April 6.—Connellsville coke (f.o.b. ovens).
Furnace coke, prompt, $1.90-$2.00 per ton.
Foundry coke, prompt, $2.65-$2.75 per ton.

April 6.—Tin (Straits), 33.00 cents.
Copper, prime Lake, 13.55 to 13.65 cents.
Electrolytic copper, 13.15 to 13.25 cents.
Copper wire, 15.25 cents.
Lead, 4.45 cents.
Spelter, 5.70 cents.
Sheet zinc, (f.o.b. smelter), 7.75 cents.
Antimony, Cookson's, 8.37½ cents.
Aluminium, 23.50 to 24.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, ordinary, $29.50 per oz.
Platinum, hard, $35.00 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $48.00 per 75-lb. flask.

STEP REDUCTION
Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of."



HARDINGE CONICAL MILL CO.
37 Wall Street, - - - NEW YORK
Cable Address: Halharding, New York. Code: Bedford-McNeill.

NOTICE

STUDENTS EMPLOYMENT REGISTER,

The CANADIAN MINING JOURNAL has opened an employment register for students taking mining or metallurgical courses at Canadian Universities or Technical Colleges. Mine operators who wish to employ students during the summer months are requested to communicate with the Business Manager.

Students are requested to send in their names, along with brief records of experience. These will be filed and no effort will be spared on our part to place applicants in immediate communication with possible employers.

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

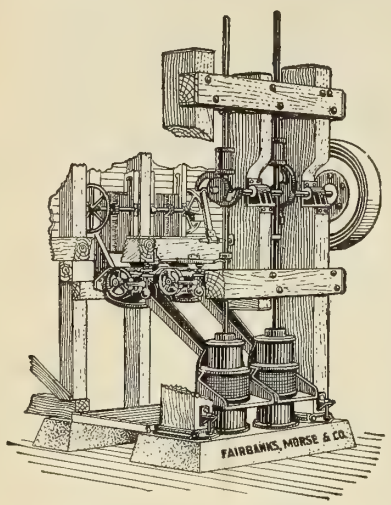
hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent, Board of Trade, MONTREAL

The Nissen Stamp



In Cobalt

NORTHERN CUSTOMS CONCENTRATORS, LIMITED.
COBALT, ONT., December 31st, 1909.

The Canadian Fairbanks Co., Toronto, Ont.

Dear Sirs :—

In answer to your enquiry regarding the Nissen Stamps supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one-inch hole.

The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening .018. With a coarser screen the tonnage would of course be larger.

The shoes and dies wear even, and the splash is well distributed over the screen.

The arrangements for keeping up the weight of the stamps are very good. I can recommend the Stamps.

Yours truly, (Sgd.) F. J. Bourne, Superintendent.

CATALOGUES AND DESCRIPTIVE PAMPHLETS UPON REQUEST.

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines

Montreal, Toronto, St. John, N.B. Winnipeg, Calgary, Vancouver.

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

Mining and Metallurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
McGee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. Sc.
MINING ENGINEER
24 Adelaide St., West, Toronto, Can.
Cable Abmott [illegible] Phone Main 5063

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt S lver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers aad Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
EXAMINING AND REPORTING ON PROPERTIES A SPECIALTY.
Box K, Sudbury Box 990, Cobalt

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

T. H. CRABREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

WEBB & COOKE
Mechanical and Electrical Engineers
R. L. WEBB, Ass. A. I. E. E.
THOMAS F. COOKE, Jr. A. S. M. E.
Specialty—Mine Power Plants.
338 Ellicott Square, Buffalo, N. Y.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

DOBBS & YOUNG
PROPERTIES LISTED and INVESTMENTS DIRECTED
MINING BROKERS and CLAIMS AGENTS
Wire or write us for particulars to
Box 541, COBALT, ONT.
WATCH THIS SPACE

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

J. R. SPEARMAN, BOX 184, COBALT, ONTARIO

Real Photograph Post Cards of Cobalt and its Silver Mines at 75c. half dozen, $1.00 per dozen. Also, views taken of any mine desired. Write

J. R. SPEARMAN, BOX 184, COBALT, ONTARIO

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.

1025. Waverley Sheet.

1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.

1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.

1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.

1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.

1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.

1075. Gowganda Mining Division, 1908. W. H. Collins.

1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.

1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

CURTIS'S & HARVEY, Limited

Manufacturers of all kinds of

EXPLOSIVES

BEST QUALITY ONLY

Blasting Powder, and Compressed Pellets, Cheddite, Dynamite, Gelignite, Gelatine Dynamite and Blasting Galatine.

Permitted Explosives for Gaseous Mines

Bobbinite, Excellite, Kolax, Curtisite, Rippite, etc., etc.

Bobbinite has the largest sale of any Permitted Explosive

Only Makers of the Celebrated "Diamond ◆ Grain" (Black), "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

HEAD OFFICE:

3, Gracechurch St., London, Eng.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary. School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL. 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners

Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide
Smelter and Refinery at Deloro Ontario

Branch Office:
32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL
The Canadian Copper Company

Nickel for Nickel Steel
The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Modera

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTI

An Important Trio

Economics



Principles



Methods



Within a few months three highly important mining books have appeared, covering the practical, the fundamental and the economic phases. They are valuable books by thoroughly sound men of established reputations.

The Cost of Mining

By JAMES R. FINLAY

415 pages, 6x9, illustrated

$5.00 (21s.), net, postpaid

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover costs of mining **coal, iron, lead, zinc, copper, gold** and **silver.**

Contents: Value of Mining Property, Factors Governing Variations, Partial and Complete Costs. Statistics of Coal Production. Costs of Mining Coal. Cost of Mining Lake Superior Iron. Occurrence and Production of Copper. Lake Superior Amygdaloid Copper Mines. Conglomerate Copper Mines of Lake Superior. Copper Mines on Fissure Veins in Montana, Australia and Arizona. Various Copper Mines of Arizona and Mexico. Copper Mines in various other Districts. The Copper Mining Business in General. Lead. Silver-Lead Mining. The Cost of Silver-Lead Smelting. Zinc Mining. Occurrence and Production of Gold. Quartz-Pyrite Gold Mines. Cripple Creek. Kalgoorlie and Goldfield. Silver Mining at Cobalt and Guanajuato.

Principles of Mining

By H. C. HOOVER

200 pages, 6x9, illustrated

$2.50 (10/6), net, postpaid

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Part I deals fully with the determination of value, prospective and in sight—the sizing up of the mine—and in this Mr. Hoover's work has been extensive and highly successful.

Part II discusses the development of tunnels, shafts, crosscuts, etc., with chapters on mechanical equipment and efficiency.

Part III. Administration of mines with all the problems of labor efficiency, labor unions, wages, working costs, accounts, division of expenditure, etc.

The main chapter headings are: Valuation of Copper, Gold, Lead, Silver, Tin and Zinc Lode Mines. Mine Valuation. Development of Mines. Stoping. Methods of Supporting Excavation. Mechanical Equipment. Ratio of Output to the Mine. Administration. The Amount of Risk in Mining Investments.

Timbering and Mining

By W. H. STORMS

300 pages, 6x9, fully illustrated

$2.00 (8/6), net, postpaid

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Contents: Introduction. Timber Used in Mining. Preservation of Timbers. Drifting and Drift Sets. Driving Lagging in Drifting. Driving in Running Ground. Breast Boards. Structural Steel in Mine Workings. Timbering Drift Gravel Mines in California. Shafts. Location, Kind and Size of Shafts. Prospecting Shafts in Good Ground, and Those Requiring Close Timbering. Cribs and Single Compartment Shafts. Size and Division of Working Shafts. Drainage. Position of Temporary Hoisting Plant and Permanent Plant. Size of Shaft Compartments. The Collar. Hanging Belts. Cross Head in Sinking Shafts with a Bucket. Stull Methods in Many Small Mines of the Cobalt District, Ontario. Bucket Dumping at Vertical Shafts. Bucket Dumping at Inclined Shafts. Framing Shaft Timbers. Butt Corner and Dove-Tail Corner Methods. Framing for Vertical Shafts. Divider and Spliced Wall Plate. The Template. Placing Timbers of Shaft Sets in Position. Placing Timbers in Inclined Shafts. Lining the Sets. Difficulties in Sinking Through Running Ground. Sinking Through Running or Loose Ground. Combination Vertical and Inclined Shafts. Bearers in Shafts. Fenders for Protection of Shaft Timbers When Blasting. The Cable Mat. Extension Tracks for Sinking. Inverted Rails. Sinking Ladders.

We can supply any engineering book in print.

Book Department **Canadian Mining Journal**

Confederation Life Building, Toronto

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ackroyd & Best, Ltd xii
Allan, Whyte & Co. v
Asbestos Mfg. Co., Ltd.....outsde B.C.
Astley, J. W. xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown..... xix
Beatty, M., & Sons, Ltd. ix
Baszanger, Jacques & Co.....xi
Belliss & Morcom, Ltd i
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply..... xxvii
Behrend Concentrators Ltd..... xi
Brown A. H. xx
Bruce Peebles..... viii

C

Canada Metal Co..... ix
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co. xiv
Campbell & Deyell .....xix & xx
Curtis & Harvey, Ltd.....xxiii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xxiii
Canadian Fairbanks Co. Ltd xviii
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks....xxiv
C. L. Constant Co.....xviii
Cobalt Electric Equipment Co., Ltd.....xiv

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus..... iv
Dominion Coal Co., Ltd. xv
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables..... iv
Davis, John & Son..... xvi
Dessau's, S. Sons..... vii
Deloro Mining & Reduction Co...xxiv

E

Evans, J. W.....xix

F

Fleck, Alex., Ltd. xii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.... v

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii
Hardinge Conical Mill Co.....xvii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C. xx
Laurie & Lamb i
Lymans Ltd.....xii
Link Belt Co. xi
Leckie, J. Edwards xx
Ledoux & Co. xx
The Lancashire Dynamo and Motor Co., Ltd..... xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxix
Nova Scotia, Province of.....xxvi
Nissen Stamps..... xviii
Northern Canada Supply Co. Ltd..xiv

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros.....vi, vii, xvi
Patterson Mfg. Co. ii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co..... xii
Stanley, W. F., & Co., Ltd.....xv
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii

T

Tyrrell, J. B. xx
Toronto University xxvii

U

United Typewriter Co,. Ltd xi

V

Vandeleur & Nichols..... viii

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Separating Co.....vii

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

The Crow's Nest Pass Coal Co.
LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905.
Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.
J. D. HURD, General Manager.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.
BRAUN'S Modern Laboratory Appliances.
WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited
513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary
A. T. LAING.

Newton & Treloar

Commercial & General
PRINTERS

14 Johnson Street, Toronto

WANTED

A Nickle Mine. Give full particulars, price and commission.

Address W. D. B. care of Canadian Mining Journal, Toronto.

The Canadian Miner's Buying Directory

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despa
If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertis
kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings (Diamond —
Montreal Steel Works, Limited
Peacock Bros.

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Peacock Bros.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Canadian Cleveland Drill C
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

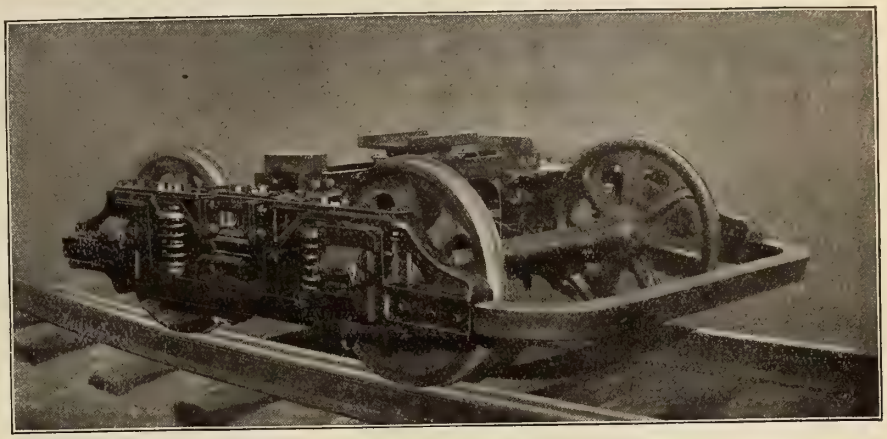
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

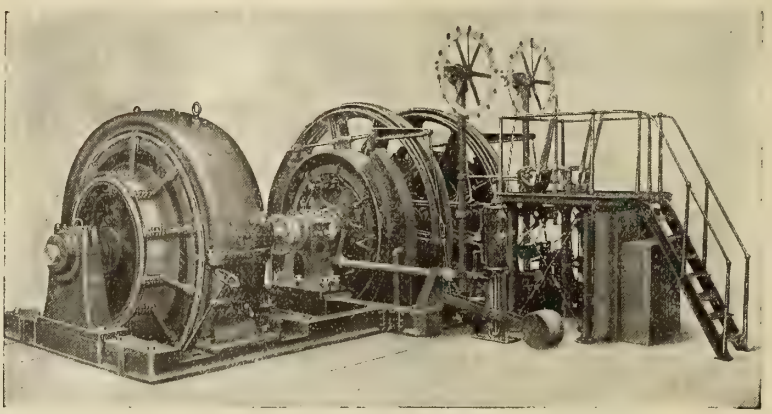
"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.



We illustrate the Hecla Mining Company's Hoisting Plant at Burke, Idaho, one of the largest of its kind and a good example of

The Westinghouse Equalizer Hoisting System

Some particulars of the installation follow:

The hoist motor is a Westinghouse 450 h. p., 600 Volt, 60 R.P.M. Direct-Current Motor, which obtains its power through a Westinghouse Fly-Wheel Motor—Generator Set, consisting of a 450 h.p., 2300 Volt. Type H. F. Induction Motor, a 30,000 lb. Fly Wheel and a 450 K. W., 600 Volt, Direct Current Generator. The normal duty of the hoist is 6,000 lbs. unbalanced load; maximum speed 2,000 R.P.M. ultimate depth of shaft 2400 feet.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
252 St. James Street, MONTREAL.
92 Hollis Street, HALIFAX.

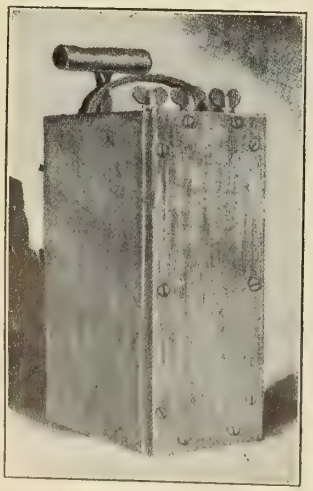
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines

Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

The Greatest Tent Value Ever Offered in Canada!

$9.90



$9.90.

This is a photographic illustration of our

SPECIAL CAMPER'S TENT.

which is made of 8-ounce duck with double sewn seams and re-inforced strain points.

Notice the outside lacing of the Ridge.

This means a top that is both storm and insect-proof, and it is the most satisfactory arrangement for attaching the tent to a ridge rope (stretched between trees) when the utmost portability is desired, using no poles.

Dimensions	Height	7 feet
	Length	12 "
	Width	10 "
Height of Walls		3 "

Complete with guy-ropes

$9.90

(If poles and pegs are desired, they will be supplied for 95c. extra.)

THE ROBERT SIMPSON COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

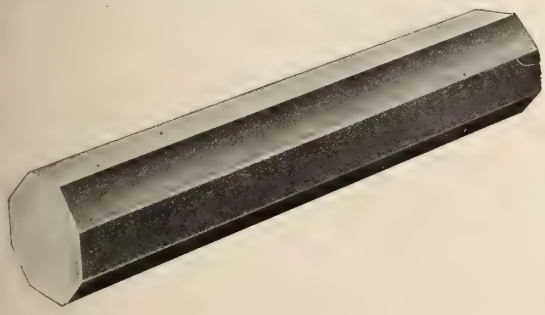
No. 263 St. James Street, Victoria Square Montreal, Canada

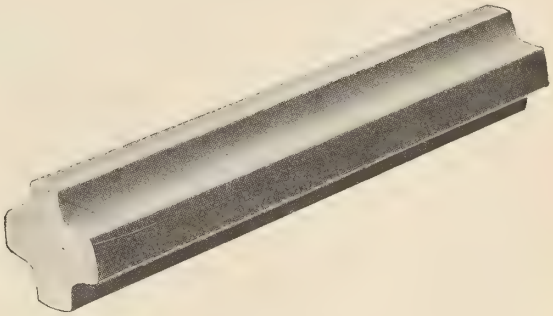
THE CANADIAN MINING JOURNAL

31 TORONTO No. 9

STEEL

We have the largest and best assorted stock of Rock Drills and Mining Steels in the Dominion of Canada. All popular sections and sizes can be promptly supplied from one of our various warehouses.







We also carry Bickford Smith & Co's. Fuse (White Jacket), Blasting Batteries, Pumps, Hoists, Crushers, Concentrators, Stamp Mills, Etc.

MUSSENS LIMITED

MONTREAL, 318 St. James St. **TORONTO,** 73 Victoria St. **COBALT,** opp. Right of Way Mine **WINNIPEG,** 259-261 Stanley St. **CALGARY,** Crown Bldg. **VANCOUVER** Mercantile Bldg.

A MINER'S REFERENCE LIBRARY

Our Publications cover the whole range of mining operations. The results of many years' experience as manufacturers and the efforts of the foremost designers are described and illustrated in the printer's highest style. These publications, which form a library absolutely unequalled in mining literature, may be had on application to our nearest sales office

Mining Machinery Bulletins

1400 Gold Dredges
1401 Hydraulic Dipper Dredge
1402 Allis-Chalmers Steam Shovel
1403 Hancock Jig
1404 McDougall Roasting Furnace—Enclosed Fire-Box Type
1405 Portable Rock Crushing Plants
1406 Forged Steel Balls for Ball Mills
1407 The Bennetts Pouring Spoon
1408 Tremain Steam Stamp
1409 McDougall Roasting Furnaces
1410 Tube Mills for Wet Crushing in Mining Work
1411 Modern Rock Crushing Plants
1412 Crushing Rolls
1413 Cyanide Plants and their Equipment
1414 The Bennetts-Jones Slag Car
1415 Style "D" Gates Rock and Ore Breaker
1416 Style "K" Gates Rock and Ore Breaker
1417 Smelting Furnaces and Accessory Equipment
1418 Ventilating Fans
1419 Rolls for Crushing Coal, Phosphate Rock, Rock Salt, etc.
1420 Gold Milling in the Black Hills
1421 Overstrom Concentrator
1422 "The Rebuilding of a Great City" (Rock Crushing Equipments for Contractors' Use)
1423 Gates Breakers, with Short Heads and Concaves for Fine Crushing
1424 Allis-Chalmers Copper Converters, Electrically Operated
1425 Perforated Metal
1426 Suspended Iron Frame Vanner
1427 Allis-Chalmers Frue Vanner
1428 Copper Converters, Hydraulically Operated
1429 Blake and Dodge Crushers; also Grizzlies
1430 Rotary Kilns
1431 Huntington Mills
1432 Stamp Mills
1433 Prospecting Mill, for Free Gold Ores
1434 Richard's Classifiers
1435 Elevators
1436 Revolving Screens
1437 Concentration
1438 Two Notable Milling Plants
1440 Ribbed Tube Mill Lining
1441 Gates Breakers and Steam Shovels
1442 Improved Mixing Mill
1443 Faber du Faur Furnace

Instruction Books

5000 Instructions for Setting and Running Style "D" Gates Rock and Ore Breaker
5001 Directions for Erecting and Operating Frue Vanner
5002 Instructions for Setting and Operating Style "K" Gates Rock and Ore Breaker
5004 Directions for Erecting Gates Elevator
5005 Directions for Setting and Operating Gates Tube Mill
5006 Directions for Setting and Operating Gates Ball Mill

ALLIS-CHALMERS-BULLOCK

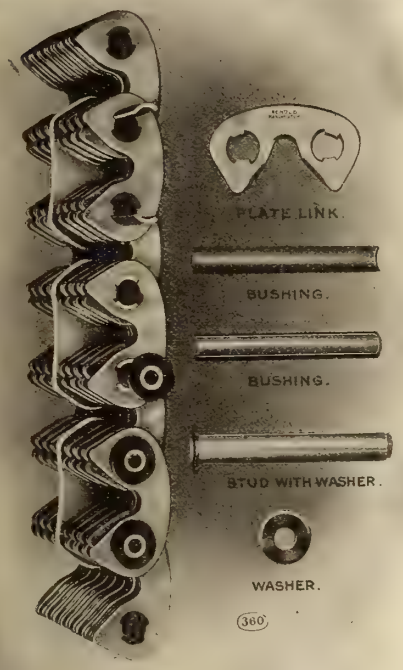
LIMITED

WORKS - - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

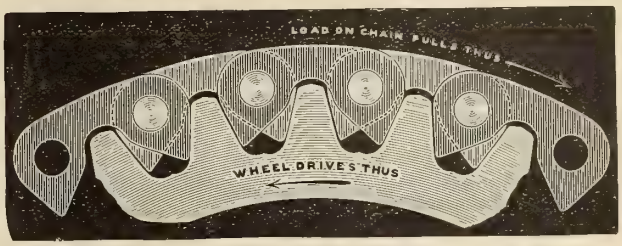


Showing the Patent Bearings of the Silent Chain and giving General Construction

RENOLD PATENT SILENT

(MANCHESTER, ENG.)

CHAINS



Showing Chain on wheel.

The only drive suitable to short centres. All the advantages of direct connection at half the cost.

JONES & GLASSCO.

Sole Canadian Agents, -:- MONTREAL

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just because it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73



JEFFREY

A 5 Electric Rotary Drill

for

Coal, Slate, Shale, Clay, Gypsum, Rock Salt, etc.

This machine
can be absolutely depended upon to drill any material which can be penetrated by an auger bit.

Send for descriptive Bulletin No. 16

JEFFREY ELECTRIC LOCOMOTIVES

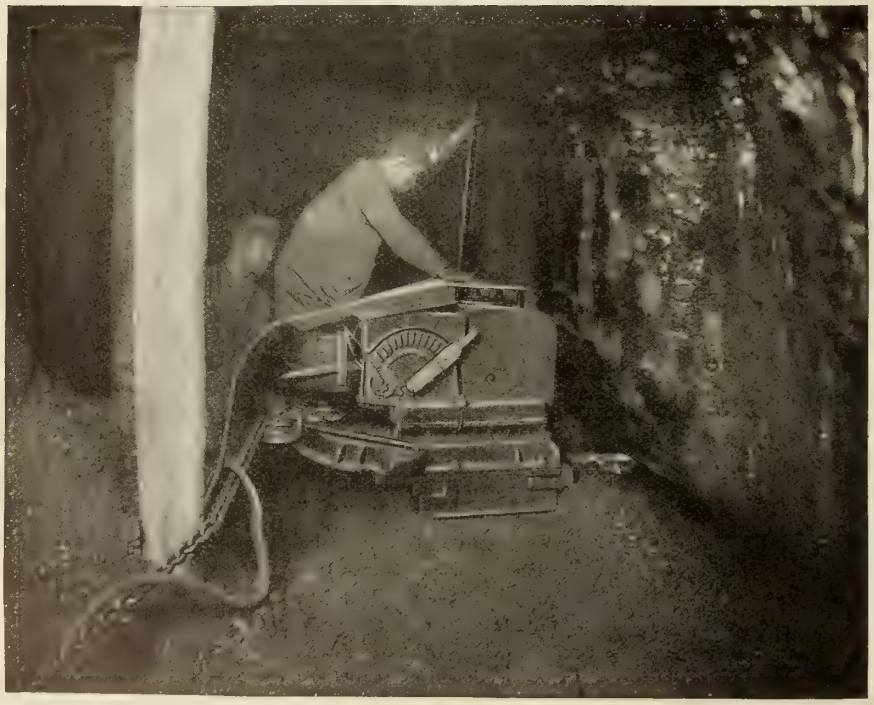
THE COST OF MAINTENANCE

of Jeffrey Locomotives has been shown by actual records to be less per ton mile than any other make of Electric Locomotive. Bulletin No. 17

We build Complete Coal Mine Equipments

THE JEFFREY MFG. CO., Columbus, O., U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance Street.



Sullivan "CE" Mining Machine crossing the face of a room.

COAL MINE
DEVELOPMENT

may be carried on most rapidly and a paying tonnage established at the earliest possible date, with Sullivan Continuous Undercutters.

These machines are well suited to driving entries, cutting room necks, break-throughs and other narrow work, by reason of their compactness, the ease with which they are handled, under their own power, and their high mining speed on the "continuous cutting" principle.

Bulletin 663 C

ROCK DRILLS **PICK MACHINES**
AIR COMPRESSORS **DIAMOND DRILLS**

SULLIVAN MACHINERY CO. CHICAGO, ILL. CLAREMONT, N. H.

BIRMINGHAM ROSSLAND BUTTE ST. LOUIS DENVER SAN FRANCISCO JOPLIN KNOXVILLE SALT LAKE NEW YORK SEATTLE PITTSBURG SPOKANE PARIS, FRANCE SYDNEY, AUS.

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed wtth Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

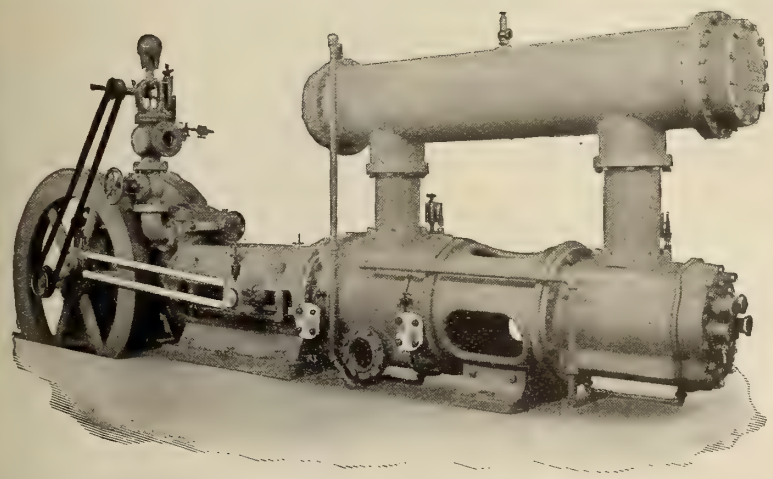
Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

Address nearest office to-day.

PATERSON MANUFACTURING COMPANY, LIMITED,
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Simple Steam Compound Air Compressors



A Straight Line Design with power applied to load in the most direct, positive manner, with the minimum of friction, fewest parts and utmost simplicity.

An ideal machine for the mine, strong, rugged, self-contained with large air output and economical steam consumption.

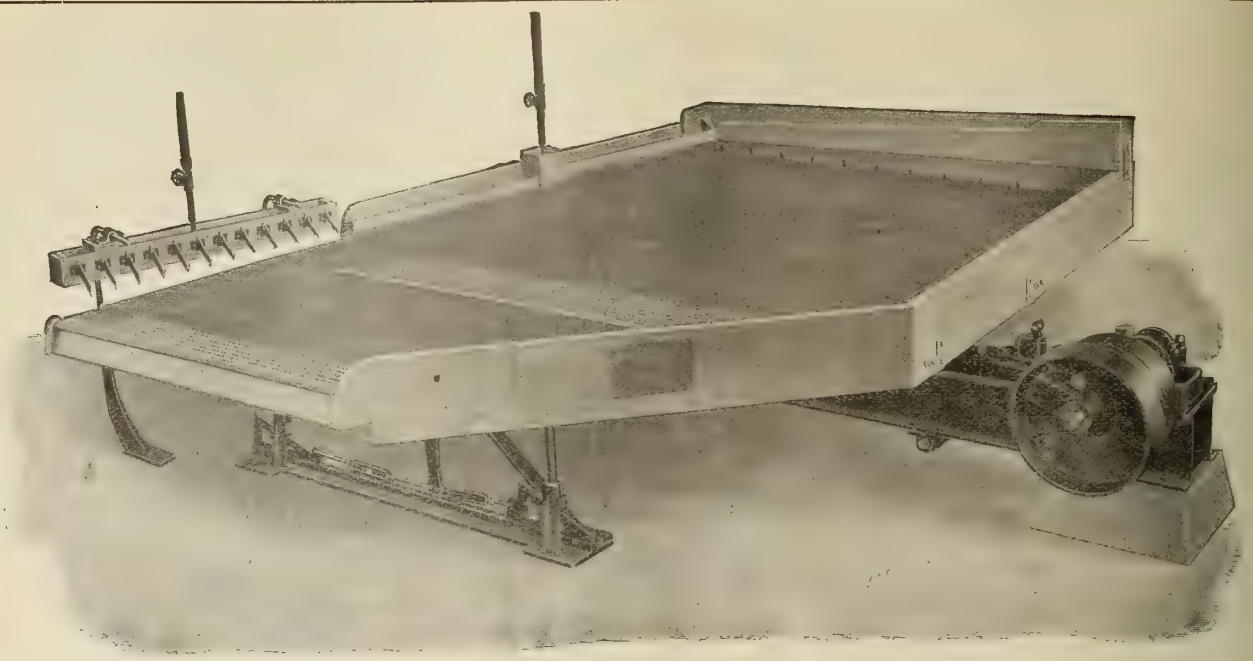
Ask for our new pamphlet, K-83.

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO. COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS



Comparative Tests Show That The Improved No. 3 Diester Slime Table

makes closer savings from fines and slimes than vanners. We are installing additional tables in the Strattons Independence Mill at Victor, Colo., as the result of a trial of *one* table.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

THE CANADIAN BANK OF COMMERCE

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English,
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

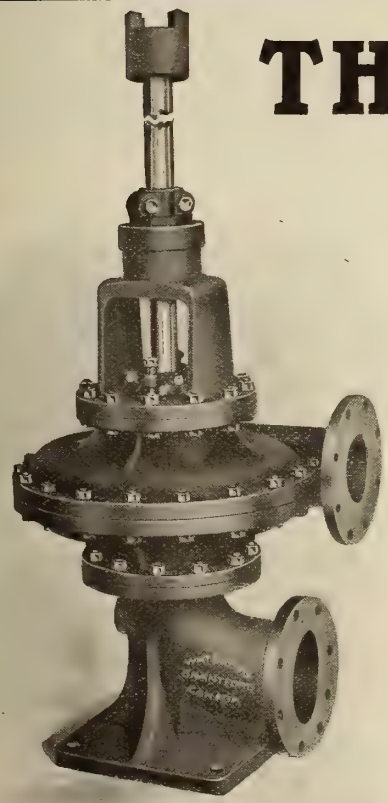
WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns,** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.



THE BEST PUMP

for use in Mine Drainage, because it is built for just this work.

Compact—Simple—Durable.

These three characteristics are combined in such a way that the Pumps can be readily handled, easily operated and will withstand the hard usage it is subjected to without breaking down.

Built for wet or dry pit work, this Pump is particularly adapted for Vertical Motor Drive. Runners and all working parts of the best material and of specially strong design.

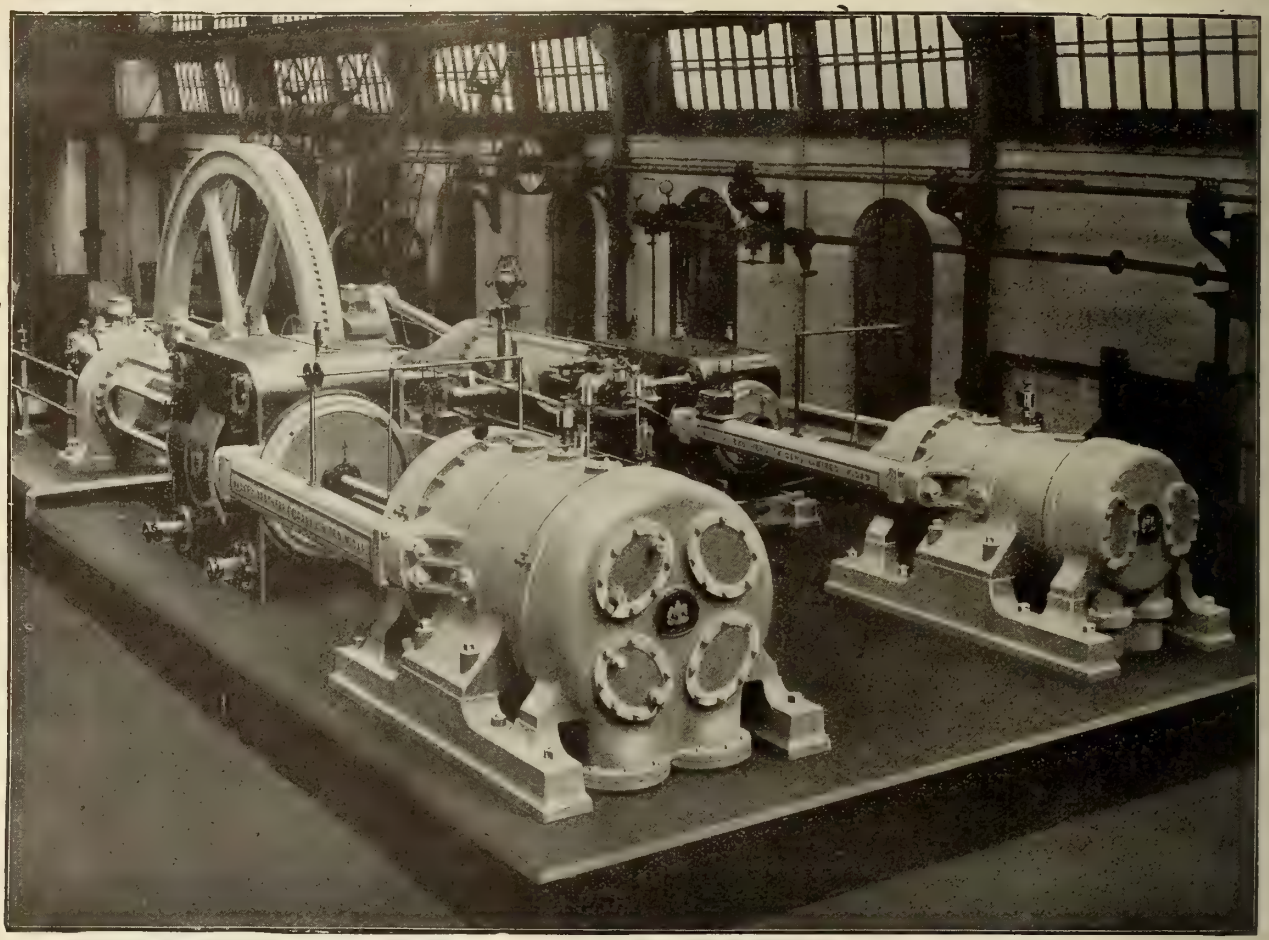
Built in sizes up to 14" discharge opening, in both Vertical and Horizontal types.

Fully described in Bulletin 200.
Write for complete Catalogue now.

The Waterous Engine Works Co. Ltd.
BRANTFORD, - CANADA.

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



A Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

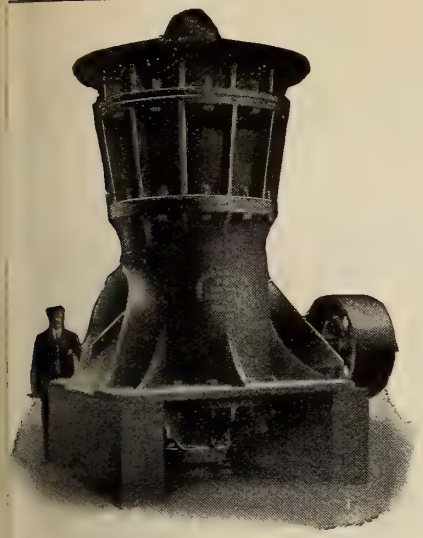
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



eclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

lucluding
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF
AND ALL KINDS OF
BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

THE CALL OF THE WILD.

The Opening Season is calling hundreds of enthusiastic prospectors away to their summer's labor in the wilds.

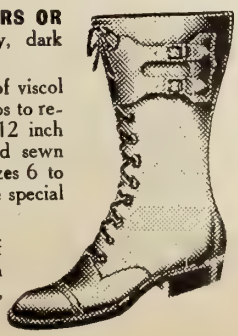
If you are Going, What About Requirements?

In many lines we are peculiarly fitted to help you get your outfit. From watches, instruments and firearms to tents, flybars and clothing we handle most of the necessaries.

OUR SPECIAL BOOT FOR MINERS OR PROSPECTORS is made from heavy, dark "tan colored" winter calf.

The leather is treated in a solution of viscol oil, makes them soft and pliable, helps to resist the wet. It's high cut having a 12 inch left with heavy double goodyear welted sewn soles and bellows tongue to top. Sizes 6 to 11. The highest kind of value at the special price per pair $6.00.

NOTE:—We recommend the use of "Visole" to be applied freely which will give additional wear to the leather, per tin .15c.



Compound arnica and witch hazel. This is the best preparation we know of for putting on bruises, if applied immediately it saves the hurt one much suffering, it soothes the pain and reduces the swelling, the bruise not getting black at all. Price pint bottle .50, quart bottle 1.00, small bottles .15 and .25.

Mosquito and black fly oil applied over the exposed parts, will prevent insects from biting, 4 oz bottle .25, per gallon 7.25

Peruvian Ointment, an antiseptic healing ointment for burns, scalds, cuts, sores, etc. Price per bottle .15, per lb. jar .75

Bandages (cotton) all 6 yard lengths,
1 inch wide.....2 for 5 per dozen .30
2 " " .....5 each, 6 for .25
2½ " " .....5 each, per dozen .60
3 " " .....2 for .15, 4 for .25

Zinc Oxide Adhesive Plaster on spools, 5 yard lengths, For strapping up cuts, broken ribs, or any purpose where strapping is necessary. ½ inch wide .30 each: 1 inch wide .40 each: 2 inches wide .60 each.

New skin, an antiseptic waterproof liquid court plaster, for cuts, burns, blisters, etc. Price .15.

Fine cold drawn castor oil, pint bottle .20

Lewis Astringent cordial for diarrhoea, cramps, etc. 4 ounce bottle .25

THE T. EATON Co LIMITED

TORONTO CANADA

STRONG, LIGHT, RELIABLE.

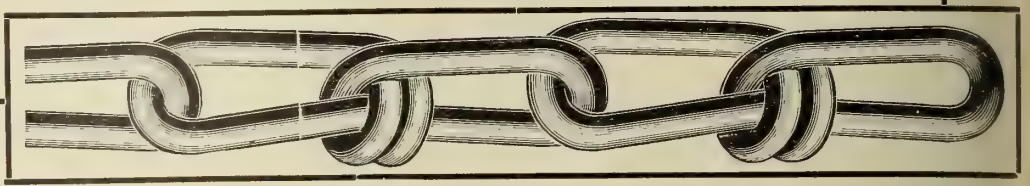
These are the qualities you require in any chain used in your business. And they are the very qualities that have built up an enormous demand for

GREENING'S STEEL WIRE CHAIN

Greening chain is perfect in mechanical construction. It is made from Hard Drawn Steel Wire—drawn and tested in our own plant. It would pay you to get our Catalogue.

THE B. GREENING WIRE CO., LIMITED

Hamilton, - Ontario
Montreal, - Quebec



NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

ANNOUNCEMENT

BRUCE PEEBLES

EDINBURGH & COMPANY, LIMITED SCOTLAND

are now represented in

CANADA

by

VANDELEUR AND NICHOLS

DINEEN BLDG., - - - TORONTO

SPECIALTIES:

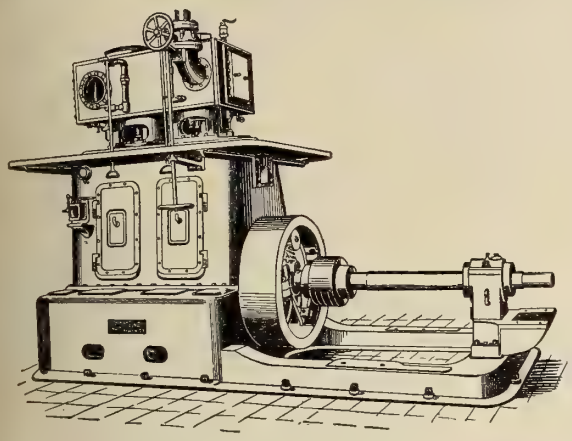
DIRECT and ALTERNATING CURRENT.
DYNAMOS and MOTORS for all Conditions of Service.
PEEBLES-LACOUR MOTOR CONVERTERS.
STEAM TURBO ALTERNATORS. TRACTION MOTORS.

The Lancashire Dynamo and Motor Company, Ltd.

Works: England. Canadian Office: 152-4 Bay Street, Toronto

Watertight Motors for Mines

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

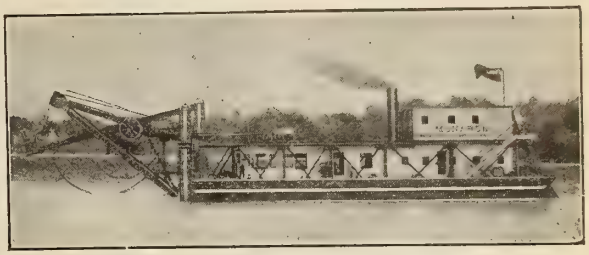
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,

Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



We Manufacture

The Most Complete Line of

Babbitt Metal

In the Dominion

Write for Illustrated Circular and Price List.

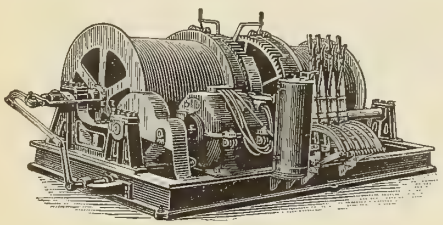
THE CANADA METAL CO., LIMITED, - TORONTO

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

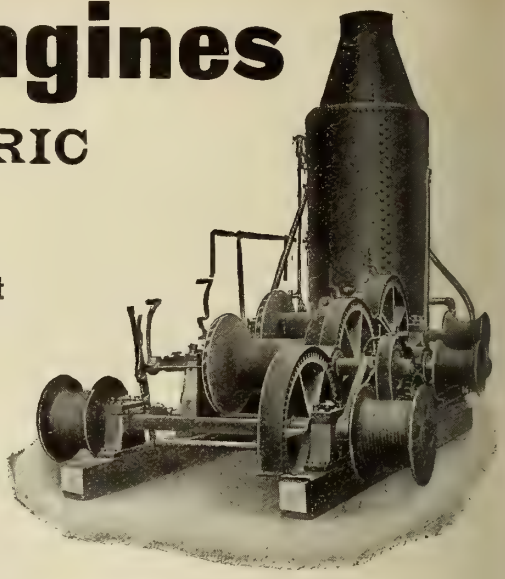
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 a.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

TROUT FISHING

CANADIAN PACIFIC RAILWAY

Season opens May 1st.

NOW IS THE TIME TO PLAN A SPRING FISHING TRIP

Commence by securing 1910 Copy

"FISHING AND SHOOTING" AND "SPORTSMAN'S MAP"

Also literature descriptive of Canada's Fishing Grounds, best reached by

CANADIAN PACIFIC RAILWAY

WRITE FOR ILLUSTRATED LITERATURE AND ALL INFORMATION TO

R. L. THOMPSON, - - District Passenger Agent, - - TORONTO

Behrend System of Concentration

DRY -:- WET

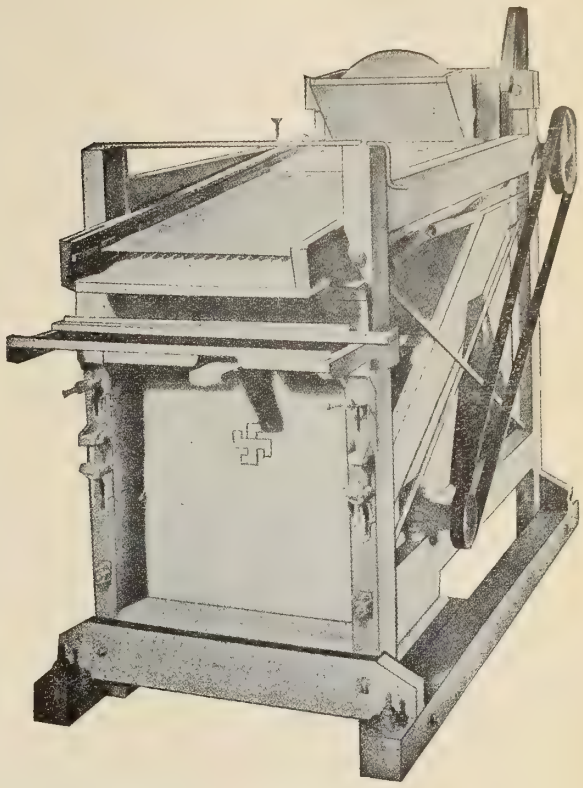
For all ores and minerals.

Highest recovery on slimes.

Send sample of ore for preliminary test to

Behrend Concentrators, Limited

48 Inspector Street, Montreal





Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

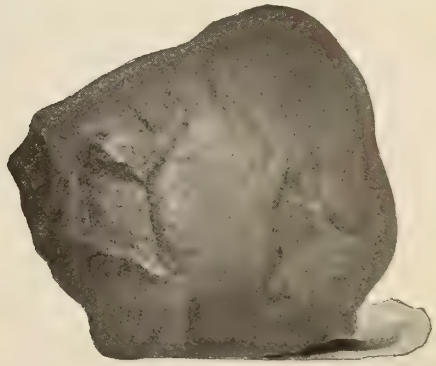
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scrantan, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

The Davis Handbook

OF THE

Cobalt Silver District

By H. P DAVIS.

ILLUSTRATED WITH PHOTOGRAPHS

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 PAPER COVER $2.00 STIFF COVER

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

"Link-Belt"

CONVEYING MACHINERY

HAS A LONG RECORD OF SUCCESSFUL OPERATION AT COAL MINES.

OUR MANUFACTURES INCLUDE

Ascending and Descending Conveyors, Bucket Carriers, Car Hauls, Coal Pockets, Coal Tipples, Coaling Stations, Screening Plants, Complete Coal Washery Equipments, Power House Conveyors, Chutes, Weigh Boxes, Car Loaders and Unloaders, Etc.

Original "Ewart" Link-Belt, "Dodge," "Monobar," "Ley," "Maximum," Silent and other Chains.

≻ Flint-Rim ≺ Specialties: Sprocket Wheels, Small Rollers and Truck Wheels for Conveyors, Carriers and Cars.



Steel Coal Tipple; Franklin Construction Co., Benton, Ill.

In every section of the country may be found Conveying Machinery of our manufacture—evidence of broad utility in an extensive and exacting field.

LINK-BELT COMPANY

PHILADELPHIA - CHICAGO - INDIANAPOLIS

SEATTLE; 439-440 N. Y. Block DENVER; Lindrooth, Shubart & Co.

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Safest and Best Quality.

BALANCES

CRUCIBLES

CRUSHERS

FURNACES

SCORIFIERS

BONE ASH

BORAX

LITHARGE

C. P. ACIDS

CHEMICALS &c.

Laboratory Apparatus of every description.

LYMANS, LIMITED.

ST. PAUL STREET, MONTREAL.

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

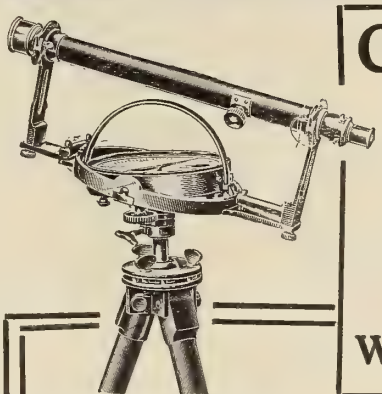
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Casartelli's Patent Mining Dial With Telescope

Sight limb moves on axes cast on the Compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indices attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Supplied without telescope if desired.

Tangent Motion fitted at slight extra cost.

Sizes 5 inches and 6 inches

Joseph Casartelli & Son

Scientific Instrument Makers

43 Market Street

Manchester, Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co., Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

T. H. CRABTREE

Member of Canadian Mining Institute

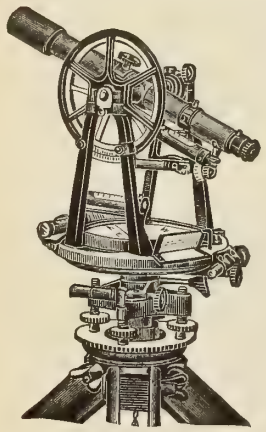
DEALER IN ASBESTOS

Inspector of Shipments for Foreign or Home buyers.

Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.

BLACK LAKE

Cable address "Crabtree" Black Lake
A. B. C. code 4th edition



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196

Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical

and

Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Dominion Coal Company
Limited

Glace Bay Nova Scotia

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

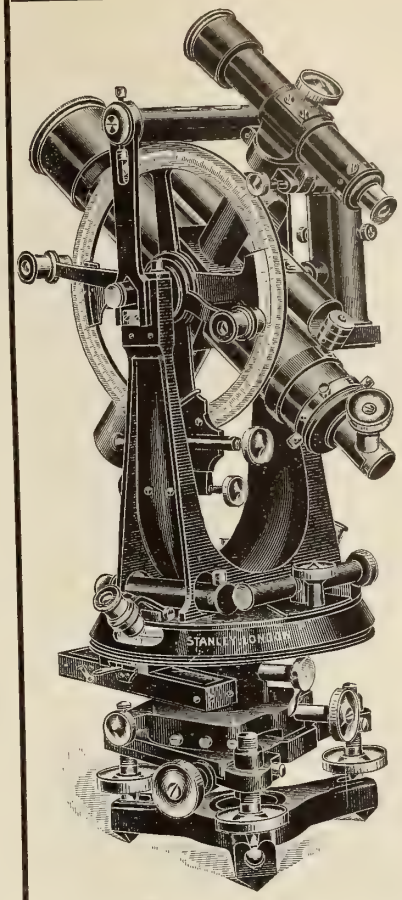
Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.



DUNBAR-SCOTT AUXILIARY TOP AND SIDE TELESCOPE—REQUIRES NO CORRECTION FOR ECCENTRICITY

TRADE
STANLEY
MARK

W. F. STANLEY & Co., Limited

Great Turnstile, London, ENGLAND

THE
Bennett Fuse

Crown  **Brand**

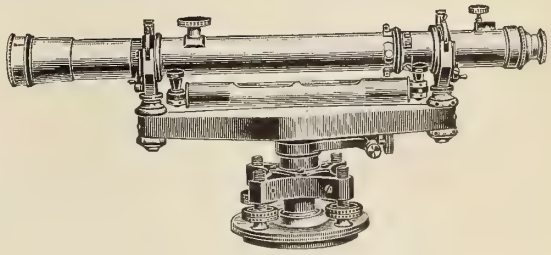
MANUFACTURED BY

William Bennett, Sons & Co.
CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.
VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION.



K & E

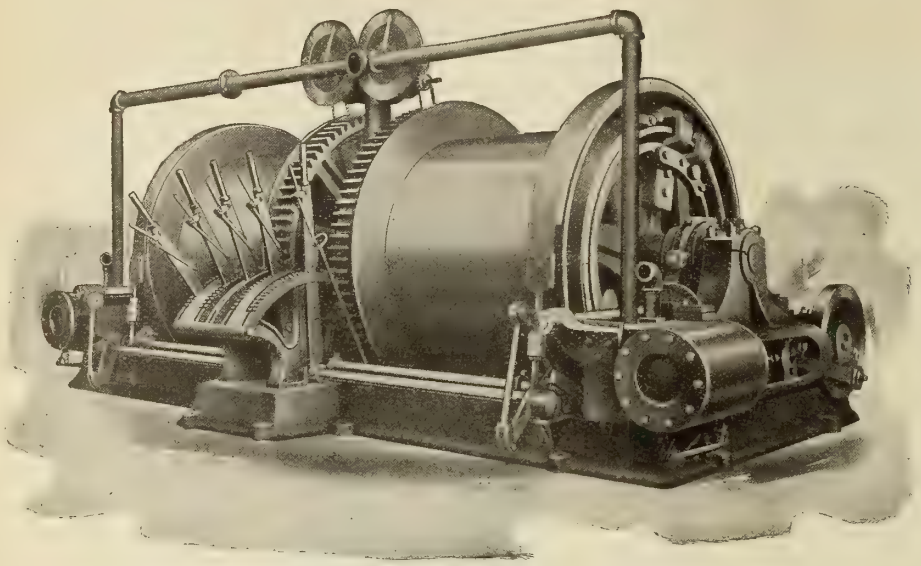
Transits and Levels

Give thorough satisfaction. Discriminating engineers select them on account of their accuracy, convenience and general reliability.

Send for our 550-page Catalogue, listing every requisite of the engineer for field or office.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.

New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes



When desired we equip our winding Engines in the larger sizes with the Lane Friction.

This device possesses great strength and adapts a Hoist to the heaviest class of work.

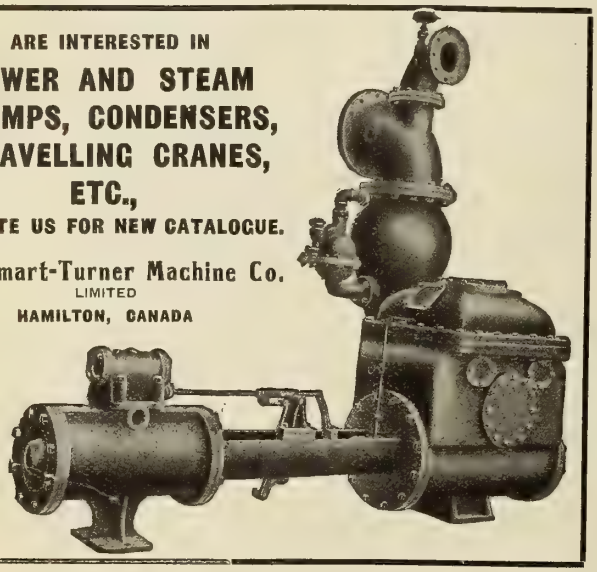
WE STOCK THE SMALL SIZES.

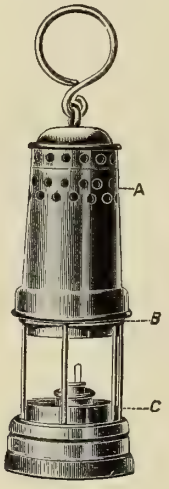
ARE YOU INTERESTED

The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.

IF YOU ARE INTERESTED IN
POWER AND STEAM PUMPS, CONDENSERS, TRAVELLING CRANES, ETC.,
WRITE US FOR NEW CATALOGUE.
The Smart-Turner Machine Co.
LIMITED
HAMILTON, CANADA





DAVIS

MINERS' SAFETY LAMPS
GAS TESTING LAMPS
(STOCK AT MONTREAL)
SEND FOR CATALOGUES

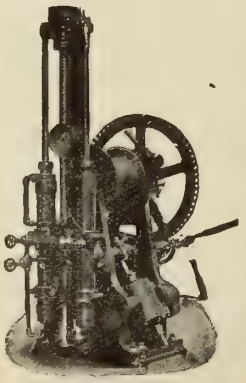
PEACOCK BROS.
68 BEAVER HALL HILL
MONTREAL

Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY
90 WEST ST. NEW YORK



LUDWIG NAUEN
HAMBURG & LONDON
IMPORTER AND DISTRIBUTOR OF
ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, May 1, 1910 No. 9

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 257
(a) Fire Loss and Mineral Products 257
(b) Producer-Gas Power Plants 258
(c) Two Recent Canadian Inventions 258
(d) New Demands of the U. M. W. A. 259
(e) Granby and Some Definitions 259
(f) Business Honour 259
(g) Granby Affairs 259
(h) The Last Straw 260
(i) Editorial Notes 260
Annual Report of the Nova Scotia Department of Mines for 1909. 260
Petroleum in Japan 265
Mining in Nicaragua 265
Report of Coal Mines Regulations Relating to Submarine Coal Areas, by T. E. Forster 267
Granby Mines, Boundary District 269
Storage Battery Electric Locomotives Handling Copper Ore, by F. C. Perkins 270
A Discussion of Leopoldo Salazar's Paper on the McArthur-Forrest Cyanide Patents in Mexico 271
Zinc Mining in British Columbia 274
Eruptive Products 276
Legal Column 276
Book Reviews 277
Personal and General 278
Exchanges 279
Canadian Patents 279
Correspondence 280
Special Correspondence 280
General Mining News 284
Mining News of the World 285
Company Notes 286
Statistics and Returns 287

FIRE LOSS AND MINERAL PRODUCTS.

We have read no more eloquent plea for the use of mineral products—and we use this term in its widest sense—in the construction of buildings than that contained in a bulletin just issued by the United States Geological Survey.

Investigations made by officials of the Survey have adduced many startling facts. For instance, the fire loss in the United States during 1907, excluding forest fires and marine losses, was more than $456,485,000. The actual fire losses due to buildings and their contents destroyed meant a per capita loss of $2.51. In Europe, due largely to the absence of frame buildings, the per capita loss is as low as 33 cents.

It is probable that the per capita loss in Canada is as large as, if not larger than, that of the United States. In both countries frame buildings are common. In both, also, there has been until recently, no organized effort to impress the public with a sense of the irremediable and appalling losses incurred through fire.

While in our larger cities fireproof business structures are the order of the day, it is yet true that the vast majority of Canadian dwellings, shops, warehouses, factories, and public edifices are either completely inflammable, or only partly fireproof. Our principal efforts to guard against fire and its results are respectively our fire-fighting brigades and our insurance systems. These, in themselves, constitute heavy annual drains on our resources. Insurance, in any form, is merely a means of indemnifying the individual at the expense of the community. Like fire-fighting organizations, insurance is a costly superfluity. The one and only adequate preventive of waste through fire is a change from our present methods and materials of construction.

In effecting this change,—a change implying the more general utilization of mineral products such as brick, concrete, building stones, slate, tiles, metallic members, and insulating material such as asbestos, mica, and slag products,—the mineral industry will be given a tremendous impetus. And, instead of depleting our forests to erect perishable and unsightly structures, we shall put a premium upon architectural permanence and fitness.

As we have pointed out above, the materials that go into our modern office buildings are fireproof. But the myriad small buildings and dwellings that dot the country and make up our villages and towns are composed in nine cases out of ten of wood. In some parts of the Dominion this is not avoidable. But in Nova Scotia, in parts, at least, of New Brunswick, and Quebec, and throughout large portions of Ontario and Manitoba, fire-resisting material is as cheap, or almost

as cheap, as wood. Further, it is only a question of time when similar conditions will obtain in Alberta and the West generally.

While we must acknowledge that wood as a building material cannot be replaced in every part of Canada, yet measures can be taken to render wooden houses comparatively unburnable. Asbestos sheathing affords probably the best protection. Asbestos shingles, tiles, boards, in all manner of shapes are being put on the market. Metallic sheathing is also a useful, though not ornamental, means of protection. It is worthy of mention that for years the fire laws of Dawson City, Yukon Territory, have made obligatory the sheathing of buildings with uninflammable substances.

But it is in our larger centres of population that a change is most needed. Wooden floors, partitions, staircases, should long ago have disappeared from our public buildings. The use of reinforced concrete, or of some equivalent, should be enforced by law in all cities. In suburban and country communities, measures only less stringent should be put into effect.

All this, naturally, cannot be done at once. It will take years to form public sentiment. But we are convinced that this is a subject that should be discussed by our legislatures and, in fact, by all our city, town, and county councils. The loss that Canada suffers annually through fire, is enormous enough; but another and a heavier toll is paid. Dozens, perhaps hundreds, of human lives are sacrificed because as a people we are ignorant and indifferent.

In developing our theme we fear that we have overlooked our original text. What we started out to say was that before the captains of our asbestos, cement, clay, mica, and iron industries lies the opportunity of educating the people up to the use of safe materials of construction. Sooner of later this must come. Canada should not be the last of civilized countries to remove the scales from her eyes.

PRODUCER-GAS POWER PLANTS.

Despite many failures, failures due both to inefficiency on the part of operators and to inherent defects in the plant itself, the gas-producer as a source of power is more than holding its own. Trouble has arisen in not a few Canadian installations. In several instances that have come to our notice the manufacturers have been to blame. In other instances the ignorance of the operator has brought disaster. But, on the whole, the gas-producer has established itself as one of the few economical sources of power.

Such is the present demand for producers and gas-engines that one new Canadian manufacturing concern, organized but a few months ago, has orders on hand that will tax its capacity for two years to come. Both British and United States manufacturers report excellent business.

But while no one can dispute the fact that the producer and gas-engine are to play a large part in our industrial growth, it may not be amiss to allude here to the tendency towards disregarding local conditions in considering the selection of a power plant. Our remarks apply, of course, only to the equipment of mines.

The belief that the gas power plant is bound to replace all steam installations is not warranted. Initial cost of plant, transportation charges, the probable life of the mine, and the probable net earnings throughout its lifetime, must all be weighed carefully. Due consideration of these factors will frequently lead the engineer to conclude that he must sacrifice actual mechanical efficiency and must be influenced mostly by the immediate requirements of his mine. In other words, a cheap steam plant, representing only a small outlay, often serves the purpose with more ultimate economy than would a more elaborate and costly outfit. It may be bad engineering to install a producer-gas power plant if a non-condensing Corliss engine will fill the bill.

That our meaning may be clearer we may add that we have no shadow of doubt as to the assured future of the producer-gas plant. It has come to stay. Its use will extend. But, for the present at least, there are limits set. These limits must be recognized. The engineer must not allow himself to be carried away by the mechanical beauty of a device that is sometimes unsuited to meet the requirements of mines situated far from transportation; or that, in point of cost, throws out of balance the mining business that he is conducting.

As our transportation lines improve and increase, and as suitable fuel becomes cheaper, the steam plant will gradually be replaced. But its days are not yet numbered.

TWO RECENT CANADIAN INVENTIONS.

Two Canadians have recently entered into the field of invention in mining machinery. Mr. John Redington, mine manager of the Coniagas Mine, Cobalt, Ont., has introduced several modifications in the standard design of rock-drill valve and piston. Ten of his drills are in use at the Coniagas mine. The parts are machined and assembled at the mine. The drill is reported to be giving every satisfaction.

Another invention, a rock-drill chuck, patented by Mr. H. W. Schorlemmer, Rossland, B.C., has been given full trial at the mines of the Consolidated Mining & Smelting Company. In the new chuck there are no bolts and nuts to tighten; the operator merely slips in his drill and turns on the air. The drill tightens automatically, and does not work loose. To release the drill it is only necessary to tap a wedge which is part of the chuck.

NEW DEMANDS OF THE U. M. W. A.

Following a visit from Mr. E. S. McCullough, ex-vice-president of the U. M. W. A., to Port Morien, the North Atlantic Collieries Company, has been served with notice by a local of the U. M. W. A. of various demands. These are as follows: Recognition of the United Mine Workers, reception of their pit committee, granting of a "check-off" system, permission to inspect the balance sheet and books of the company at intervals to see whether or not an increase of wages is justified, and an undertaking on the part of the North Atlantic Company not to mine or load any coal for any company at whose mines members of the U. M. W. A. may be employed. These are modest demands. This occurrence but serves to emphasize our previous contention, namely, that Canadian companies are at the mercy of the heads of the international labour unions.

Take this particular instance as a case in point. The North Atlantic Collieries is a small concern, which has never at any time been very remunerative. No matter how preposterous the demands of an international union, nor how small the Canadian company, there is nothing in our laws to prevent the whole financial force and the whole official personnel of the union from being concentrated upon one single devoted company. Instructions can be issued in the United States and carried out in Canada. American money can be used without let or hindrance to destroy Canadian industries, and apparently no power in our country can say nay. What magic is there about a labour union that it should be exempted from the ordinary protective laws which a sovereign country exercises over the actions of aliens within its borders? The United Mine Workers of Canada is not an incorporated body, either in the United States or in Canada; its officers report to no government authority; its finances are untrammelled by legislation that joint stock companies must recognize. Canada is usually supposed to be a free and democratic country, affording to its citizens the rights of individual liberty. But the fact remains that its citizens can be prevented from exercising their right to work, and the investments of other citizens can be rendered worthless at the beck of a labour leader in the United States. Ottawa cannot prevent the alien from sending his money here, nor can Ottawa deport the undesirable agitator when he is stirring up strife. The situation would be amusing were it not so humiliating. We erect a high tariff barrier against United States imports that interfere with our industries; we bar the willing European worker, no matter what his qualifications, unless he can produce twenty-five dollars; we deport the indigent and the feeble; we keep out the immoral and the diseased; but the international union delegate who comes in the sacred name of labour is admitted and allowed to remain, no matter how incendiary his speeches nor how dangerous his mission to our industries and our workers.

GRANBY AND SOME DEFINITIONS.

After reading current reports of the Granby mix-up, we are struck with the fact that much of the difficulty might have been obviated had the phrases "ore in sight" and "ore reserves" been used in their right technical sense. The loose allusions made by Manager Hodges to "ore in reserve" must have referred to probable or indicated ore. By no stretch of the imagination can we conceive of an experienced mining man speaking thus of ore positively blocked out and ready for stoping.

Thus when we are informed that Dr. Sussman reports 6,000,000 tons as ready for stoping, we cannot see that the position of Granby is bad. This quantity will provide about five years' ore supply at the present rate of consumption. This is all that can be expected, so far as "ore in sight" is concerned.

The future of Granby hinges, therefore, upon those ore supplies, not yet blocked out, ready for stoping, or "in sight," but falling into the category of "probable," or "indicated." Just how far these bodies have been explored remains to be seen. But certainly their extent, or, rather, the presently available knowledge of their extent, is the crux of the Granby question.

BUSINESS HONOUR.

An exceptional instance of honourable business methods has come to our notice. Our readers are familiar with Stevens' Copper Handbook. This annual contains a number of pages of advertisements. Usually the volume is revised completely every year. For two years past Mr. Stevens has been unable to revise the volume completely. Feeling that this fact will affect the circulation of the book, Mr. Stevens has, nevertheless, notified each subscriber. Further, considering it prejudicial to lower his advertising rates, but feeling, also, that he is not justified in charging full rates, Mr. Stevens has decided to reprint all advertisements for this year free of charge.

The frankness and candour with which Mr. Stevens has faced the situation are refreshing, and, so far as our experience goes, unique.

GRANBY AFFAIRS.

Elsewhere we publish a communication dealing with the Granby muddle. Our correspondent points out that if it be true that ore available is limited to six million tons, then an independent examination should be demanded at once. Statements made within the last two years by Mr. A. B. W. Hodges, who recently resigned the managership, indicated his belief that much larger quantities were in sight. The late slump is attributed to rumours contradicting Mr. Hodges' assertions.

It is neither wise nor desirable to diagnose the trouble at its present stage. But it is imperative that full investigation be made without delay. The directors must spare no pains to clear themselves. The pub-

lic has a right to know whether stupidity or something less excusable has brought about the present unfortunate circumstances.

THE LAST STRAW.

We must express our sympathy for the unfortunate crusaders who, a few weeks ago, dashed to the Camel's Back region—and returned. For those who negotiated the slushy spring trails there was little humour in the episode. They will scarcely rise to the bait so easily again. The men who started the false rumour of discoveries need a severe lesson..

The fact remains that northern prospectors are too readily stampeded. Reports of new finds are always, or nearly always, discountable. The best policy is to study the country carefully, to make one's plans with equal care, and then follow out those plans to the letter. Prospecting should be systematic. Wild excursions into the bush do not pay.

EDITORIAL NOTES.

Apart from obvious physical advantages nickel coins would advertise Canada's resources. The matter should be pressed upon the proper authorities.

The new price set by the Dominion Coal Company on coal sold to the Dominion Steel Company is $1.55 per ton. The former price was $1.28 per ton.

The output of the Western Fuel Company, Nanaimo, B.C., was 48,000 tons during March. This is 3,000 tons larger than any monthly output in the history of coal mining in Nanaimo.

Canadian architects are not as familiar with the uses of asbestos as might be expected. Few of them have had occasion to use it extensively. This should not be the case. Practical immunity from fire risks can be had very cheaply by using manufactured asbestos.

ANNUAL REPORT OF THE NOVA SCOTIA DEPARTMENT OF MINES FOR 1909.

The annual report of the Nova Scotia Department of Mines shows, once again, a decided improvement in form and arrangement. While there is still much room for change, especially in the matter of statistics, we are glad to note that the Department is making some progress. We suggest, as we have suggested before, that the mine accidents be summarized and resolved into rate per thousand men employed. Moreover, some effort should be made to embody in a tabular statement the tonnage and money value of all mineral outputs for the year.

COAL TRADE.

The returns of coal sold during the year 1909 show, compared with the returns for 1908, as follows:

	1908.	1909.
Nova Scotia	1,950,632	1,769,803
New Brunswick	510,331	542,827
Newfoundland	207,062	156,248
Prince Edward Island	63,331	78,898
Quebec	2,047,638	1,508,817
United States	499,634	320,735
Mexico	8,907	.....
St. Pierre	.....	10,235
Other countries	4,697	755
Bunker	193,352	227,395
	5,485,583	4,615,713

Coal Production by Counties.

	1908.	1909.
Cumberland County, tons	559,013	542,040
Colchester County, tons	3,951	1,330
Pictou County, tons	777,217	667,637
Cape Breton County, tons	4,556,446	3,634,392
Inverness County, tons	402,655	362,516
	6,299,282	5,207,915

COAL MINING.

Notes from Inspectoral Districts.

Southern District of Cape Breton.

Dominion No. 2 Colliery.—There are 235,000 feet of air in circulation in this mine. One Dixon fan, 29 by 9 feet, produces the current. The seam is 7 feet 6 inches thick, with a pitch of 5 1-2 per cent.

The method of timbering is props-and-caps. Minimum diameter of props is 4 inches.

The colliery has a complete water system. Every thousand feet there are connections with air lines. Working places are sprayed every night. Ackroyd and Best safety lamps are in use. The pit bottom is arranged with revolving tipples and storage tanks. Compressed air is used as motive power.

Excellite powder is used.

Haulage is all plane-rope, except on levels to pit bottom, where air locomotives are used. Room-and-pillar system is followed.

Dominion No. 3 Colliery.—There are 50,000 cubic feet of air in circulation in this mine. One Capell fan, 13 1-2 by 7 1-2 feet, is in service.

Coal seam is 7 feet 6 inches thick, pitching 8 per cent. The mine is worked on the room-and-pillar system.

The compressed air pipe can be coverted into a water line. Ackroyd & Best safety lamps are used.

Dominion No. 4 Caledonia Colliery.—The ventilating of this mine is done by one Dixon fan 14 by 6.4 feet, and one Murphy fan, 12 by 6 feet, delivering 100,000 cubic feet of air. Seam is 7 feet thick, pitching 8 degrees. Props used measure 5 inches at the small end.

The mine is worked on the room-and-pillar method. Rooms are 20 feet wide. Pillars under land area are from 25 to 35 feet thick; under the sea area from 27 to 40 feet thick.

The water for steam and for fire protection is drawn from the town system. Ackroyd & Best safety lamps

re used. The explosives used are Excellite, in pillars; nd Bulldog, in rooms and narrow places.

Endless haulage on the deeps and main level.

DOMINION No. 5 COLLIERY.—Air, 190,000 cubic feet, s supplied by two fans—one 24 foot Guibal, and one 5 foot Chaneller. Room-and-pillar. Ackroyd & Best amps.

DOMINION No. 6 COLLIERY.—One Walker fan, 20 by 7 eet, supplies 48,172 cubic feet of air. Bord-and-pillar nethod in mining. Ackroyd & Best lamps. Bulldog owder. Five and one-half tons of coal are produced or each pound of powder used.

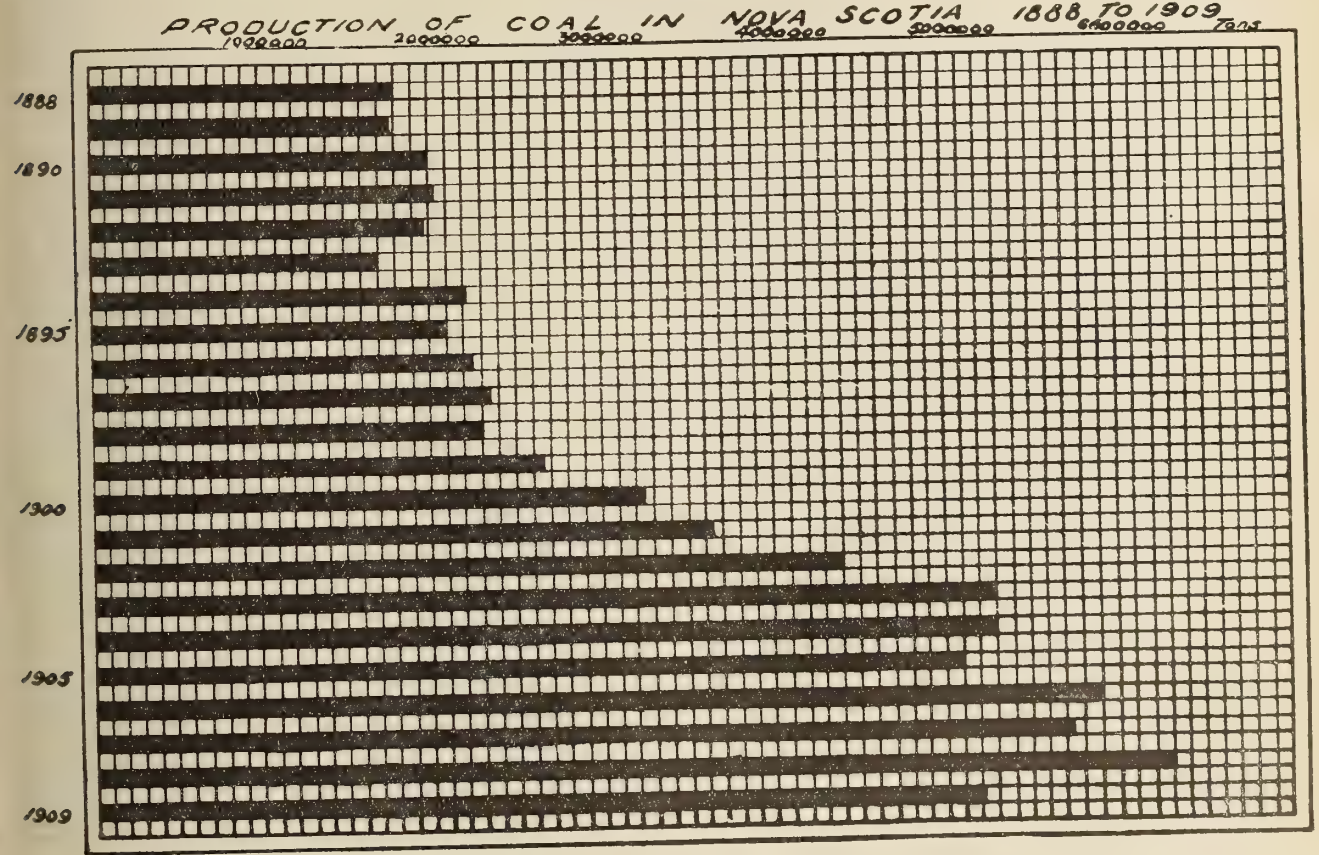
DOMINION No. 7 COLLIERY.—One Capell fan, 12 feet y 11 feet 6 inches, supplies 60,000 cubic feet of air. Room-and-pillar. Bulldog powder.

of similar capacity is held in reserve. Both endless and plane haulage systems are in vogue.

N. S. STEEL & COAL CO., SYDNEY No 2 COLLIERY.—Bord-and-pillar system. Coal all mined by machines of the Hardie and Whitcomb type, driven by compressed air. Marsant safety lamps.

SYDNEY COAL COMPANY.—Employs only 10 miners and 5 unskilled workmen. Open lights are in use.

N. S. STEEL & COAL CO., SYDNEY No. 3 COLLIERY.—On a seam 4 1-2 to 5 1-2 feet thick, three parallel slopes now down 8,885 feet are driven. Daily output, 1,000 tons. Method of working, bord-and-pillar. Width of rooms, 20 feet. Pillars, 25 feet to 40 feet, according to cover. Cross-cuts driven every 60 feet. Coal cutting machines, puncher type, are operated by compressed



DOMINION No. 8 COLLIERY.—One Murphy fan, 8 feet in diameter, supplies 58,000 cubic feet of air. Bord-and-pillar. Marsant safety lamps. Bulldog powder. Endless haulage.

DOMINION No. 9, DOMINION No. 10, and NORTH ATLANTIC COLLIERIES complete the list in this district.

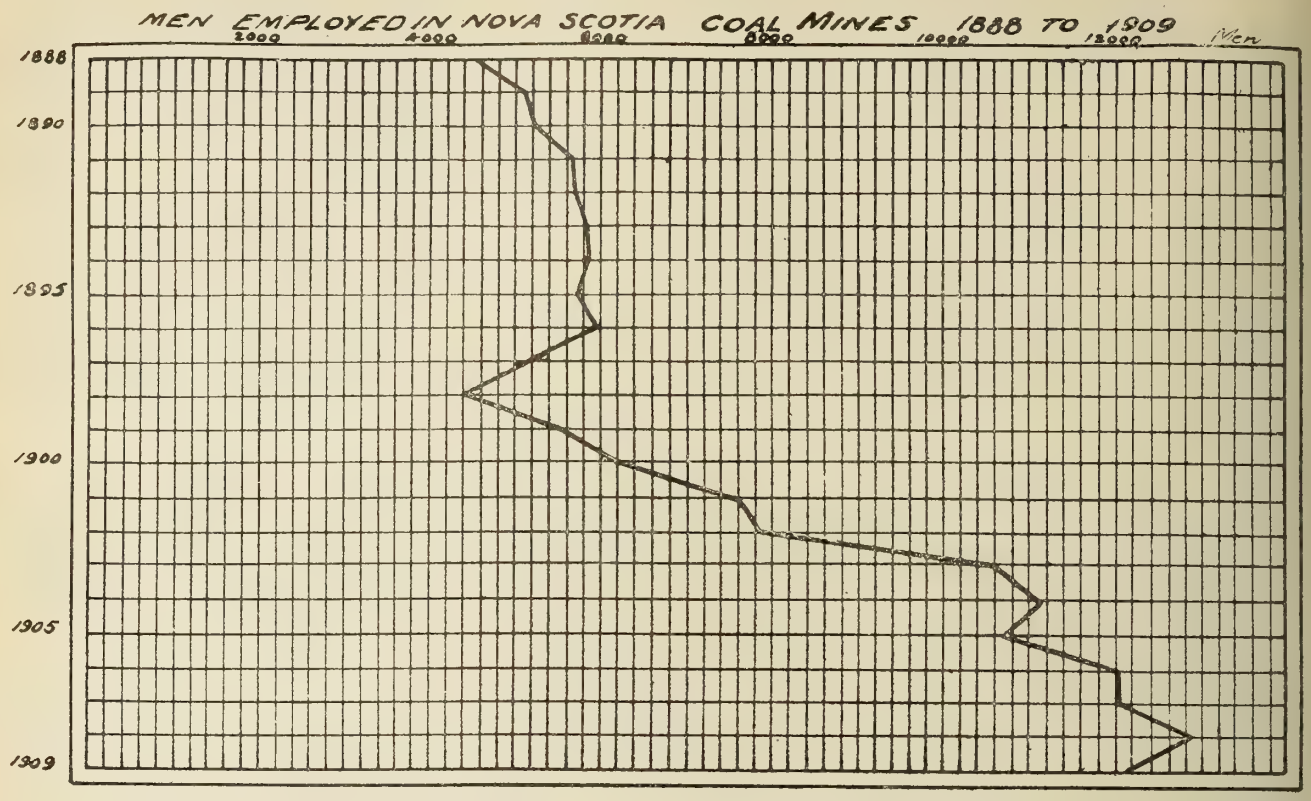
Northern District of Cape Breton.

N. S. STEEL & COAL CO., SYDNEY No. 1, COLLIERY.—877 men are employed here. The output during the year was 250,470 tons, of which amount 118,284 tons were mined in pillars. Bulldog powder was used to the extent of 21,361 lbs. Thickness of seam, 5 feet to 6 feet. Coal, soft and gaseous. Roof and floor are shale. System of working is room-and-pillar, rooms being 17 feet wide and pillars 60 feet thick, with crosscuts driven every 60 feet. Coal all mined by hand picks. A Capell fan, 20 feet by 5 1-2 feet, delivers 120,000 cubic feet of air. A spare 30 by 10 Walker-Guibal fan air. Asbestos fibre brattice cloth and board are used. Marsant lamps. Endless haulage. One Capell fan, 15 by 7 1-2 feet, delivers 48,985 feet of air. An auxiliary fan, a Murphy, 10 by 6, delivers 59,900 feet.

N. S. STEEL & COAL CO., SYDNEY No. 4 COLLIERY.—Coal mined by means of four class E.6 Sullivan electric coal cutters; also by hand. Plane haulage. Bord-and-pillar. One Sirocco fan, 4 1-2 feet diameter, 5 foot blade; and one Sturtevant fan, 6 feet diameter, 3 foot blade. Marsant lamps. Monobel explosives.

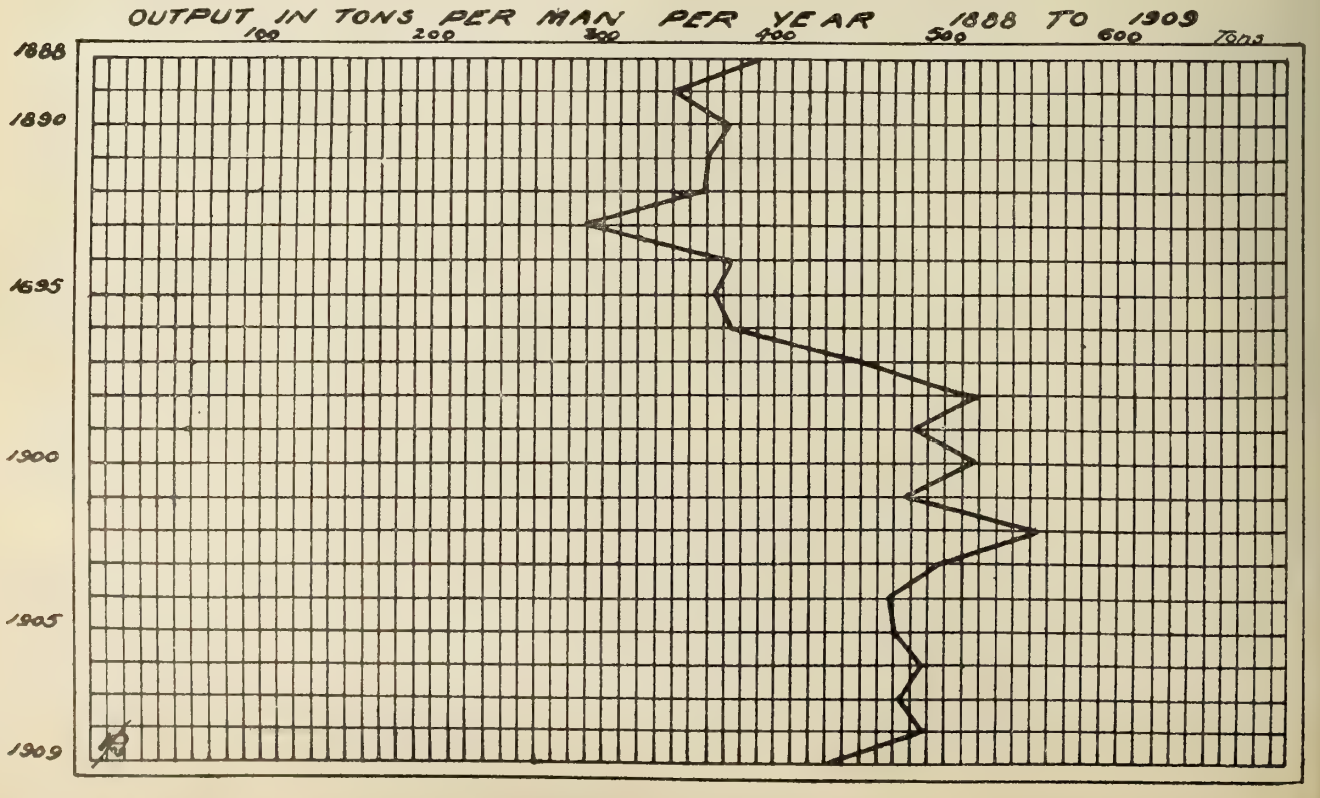
N. S. STEEL & COAL CO., SYDNEY No. 5 COLLIERY.—Bord-and-pillar. Asbestos fibre brattice cloth. Bulldog compressed powder. Endless haulage. Marsant safety lamps.

Dominion No. 1, No. 12, No. 14 and No. 15 Collieries, and the workings of the Colonial Coal Company and of the Mackay Mining Company, make up the remaining mines of this district.



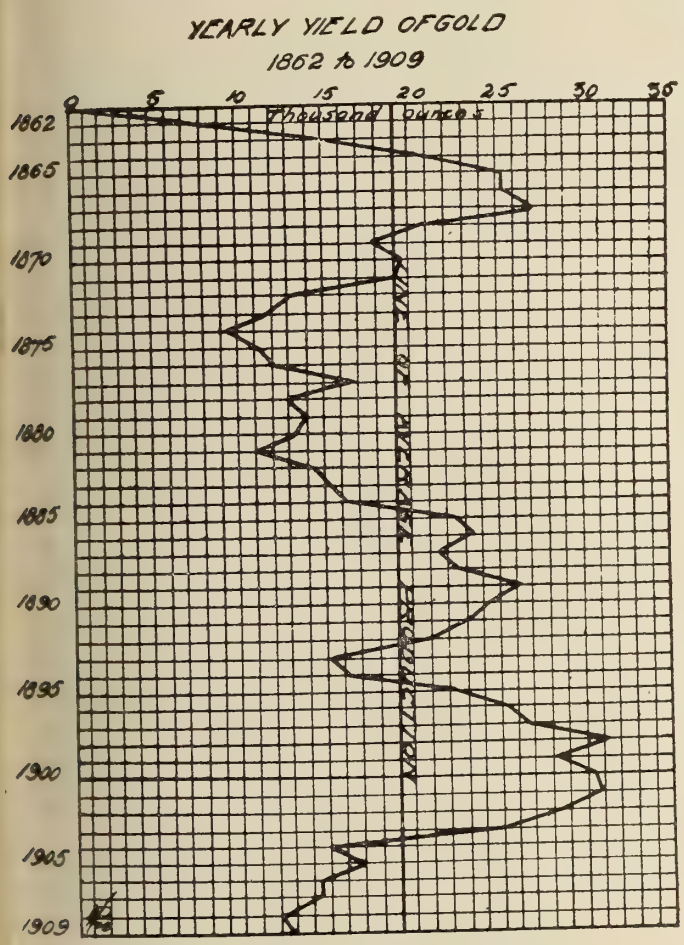
Pictou County.

Acadia Coal Company, Albion Mines, Stellarton.—Here three seams are worked, Cage-Pit, McGregor, and Third. The Cage-Pit seam, 14 feet thick, has an average pitch of 25 degrees. Pillar work was the principal work done. The Third seam, 12 feet thick, is also producing. 270 Wolff safety lamps are used; there being 385 in stock. Monobel explosive, to the amount of 16,682 pounds, and 32,898 detonators were consumed during the year. The air pipes on the main haulage ways are fitted with connections and valves, so that they can be converted into a water system in less than five minutes. The Allan Shafts, owned and operated by the Acadia Coal Company, were not so actively developed as during 1908. Water in the Ford pit hampers work in these shafts. Work has been principally confined to the Ford seam in No. 2 shaft. No. 1 shaft output only 6,559 tons. Monobel explosive was used. Wolff safety lamps.



ACADIA COLLIERY.—Work here was also curtailed to a ertain extent. The airways are reported to be in a ery bad condition, and insufficient air is supplied. The ine is worked longwall, the length of each wall being 7 feet from lowside to lowside. Tarred canvas and, in ome cases, boards are used for brattice. No explosives re needed. Wolff safety lamp. A 13.6 by 4 Capell an, driven by a 100 h.p. Robb Armstrong tandem en- ine, supplies air. Vale Colliery, Thorburn, has been ell developed. Bord-and-pillar system and longwall. Ackroyd-Best and Marsant lamps, with electric lighters nd patent re-openers at the surface and mine stations. Monobel explosives. One 28-foot Walker fan.

INTERCOLONIAL COAL COMPANY.—The Drummond Col- iery was in steady operation. The mine is divided into ections. In No. 1 section no explosive is used. Excellite owder is used in No. 2 and No. 3 sections. Tarred can- as is used for brattice. Marsant lamps with plug lock. One 20 foot 6 inch indestructible Walker fan supplies ir. All the underground engines are run by compress- d air.



Cumberland and Colchester Counties.

CUMBERLAND COAL & RAILWAY COMPANY, SPRINGHILL COLLIERIES.—Good deal of development work done. Dynamite and saxonite are explosives used. Capell fans. Marsant lamps. Lino-tarred brattice cloth.

MINUDIE COAL COMPANY, MINUDIE MINE—River Hebert. Slope is down 2,300. Development work is being pushed. A Stine fan supplies 25,000 cubic feet of air per minute. Asbestos brattice cloth. No spraying apparatus. Black powder and dynamite. Open lights. Longwall advancing. The three-foot seam has a clay parting in centre. Seam pitches at angle of 19 degrees.

MARITIME COAL, RAILWAY & POWER COMPANY, JOGGINS MINE.—Steady progress here. Haulage system changed from tail-rope to endless. New tipple, screen, and picking tables, and 36 new tenement houses. One Sturtevant fan, 7 feet by 8 feet 9 inches, supplies 20,000 cubic feet of air. Seam four feet, pitching 17 1-2 degrees. Bord-and-pillar and longwall systems. No spraying. Marsant lamps. Tarred cloth for brattice. Black powder and dynamite. Chignecto Mine, operated by the same company, worked steadily. Bord-and-pillar and longwall. Open lights. Black powder. Main-rope haulage. One 14-foot fan made by Londonderry Iron and Mining Company, direct connected.

The Fundy Mine is closed. So also is the Great Northern, one of "Dr." Hugo Von Hagen's fakes. The Jubilee and De Bert mines are doing nothing. The Strathcona mine, River Hebert, produced 5,835 tons.

Inverness County.

INVERNESS MINE (McKenzie & Mann).—Fair development here. Bord-and-pillar and longwall. Both tail-rope and horse haulage used. One 7 by 18 Walker fan. Austen's No. 2 twill brattice cloth. Acadia No. 3 blasting powder. Although the mine is reported to be non-gaseous, Marsant safety lamps are used throughout.

THE MABON MINE, MABON, was operated by the Government for five months. It is now flooded.

THE PORT HOOD-RICHMOND COAL & RAILWAY COMPANY.—The Port Hood mine of the company. Slight decrease in output owing to strike. One 6 by 14 Dixon fan supplies 50,000 feet of air. Seam is 6 feet thick, pitching 22 degrees. Bord-and-pillar. Rooms, 14 feet wide; pillars, 35 feet. Mine is dust free. Gaseous. Ackroyd & Best magnetic lock safety lamps. Monobel powder.

Coal Mine Accidents.

These will be the subject of a separate article. It may be noted, however, that no proper statistics are set forth in the Annual Report. This is a lamentable omission.

GOLD.

During the year 19 companies, operating in 19 districts, produced 12,597 ounces from 59,058 tons of ore, a slight increase over the preceding year. The total value was $239,353; the average value per ton being $4.05. This latter figure is 24 cents greater than the average for last year. About 500 men were employed. No fatalities occurred.

We shall glance over a few of the larger concerns.

Guysboro County.

THE NEW ENGLAND MINING COMPANY (formerly the Boston-Richardson Mining Company), Isaacs Harbour. 88 men were employed here. 41,425 tons of ore yielded 5,024 ounces of gold, valued at $95,456. 82.6 per cent. of the total was recovered by stamp amalgamation; from 1171.5 tons of concentrate, 17.4 per cent. The increase indicated over the previous year is 3,425 tons crushed and 938 ounces gold recovered. The average yield per ton is 24 cents higher. The reported costs were $1.07 for mining; for milling, including bromo-cyanide treatment of concentrate, $0.71 per ton of ore. The actual cost of bromo-cyaniding one ton of concentrate was $3.06. The average recovery was 78.7 per cent. At the end of September the broken ore in mine was estimated to be 18,000 tons.

At a small working at Lower Seal Harbour, Edgar

Silver and others mined and milled 393 tons of ore, yielding 288 ounces of gold.

THE SYDNEY GOLD MINING COMPANY, County Harbour, recovered 455 ounces of gold from 510 tons of ore.

At FOREST HILL, McDonald & Copeland obtained 415 ounces of gold from 289 tons of ore.

Halifax County.

THE EAGLE MINING COMPANY, Salmon River, got 97 ounces from 143 tons of ore mined and milled.

THE DOMINION MINING COMPANY, Tangier, obtained 62 ounces of gold from 180 tons of ore. This ore came from development work. A complete hydro-electric plant is now completed. Power is derived from dam on Tangier River and transmitted one mile. The mine will be worked on a larger scale this year.

CARIBOU GOLD MINES, Caribou.—About 40 men are employed here. From 1,055 tons of ore 824 ounces of gold were gotten.

M. J. O'BRIEN, Moose River.—The old Touquoy water-power mill was worked here on lease. 3,135 tons of ore yielded 539 ounces of gold.

OLDHAM STERLING GOLD COMPANY, Oldham.—From 940 tons of ore mined and milled, 2,710 ounces of gold were recovered, an average of 2.88 ounces per ton. (The average yield for the previous year was 4.53 ounces!) The shaft, an incline, is down 1,525 feet on the dip, or 850 feet vertically. At the shaft bottom the dip is 43 degrees. A Pelton water-wheel is installed to develop power for mill and crusher. The wheel is working under a 72-foot head, fed by a 14-inch pipe line.

THE OLDHAM MINING COMPANY, Oldham, won 2(ounces from 224 tons of ore. The ore was crushed the mill of the Oldham Sterling Company.

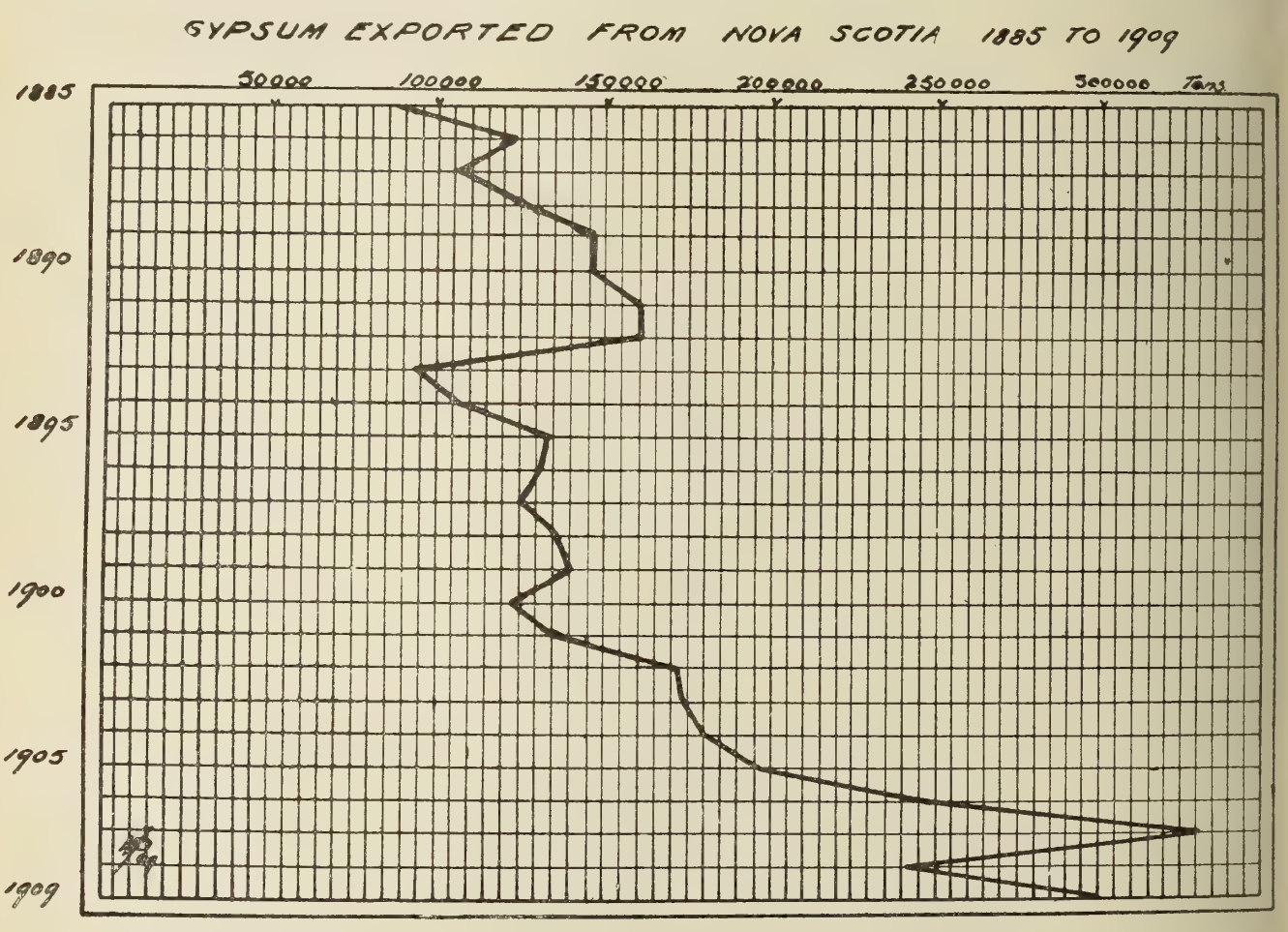
THE PETPESWICK MINING COMPANY, Lake Catcha, d voted the year to development.

THE CHESTER BASIN GOLD SYNDICATE, Gold River, o tained 307 ounces of gold from 791 tons ore crushe and milled.

THE UMACKE MINES & POWER COMPANY won 87 ounc from 100 tons of ore.

Queens County.

THE PONHOOK MINING COMPANY, Molega Barren mined 1,006 tons of ore, yielding 612 ounces of gol Crushing was done in the old Molega Mining Com pany's 10-stamp mill, which has been thoroughly over hauled. The hoist and mine pumps are operated by compressed air, piped 1,260 feet through a 3-inch line



Hants County.

THE EAGLE MINING COMPANY, Renfrew, obtained 4 ounces of gold from 180 tons of ore.

Victoria County.

THE GREAT BRAS D'OR GOLD MINING COMPANY, Middle River, milled 1,783 tons of ore, yielding 708 ounces of gold.

IRON.

During the year iron ore imports amounted to 666,050 tons, classified thus:

From.	Tons.
Newfoundland	639,527
United States	9,579
Spain	9,481
Norway	5,428
Ontario (Moose Mountain)	2,035
	666,050

The only iron ore mined in the province is credited to the Canada Iron Corporation. Their Torbook workings produced 12,000 tons from development entirely. None has been shipped.

The total production of pig-iron was 307,330 tons. The only producers were the Dominion Iron & Steel Company, Sydney, and the Nova Scotia Steel & Coal Company, New Glasgow and Sydney Mines.

COPPER.

LAKE COPPER COMPANY, Lochaber, Antigonish County. 14 men were employed. Shaft is now 290 feet deep. Drift from shaft bottom is 40 feet. An adit is in east 325 feet, connecting with No. 1 level west. A cross-cut is being driven north. Work has been discontinued in the shaft.

LEAD-SILVER.

Two small concerns, one near Boisdale, Cape Breton, and the other near Musquodoboit Harbour, are prospecting galena deposits.

GYPSUM.

The output of gypsum for the year was 299,045 tons. 600 men were employed. Eleven companies were in active operation. 25,000 tons were used in small local mills for the manufacture of wall cement, finishing plaster, plaster of Paris, etc. The remainder of the gypsum was shipped to the United States.

BUILDING STONE AND BRICK.

Four companies are reported as quarrying a total of 19,400 tons of stone (variety not specified). 22,000,000 bricks and 300,000 feet of drain pipe were manufactured by 17 concerns.

The records of the Provincial diamond-drill will be touched upon later.

PETROLEUM IN JAPAN.

According to a report in the "Deutsche Japanpost," a German contemporary dealing with Japanese affairs, a trade combination has been formed among the four large petroleum companies which supply oil to the Japanese market, the result being a rise of price of 10 sen per case. The companies referred to are the two Japanese firms, the Hoden Sekkyn Kaisha and the Nippon Sekkyn Kaisha, and the two American firms, the Standard Oil Company and the Rising Sun Company. The total consumption of Japan per annum is reckoned at 10,000,000 cases, of which the two American firms supply about 6,500,000 cases, the Hoden Company 2,300,000 cases and the Nippon Company 1,200,000 cases. The Japanese companies are so far only in the initial stage of their development and are only working oilfields in the Province of Echigo, but they also hold concessions in Hokksido, in the north of Japan, and in Formosa. Their oil is not of so good a quality as the American, but their cost of production is much less and their supply very constant, which enabled them to keep their price always a fraction below that of the American, which is handicapped with freight charges. By the agreement the American firms are instated in the right to meet about two-thirds of the Japanese demand for oil, while the Japanese firms are enabled to turn their attention with profit to the working of their hitherto untouched concessions. The only sufferer is the Japanese public, which now has to pay a higher price for its oil, whether it be the home or the foreign product.

MINING IN NICARAGUA.

(Written for THE CANADIAN MINING JOURNAL by an Occasional Contributor.)

The first recorded discovery of gold in the eastern division of Nicaragua, C. A., was made in 1886 by a Sumo Indian, named Josiah of Youga. Gustavo Schultz, a German merchant, then engaged in buying and exporting rubber from Nicaragua, was at that time prospecting for cinchoria in the forest on the banks of the Youga river. Here he met the Sumo Josiah, whose life he had saved.

Josiah asked Schultz what he was looking for. Schultz replied that he was in search of Peruvian bark. Josiah said: "Come with me and I will show you something better." He then took Schultz to Matice creek, a branch of the Principulca river, and turned over a flat stone, showing him a quantity of fine gold mixed with the black sand of the creek bed. Schultz immediately commenced work on the newly-discovered placer deposit and gathered the first riches, which, according to some interested parties, amounted to one ton of gold. This estimate of the production may be excessive, but it is known that Schultz was then in debt to the tune of $200,000. Shortly after he started placer operation on the Matice creek, he liquidated his account.

The gold of the Matice creek was derived from the erosion of an ore deposit, now known as the La Lus y los Angeles Mine. This is probably the richest mine yet discovered in this part of Nicaragua, though its monthly bullion shipments have not exceeded six or seven hundred ounces, owing to the poor management and defective surface equipment.

The "El Dorado" and "The Monte de Oro" mines, which are situated a few miles from the Matice creek, yielded considerable gold in the early days, but during the past few years have been worked in a desultory manner with negative results.

Some rich placer ground was discovered in the Cuicuinita district, situated twenty miles or so southeast of the Matice creek, about a year after Schultz commenced sluicing operation. This camp produced a large amount of placer gold, but so far no mineral veins have been found in Cuicuinita. The country east of Cuicuinita, drained by the Wowales creek and its branches, is not mineralized.

Bacan, which is a mesa or table-land, between the Cuicuinita and the Matice or Suina district, has produced about 2,000 ounces of alluvial gold, apparently derived from some small veinlets in porphyry.

In the year 1888 or 1889, a Jamaican rubber hunter named Grimmins, discovered the Constancia mine of

the Piz-Piz district, and a little later the Siempre Viva was located in the same mineral zone.

From that time several mines have been discovered in the Piz-Piz, and the district has been the centre of the mining activities of the Mosquito Coast.

Following the mineral discoveries in Piz-Piz, the Ocumwass district attracted prospectors with the location of the El Paraiso, the San Domingo, and some other mines of minor importance. The El Paraiso is a contact deposit between limestone and the Ocumwass shales. The main shaft is down about 115 feet and is the deepest in the country. The outcrop was very rich in places. The vein filling is chiefly calcite. The San Domingo is reported to be a clastic dike with high values in gold.

The La Luna mine is in the Ocumwass district and is a promising investment. Ocumwass has yielded a large amount of gold, chiefly as placer, or from the workings of some exceedingly rich verticals which paid to work in hand mortars.

The Minisota mine lies between Ocumwass and Piz-Piz. The gold here is an impregnation which has been traced in a northeast and southwesterly direction for about 15 miles. Scattered along the line are a number of mines such as Dos Amigos, Renco Viejo, Escondido, America, etc.

The Minisota is reported to have produced about $60,000 or $70,000 in gold, a large amount of which was recovered by washing a gold-bearing manta, which was formed by the leaching out of rich pockets in the impregnated porphyry.

In the Dos Amigios there is a manta which the owner claims to average $19.50 per ton in gold. The method of securing data is by drilling holes to bed-rock with a large auger, panning, sampling and assaying.

In the Bana Cruz district five or six veins carrying values in gold, have been denounced: the New America, the Union, the Sunshine and the Libertad . The samples from the New America assayed from $4 a ton to $80; the Union samples from $30 to $700 per ton, and eight samples from the Libertad from $3 to $79 per ton. Bana Cruz is reported to possess some water power, but there is no exact information on this subject. The mineral veins of the district appear to be faulted and shattered in places.

Several gold mines have been discovered in the Wawa district on the banks of the Wawa river and its branches, but the mineralization is, in general, poor; in fact the district may be classed as a zone of lean and sterile ores. There have been two notable exceptions, the Coco mine and the Tilba mine. Both of these mines produced considerable gold, and proved very profitable to their owners.

In the Wahawass district of the Wawa river some placer gold and platinum have been recovered by washing the creek beds.

The country rock is chiefly granite schists and porphyry. The Mother lode is on a contact between granite and porphyry and is covered in places with a manta ten to fifteen feet, which consists of a sintery mass of oxidized material earthy and black, carrying good values in free gold.

The gold in the Wahawass district was valued at $18 to $18.50 in the New Orleans Mint.

Cocoalya River.—Gold has been found in several parts of Cocoalya, but in general this may be considered a neglected section, as few prospectors have been through this part of the country.

Wanks River.—Miller's mine, on the Umbera creek, Wanks river, ranks next to Schultz's mines as a gold producer. Both placer and quartz gold have been produced in large quantities. Nuggets weighing from three to thirty-two ounces have been found in the wash which extended up the side of a hill. The overburden was fifty-eight feet in places.

The placer gold was evidently derived from the oxidization of a rich iron pyrite deposit carrying gold, which crosses the hill at right angles to the main pay channel.

In the Waspook creek of Wanks river an extraordinarily rich veinlet was discovered and worked by Juan Alresing some years ago. Lapierre bought the property in November, 1899, and in January, 1901, made the first shipment of bullion, time of development and equipment, therefore, being thirteen months. From the first shipment of January, 1901, to May, 1906, the bullion production of the Bonanza mine has amounted to the sum of $453,102.77. During the dry months of April and May when there was only water enough to run two or three 3 1-2 foot Huntington mills, there was a net profit on the mining operations of $6,350 for the two months, and the yearly gain amounted to 50 per cent. of the proceeds.

On November 29th, 1907, J. T. Clark arrived at the Morning Star Mine with supplies and tools. After considerable prospecting on the property, which is claimed to have exceeded the work done on any of the other mines in the vicinity prior to mill operation, Clark commenced milling with a three-stamp prospecting mill (250 pounds each) on November 15th, 1908. The time of prospecting and equipment was twenty months. In eight months' run with only a prospecting mill, the mine yielded bullion to the amount of $11,093.91, or 530 fine ounces gold and 255 silver as per mint returns.

On February 1st, 1905, H. B. Humphries bought the Santa Rita mine for W. D. Parker. On November 14th, 1905, Parker left the Bonanza mine. Later he returned and on July 24th, 1906, he commenced milling.

As per data from the "American" (the newspaper of Bluefields), dated December 19th, 1909, the shipments were as follows: The Bonanza mine, 1,586 ounces; Lone Star, 814 ounces; Santa Rita, 272 ounces; Siempre Viva, 712 ounces; Linda Ventura, 60 ounces; and other shipments, 450 ounces. This is but a part of some of the shipments, as a fair amount is shipped from other sources. However, it shows what has been accomplished up to the present, with quite inadequate equipment at the mines. The country has up to the present been barely scratched. Capital is needed and needed badly.

The South African Mining Journal, 19th Anniversary Number, March 12th, 1910.—In this very creditable issue our enterprising contemporary departs from its usual custom and incorporates a number of half-tones. Many highly instructive contributions appear. Not least interesting is a sketch of the history of the S. A. Mining Journal itself. An article on the development of mining during the past seven years in Rhodesia is also noteworthy. The total value of the mineral production of that country up to date totals £15,428,970. In this total gold is by far the largest item—£14,682,744. Coal comes next with £363,640. Then chrome iron ore, £139,099; silver, £113,906; lead, £61,774; diamonds, £39,115; copper, £21,266; tungsten ores, £10,930; asbestos, £2,875, and antimony £275. The total value of the mineral output last year was £2,808,123, of which gold made up £2,623,709. Much emphasis is placed upon the need of systematic geological surveys.

REPORT ON COAL MINES REGULATIONS RELATING TO SUBMARINE COAL AREAS.

(Submitted to the Government of Nova Scotia.)

By T. E. Forster.

Dear Sir,—I have, in accordance with the instructions which you gave when I visited Nova Scotia in August, considered the clauses in the Coal Mines Regulation Act relating specially to Submarine Areas, with a view to advising you as to their suitability to the conditions under which undersea coal is now being worked in the province. In order to enable me to do this, I visited, as you are aware, all the districts in which undersea mining operations are being carried on, and made underground inspections of various mines besides examining the sections of the strata exposed at different points along the coast. In this investigation I had the benefit of your own valuable knowledge and experience, as well as that of Mr. Fletcher of the Geological Survey, while I had further the opportunity of discussing with several colliery managers, questions in relations to the subject in hand. The ready and courteous spirit with which the information I required was everywhere imparted has been much appreciated by me. I now beg to report as follows:

The clauses in the Coal Mines Regulation Act relating to Submarine Areas are as follows:

54. (1) In the working of coal or stratified deposits in submarine areas, the following provisions shall apply:

(a) No submarine seam of coal or stratified deposits shall be wrought under a less cover than one hundred and eighty feet of solid measures. Provided, that the owner or lessee of any such area may drive passage ways to win the mineral to be wrought under a less cover than one hundred and eighty feet, but not less than one hundred feet of solid measures.

(b) A barrier of the mineral wrought, of not less than fifty yards, twenty-five yards on both sides of the boundary lines of every lease, shall be left unwrought between the workings of every submarine seam.

(c) Where there is less than five hundred feet of solid measures overlying the seam or stratified deposit wrought, the workings of every such submarine area shall be laid off in districts of an area not greater than half of one square mile, and the barrier enclosing each separate district shall not be less than thirty yards thick, and shall not be pierced by more than four passage ways having a sectional area not greater than nine feet wide and six feet high. Provided, that the inspector may, if he deems it necessary, permit the said passage ways to be driven with a cross section, not exceeding sixty square feet.

(d) No district shall have its length when parallel to the general trend of the adjoining shore greater than one mile.

(e) A proposed system of working the mineral in each submarine area shall, before work is commenced, be submitted to and approved of by the inspector, and no change shall be made in such approved system without the written sanction of the inspector.

(f) The opening of a new lift or level in a mine already working in a submarine area shall be deemed the commencement of a new winning within the meaning of this section.

(2) The owner, agent or manager of any mine to which this section applies, who contravenes or fails to comply with any provision of this section, shall each be liable to a penalty not exceeding one thousand dollars, and if the offence complained of is continued or repeated after a written notice has been given by the inspector to such owner, agent or manager of any such offence having been committed, the Supreme Court, or a judge thereof, whether any other proceedings have or have not been taken, may, upon application by the Attorney-General, prohibit by injunction the working of such mine. Provided, that the Commissioner may waive or modify any of the provisions of this section when, on the report of the inspector, it appears to his satisfaction that valuable coal areas cannot be otherwise wrought or mined.

R. S., c. 19, s. 52; 1903-04, c. 2, s. 7.

Before discussing in detail the above regulations, I think that possibly it may be of interest and advantage to give a short account of the system under which the working of submarine coal areas is regulated elsewhere.

In this country the undersea coal is the property of the Crown, from high water mark for a distance of three miles seawards, though there are cases in which possession of the coal under the foreshore, between high and low water-marks, is vested in the owner of the coal under the adjacent land where he has been able to prove his title to it either by virtue of a direct grant or otherwise. The leasing of the undersea areas is conducted by the Office of Woods and Forests, assisted by a mining engineer who deals with all technical points relating to the method of working, controls the submarine workings, and looks generally after the interests of the Crown as owner of the minerals, but has nothing to do with the administration of the Mines Regulation Act, which is carried out in the ordinary way by the Inspector of Mines. In other words, the Office of Woods and Forests acts in the same way as any private owner of minerals in this country, and makes such conditions as it thinks fit as to the method of working, to which objection can only be taken by the Inspector of Mines under the Mines Regulation Act in the event of his considering it to be unsafe.

There are no clauses in the Coal Mines Regulation Act dealing specially with submarine areas, as in Nova Scotia, any special provisions as to working being included in the several leases. In framing these conditions it has always been the practice, and I think a sound one, to consider the special circumstances of each letting, rather than to attempt to regulate the whole on a hard and fast basis.

At the present date the leases which are issued by the Office of Woods and Forests generally contain clauses restricting working under a specified cover and providing for the workings being controlled by their mining engineer. The limit of working is, I think, usually placed on what may be termed the "safe side," but as the workings are opened out and information as to the surroundings and experience of the effect of operations is gained, there has, in my experience, been no difficulty in obtaining any reasonable variation of the terms of any lease which the particular circumstances of the case appeared to warrant. I have had as a lessee, a long experience of the system, and I am of opinion that, under it, great advances have been made and large areas have been worked which would otherwise have been abandoned.

So far as I am aware, the only case in which definite regulations for the working of undersea coal (similar to some extent to those in force in Nova Scotia) have been established is that of New South Wales. I have a personal knowledge of this locality, having visited it on two separate occasions, and having acted for a considerable time as consulting engineer to a company engaged in working its undersea coal. Experience obtained in this way enables me to point out that the regulations in question were framed with a view to meeting the special conditions occurring in the vicinity of the Hunter River estuary, where the presence of extensive alluvial deposits overlying the principal seam of coal, combined with its shallow depth, rendered it necessary to ensure special precautions being taken. For this reason, I consider that these regulations generally cannot be taken as forming a guide to those which would seem to be necessary in the case of the Nova Scotia fields.

The provisions contained in the Nova Scotia Mines Act were, I understand, drawn up about the year 1877 by Mr. H. S. Poole, then Chief Inspector of Mines. They appear to have remained unaltered (except for one variation on a matter of detail) since that time. In the report of the Department of Mines for the year 1877 Mr. Poole discussed at some length the question of submarine mining in Nova Scotia. The information contained in this report has proved of great interest and value to me, throwing light as it does on the nature of the evidence on which Mr. Poole founded the regulations, and the opinions which were held at that date by various persons interested in undersea mining. I would point out that the thirty years which have since elapsed have provided a large amount of additional experience attended by, in some respects, a change of views.

I will now proceed to remark in detail on the various provisions contained in the Act:

54. (1) (a) Provides that no undersea workings shall be carried on at a less depth than 180 feet of solid cover, but gives power to the lessee to drive passage ways for the purpose of winning the deposit only, under a cover of not less than 100 feet.

Although it is true that, both in this country and in New South Wales, workings have been carried on successfully, under special precautions, at less depths than 180 feet, I am of opinion that having regard to the general nature of the beds overlying the seams in the various districts adjoining the seaboard in Nova Scotia, it would not be advisable to alter this regulation. It must always be a difficult, if not an impractical task, to ascertain the exact thickness of the "solid measures," and I think therefore that a considerable margin of safety should be provided. In the case of passage ways to be driven under a less depth than 180 feet of solid cover, I assume that, if it should be thought necessary and judicious to reduce the 100 feet limit in any particular instance, the Commissioner could, under sub-section 2, sanction such a proceeding.

(b) Provides that "a barrier of not less than 50 yards, 25 yards on both sides of the boundary lines of every lease, shall be left unwrought between the workings of each submarine seam."

Section 208 of "The Mines Act" 1892, in which I presume that the term "land covered with water" includes submarine areas, provides that a barrier of 25 yards is to be left "within and along each of the boundary lines" of any submarine lease. This is in effect the same as the regulation quoted above, but, I think, expresses the nature of the reservation more clearly, and I would suggest that it might possibly be advisable to alter the clause in the Mines Regulation Act so as to make it correspond with that in the Mines Act.

It may happen, I think, that with deeper mining or under special circumstances, wider barriers may be required, so that it seems to be a matter for consideration whether power should not be given to the Commissioner to require such extensions, if considered necessary.

(c) Provides that, where there is less than 500 feet of solid cover over the seam worked, the workings shall be laid out in districts of an area not greater than half a square mile, each district being enclosed by a barrier not less than 30 yards in thickness, which shall not be pierced by more than four passage ways of a sectional area not greater than 9 feet wide by 6 feet high, with a modification to the effect that the inspector may, if he thinks it necessary, permit the cross section of the passage way to be increased to 60 square feet.

(d) Restricts the length of any district when parallel to the general trend of the adjoining shore line, to one mile.

(e) Requires the submission to the inspector of any proposed system of working, and his approval of the same before work is commenced, as well as his sanction to any change being made in the approved system.

(f) Provides that the opening of a new lift or level in a mine already working shall be deemed the commencement of a new winning within the meaning of the section.

I have thought it better to consider the above regulations together, as they seem to comprise those which relate expressly to the methods under which the coal is to be worked or points in connection therewith.

The first two provide for the application between the lines of 180 and 500 feet of cover, of a system which is generally known as the "panel system." Under this the area to be worked is divided into districts or "panels" surrounded by barriers through which as few holdings as may be considered absolutely necessary are made. The dimensions of these places are restricted so as to enable dams to be placed in them in case of any inburst of water occurring in the panel in which they lead, with the object of shutting off the district and preventing a general flooding of the workings. This system has been practised to a considerable extent in this country in the case of workings at moderate depth, but I think that experience has shewn that, while it presents many disadvantages, it offers in reality little, if any, real security. The restrictions as to the number and dimensions of the places communicating with the panels cause great inconvenience both in the matter of haulage and ventilation, while the loss of coal due to the barriers left is considerable. On the other hand, it is very seldom that the conditions of the strata surrounding the drifts are such as to render any prospect of dams, likely to be of an effective nature, being capable of being erected. Under these circumstances—and they are such as I consider apply in the same way in Nova Scotia as here—I do not think that any importance can be attached to this method of working, but that it is better to rely on the pillars left for the support of the roof being properly proportioned with a fair margin of safety and a careful restriction of the width of the working places and disposition of the same.

I am of opinion, therefore, that no advantage can be obtained by the retention of these provisions, and that their elimination from the regulations would not lessen the security of the mines, while it would, on the other hand, lead to a saving of coal and give improved facilities for working. Under the regulations the system of working below the 500 feet line is unfettered, though subject to the approval of the inspector. I think that the same condition should apply wholly, as it already does in

part, to operations carried on between the 180 to 500 feet lines, or, in other words, that the system of working should be entirely under the inspector's control, as it appears evident that, in any case, some controlling authority must eventually take the responsibility of regulating workings of this description. I am strongly of opinion that the conduct of undersea workings cannot, generally speaking, be advantageously provided for by hard and fast rules, and that a careful consideration of the circumstances of each case, guided by experience gained in the gradual development of operations, is the proper system to be pursued in such cases.

As to matters of detail I would make the following suggestions:

1. In clause (e) I think that it should be provided that the approval of the inspector in the first instance should, as in the case of any alteration, be in writing.

2. I am of opinion that provision should be made, either in the Mines Regulation Act or in the leases, that, where any workings are carried on upon the long-wall system, an exploring drift shall be driven fifty yards at least in a seaward direction in advance of such workings so as to prove the existence of any faults or dislocations, until it reaches the barrier required to be left.

3. I think that surveys and levellings of undersea workings should be made every three months, and that the levels together with the depth of cover should be marked upon the working plans at specified distances along the lines of all main roads and round the faces of all workings approaching the 180 feet line of cover. Soundings should also be taken at reasonable distances and recorded on the plans.

I trust that you will let me know if there are any points on which you require further information or explanation, in which case I shall be very pleased to do my best to afford it.

Yours faithfully,
(Sgd.) T. E. FORSTER
Newcastle-on-Tyne, October 22nd, 1908.

HIRAM DONKIN, ESQ.

GRANBY MINES, BOUNDARY DISTRICT.

The publication of a statement to the effect that the ore reserves of the Granby Mines, in Phoenix camp, Boundary district, are within measureable distance of being exhausted has caused great surprise and, to many stockholders, much monetary loss. Whether there is or is not good reason to believe that mines heretofore regarded as having an abundance of ore, sufficient to supply the company's reduction works at full capacity for a much longer period than can be done if there prove to be only six million tons of ore available, as now stated, is a question that can only be determined by fully qualified mining engineers and that after a most exhaustive examination of the property. There are some circumstances, though, which would appear to make it quite reasonable to ask whether the directors of the company and their late local manager are in any way to blame for the present disastrous situation. At this time it may be of interest to point out that the management of the Granby Company has not at any time, so far as has come to my notice, made public information that would throw doubt on the general belief that the reserves of ore in the company's mines were not large and equal to all demands likely to be made upon them for a longer period than it is now suggested they will last at present rate of production. Without going back to the very optimistic assertions that some years ago were occasionally made, attributing to the Granby Company possession of mines which with an output of one million tons a year had ore enough to last at least one generation and probably two, it is reasonable to ask how far statements made within the two years last past were or are dependable. For instance, Mr. A. B. W. Hodges, until quite recently local manager of the company, stated at a meeting of the Canadian Mining Institute, held in Parliament Buildings, Victoria, in September, 1908, on which occasion there were present a number of influential mining engineers and geologists from Great Britain, continental Europe and Eastern Canada, that "from 10,000,000 to 30,000,000 tons of these low-grade ores are in sight in the Boundary district." Again, he said: "We have in one of our mines 10,000,000 tons of good ore." In the "Souvenir Number" of the Canadian Mining Institute Quarterly Bulletin, Mr. H. Mortimer Lamb, secretary of the Institute, when describing the visit to the Granby mines, wrote: "There is said to be approximately 20,000,000 tons of ore in sight." Last August a New York firm, which makes it a practice to send out "information obtained from what we regard as reliable sources, and believe to be accurate," advised its clients and others as to the Granby Company's ore reserves, as follows: "Exact figures on the ore reserves are not available, but according to the management the tonnage is placed at between 12 and 15 years' supply on an annual consumption of 1,000,000 tons." Further, in its issue of November 27, 1909, the Phoenix "Pioneer" published an interview with Col. N. E. Linsley, of Spokane, Wash., whom it credited with saying, in part: "About March 26, 1898, I made the first report on the Old Ironsides for Mr. Jay P. Graves. Then, on February 12, 1903, I made a complete report on the properties of the Granby Consolidated Mining, Smelting & Power Company, Limited. At this time the Granby was a going concern, mining and treating 1,600 tons of ore daily, with 8,500,000 tons of workable ore blocked out and 14,000,000 tons more reasonably in sight. Altogether, about 5,000,000 tons have been mined at the Granby's Phoenix properties and treated at the company's smeltery since then, and still at the present time, from a cursory examination, there is more ore in sight than there was then." These and other statements to a like effect have been permitted to go uncontradicted by anyone in authority in connection with the company. Of course it may be claimed by the directors and officers of the company that it is not incumbent on them to contradict statements published without their authority, but even if this be so there are other circumstances, and for which they are responsible, that have given stockholders and the public generally a feeling of security. For instance, the expenditure on constructive account during the past two years of a sum stated to have been about $250,000, and the recent issue of 13,500 shares of treasury stock at $85 were surely intended to give stockholders the impression that the company might be expected to have before it a long life of profitable operation. Perhaps, after all, this impression is warranted by actual conditions. It is not well to take it for granted that the recent panic and consequent heavy fall in the market price of shares in the company was fully warranted. Until assured on thoroughly reliable testimony that there really is reason for serious concern as to the future, prudence suggests that the statements of Messrs. Jay P. Graves, vice-president and general manager, and W. Yolen Williams, consulting engineer, be given due consideration. A published telegram from Mr. Graves says: "I have not

visited the mine personally for about 18 months, but according to our employees there has been no change in the mine during that time for better or worse," while to Mr. Williams is attributed the following assertion: "No important developments of any kind have taken place in the mine for two or three years. I mean by that that no new knowledge has been gained as to the extent or limit of the ore bodies." Mr. Yolen Williams directed the opening of the mine during eight years, 1896-1904, so that he was fully informed as to conditions prior to relinquishing the active oversight of development work. Whether the extraction of about five million tons of ore since Mr. Hodges took charge of the mine exhausted all the reserves of which Mr. Williams knew, is not apparent, but there is this fact to be kept in mind—Mr. Williams has a high reputation for long experience as a practical miner, for undoubted ability as a mine manager, and for strict integrity as a man, so that if he shall have carefully examined the mines lately, his judgment and opinions should have respect until such time as there shall be adequate evidence to prove him wrong. Incidentally, it may be mentioned that the aggregate tonnage of ore extracted from the Granby mines to date is about 6,045,000 tons, of which quantity about 1,650,000 tons have been produced since September, 1908. If Mr. Hodges was justified in then claiming that IN ONE of the company's mines there was "10,000,000 tons of good ore," it is plainly evident that there should remain considerably more than 6,000,000 tons IN ALL of the Granby mines. The official explanation of the situation by the directors is being anxiously awaited, and if this shall not be clear and satisfactory it would seem that there should be close enquiry into all the conditions, and an exhaustive examination of the mines by independent and competent engineers.

Storage Battery Electric Locomotives Handling Copper Ore.

By Frank C. Perkins.



The accompanying illustration shows a novel type of electric storage battery locomotive designed for industrial service handling copper ore and ingots at Constable Hook, N.J., for the Oxford Copper Company.

There are many situations where the trolley type of electric locomotive is undesirable on account of the appearance of an overhead trolley wire system. In many cases the fire risk is also serious through the sparking of the trolley, this risk being eliminated when a storage battery locomotive is utilized. As it is able to take curves of 12 feet radius, every part of the work is made accessible by this type of locomotive, even where the buildings are irregularly placed and close together.

The motors are of the enclosed type and the storage batteries require no attention during working hours, while it is maintained that the cost of operation for haulage is far less than with animal power. The narrow gauge locomotive weighs 4 tons and is designed for a track having a gauge of 21 1-2 inches. This storage battery locomotive measures 70 inches high and 56 inches wide over all, the total length being 12 feet. Only when the locomotive is in service is electric power used, all cost for electric current ceasing when the controller handle is thrown to the off position.

There are two independent electric motors employed which are connected in series or in parallel, allowing a speed of from one to four miles per hour. At low speeds the motors give a great starting effort with a minimum consumption of electric current and the storage batteries have a capacity such as to give a range of action for the locomotive of ten hours in ordinary service. This narrow gauge electric storage battery locomotive will haul 50 tons on a level and 25 tons on the one per cent. grade, while on a two per cent. grade it will handle 15 tons without difficulty. The capacity decreases from ten tons to seven tons and five tons respectively on grades of three per cent., four per cent. and five per cent. A direct current of 110 volts or 120 volts is used for charging the storage battery at regular intervals. The system of charging is so thoroughly safeguarded and simple that any careful workman can be entrusted with this work without technical knowledge.

A Discussion of Leopoldo Salazar's Paper on the McArthur-Forrest Cyanide Patents in Mexico; and the Lessons to be learnt from the History of this Subject.

By John Malcolm Nicol.

(Proceedings of the Mexican Institute of Mining and Metallurgy.)

Mr. Salazar's very interesting paper on the McArthur-Forrest Cyanide Patents, raises a number of questions of the whole subject of Patent Law, and before I can attempt to answer some of the questions which he propounds, or discuss the problems which are brought to light by the historical part of his paper, I think it will be advisable to give clear definitions regarding patent law and inventions.

As I understand it, the first purpose of the patent law, based on the human sense of justice to "Render unto Caesar that which is Caesar's," is to insure that society gives to an inventor a just and fair reward for the benefits which his inventions give to society.

The second object is to develop a stimulus which will tend to make more men take up the drudgery, and heavy mental strain, of solving the problems that are continually arising from the ever-growing demands of the industrialism of modern civilization: this stimulus being the commercial reward resulting from the ownership of a valuable patent.

It is only just beginning to dawn on legislators that the industries and manufacture resulting from modern inventions are of great economic value to commerce, and national income, and hence the third object of the patent laws of a nation may well be, to not only concentrate within her territory men of brains and intellect, but to obtain a share of the wealth resulting from the manufacture of their inventions, and with this object in view the new English patent law requires that a regular manufactury be established for the production of a patented article or else the patent becomes null and void after a few years.

The next definition that we require, is one that will give us a clear understanding of the words, discovery, research, invention, and design, in the sense in which they should be used in relation to the patent law.

I feel and I think, that many of our learned friends present will agree that a new word is needed in the English language to define the difference between a "chance discovery" and a "discovery" that has been made, by definite research work, leading up to some phenomena, or substance whose existence was deduced but whose qualities were unknown.

I therefore take the liberty of coining a word to designate a discovery which is the result of deliberate research: let us call it a "pruvery" and reserve "discovery" far chance finds. These two words have their principal application to the natural phenomena of physics and processes based thereon.

The former class of discovery is interesting and may be invaluable to humanity, but deserves reward only in relation to the associated work of the discoverer; the latter class is evidence of the finest type of intelligence of the human race; and although the "pruvery" may only be of scientific value and industrially worthless, yet it is worthy of the highest honours and reward that humanity can confer on the demonstrator, as it leads to unknown potentialities in the development of human intellect.

As examples bearing on the question of patent law I will cite the following:—Edison's chance "discovery" of the phonograph, and Ramsey and Raleighs' "pruvery" of Argon. Edison was working with a German assistant in his laboratory, experimenting with an instrument for recording the vibrations of a musical note. He had constructed one with a wax-coated cylinder driven by a small electric motor. By chance the assistant reversed the drive, and the impression on the wax cylinder passing under the disc reproduced the notes. The German, with Teutonic bluntness, said, "my God, she speaks." Thus Edison discovered by pure chance the phonograph. He subsequently "invented" the needles, discs, etc., and "designed" the mechanism as a whole, which made the phonograph a commercial success.

The discovery of the phonograph resulted in a valuable patent, which gave great reward to the owner, and yet the discovery in itself deserved little credit, and, while it is of occasional use commercially, it is otherwise merely a toy.

The "pruvery" of Argon could not be patented and had no commercial value, and as far as I am aware, brought no financial reward to Ramsey or Raleigh, and yet the demonstration of the existence was the result of patient mental effort, and was of great value to the intellectual development of the human race, because it was an infallible proof of the absolute accuracy and reliability of our modern scientific methods of deductive reasoning.

An "invention" consists of finding a means of applying a process to an industrial use, or of planning an apparatus for the working of a process. An "invention" must in every case be an original idea which has never been executed, or a combination of known "ideas" in such a novel form, or for such original purpose, that it virtually forms a concrete conception in itself.

A "design" in mechanics consists of grouping together known principles, and designs, to produce a required effect. The border line between "discovery," "pruvery," "invention" and "design" is interlaced by each, and perfect definitions are difficult and I know that those that I have given are far from complete but they will serve my purpose for the present.

The field is now clear for me to discuss the questions and problems of Mr. Salazar's paper.

First, the discovery or "pruvery" of Hagen in 1806 revealed a chemical phenomenon; the action of cyanogen on gold. It was not in any sense an invention. Even the work of Simpson in 1885, for which a patent was granted, barely merits the title of invention, and with regard to Mr. Salaza's fundamental question, "can a process be considered as new when it has been proposed but has never been put in practice with industrial ends in view?" I would emphatically state that the application for industrial ends bears no relationship to its claims for novelty. A process that has been once proposed or demonstrated is not new. A man who takes a known and demonstrated process and applies it may be doing a very meritorious act, and may demonstrate an industrial utility that was unknown before, but he is not an inventor, and should not be granted a patent. We must find other means of rewarding him. Neither

can the "amount of dilution" of a chemical process be considered ground for a patent, for the amount of dilution is a variable function, known to be common practice to all forms of chemical processes. On this point I heartily agree with Mr. Salazar when he states "that the restriction is unscientific in principle."

In the case of the McArthur-Forrest patents, it seems clear on the basis of the above argument that they did not make any invention at all. They merely designed plants which made possible the application of known chemical phenomena to industrial purposes.

They may have invented numerous mechanical details for apparatus to carry out the above process, but these had no relation to the patents which were granted.

It therefore seems that if patents are to be allowed only for novelty and invention, that a patent should not have been granted, and yet there is no question but that the early success of the cyanide process, and the resultant position of the industry, was primarily and largely due to the ideas, the brains, energy and courage of the McArthur-Forrest combination.

Ethically, then, the patents should not have been granted, and yet if it had not been for the assumed guarantee of a monopoly resulting from these patents, the capital might never have been invested, and the experiments and working tests made, which have resulted in world-wide benefits from the modern cyanide process.

On the general principle that it "pays a nation" to stimulate brain energy, and to assure a suitable and just reward to the intrepid investigator, experimenter, and demonstrator, it would seem that a law is needed that could grant a monopoly that is not a patent, and not a concession for just such cases as these; and as the granting of such a monopoly would have to be certain and independent of reversal by the courts, it is evident that "a priori" search would be necessary.

It seems, therefore, that four distinct evidences of human intelligent effort have to be dealt with in relation to the patent law.

First: The scientific research worker, whose discoveries or "pruveries" either directly or indirectly are of inestimable value to human industry; yet little, if any of their work is subject to protection and reward by patent, their only recognition being that of scientific societies, who give gold medals, and occasional prizes.

Second: The recognized body of inventors, men who seeing the demand for a machine or process to meet an industrial requirement, "invent" a novel "method" for the solution of the same. These are more or less protected and encouraged by the various existing patent laws.

Third: Those who, by the aggregation of known principles and by the perfection of plant design and careful test and demonstration, create new industries from known, but untried, or half developed processes. These men are probably one of the most valuable assets that a nation can have, and yet they have never been recognized as a body, and no legislature has ever attempted to create laws which would in justice protect and stimulate this class of human endeavour.

Men under this heading frequently try patenting some trivial part or adjunct, a procedure which is generally a failure.

Fourth: We have the purely commercial type of man who undertakes to establish a well-known process, or recognized industry, in a new locality where commercial success, and financial reward, are uncertain, but where the establishment of the industry is of great national economic importance. This man is amply protected by the granting of concessions which give him an exclusive monopoly as a reward for his endeavours and the risks he takes.

I only draw attention to this fourth class for the simple reason that it might be supposed that such cases as McArthur-Forrest, failing to obtain adequate protection from patents, might obtain reward for the speculative investment in experiments and demonstrations by this means; but for reasons which will be self-evident from my further arguments, it will be seen that a separate law is really required to meet the cases under the third heading.

Of course the work of each of these groups is co-related and merges insensibly one into the other. But I think that my definition and meaning is sufficiently clear, and will be generally accepted. The first, second and fourth, I know, are generally accepted, and to make my statements regarding the third class clearer I will name some typical examples: (1) The application of the cyanide process to metallurgy. (2) The development of step-reduction, crushing and trituration as a process. (3) The perfection of the mechanics and dynamics of the cyanide process. This latter is a particularly interesting example, as although numerous patents have been taken out there is hardly one of them which is "ethically" valid, and yet the mining world is reaping a rich harvest from the work of many men who have devoted much time and study to the application of known principles and to the perfection of design. Under this head I include the various vacuum filters and air agitation tanks, classifiers, pulp thickeners, etc. (4) The application of dredging to gold placer mining, etc.

Against this list, which could be continued almost indefinitely, we find that in some cases the patent law grants sweeping monopolies for veritable "tricks of wit," which enables the holders to really hinder industry and to reap a rich and undeserved reward. The best example I know of this was the basic combination patent on automobiles, granted in the United States.

It appears to me that one of the lessons to be learnt from Mr. Salazar's paper is the necessity of being able to properly classify the nature of the work that has been done by a so-called "inventor" when he presents an application for a patent. To quote, Mr. Salazar says: "When a process which, on account of its lack of novelty, has everywhere been pronounced faulty in the eye of the law, nevertheless works such an extraordinary revolution in an industry, it is reasonable to suppose that there are circumstances which have escaped the legal mind, and these circumstances are in my opinion, of a purely industrial character, and should, therefore, be defined by those engaged in the industry."

I beg to disagree with Mr. Salazar. I do not think the circumstances are purely industrial. It appears to me that the legal mind has overlooked the difference in status between the classes 1, 2, 3 and 4 which I have enumerated. The function of the law in these cases is to insure to a man the enjoyment of something that is his, and for this reason it is ethically doubtful if the patent law should force a man to manufacture something that is even more essentially his own than the possession of land. Or that it has the right to dispossess him of a monopoly once granted any more than it has the right to dispossess a man of the title to land. In fact, the latter procedure, which is not practised for the public good, except in exceptional cases, is more logical and just than the former, which is recognized and prac-

sed by all nations. But then land owners and not ngineers, were the framers of our laws.

Here, then, are the problems which are brought to ight by Mr. Salazar's paper and by my discussion:

(a) How many classes or divisions of the inventor's vork (in the broadest sense) do we have to consider? b) What specific thing is presented by each class that an be considered as deserving of judicial recognition nd legal protection? (c) To what extent and for what eriod are we to grant monopoly (if any) for the purose of reward and stimulus of each class? (d) How an we give to individuals right and title to monopolies without interfering with the possible future rights of another individual or the community at large? (e) How can monopolies be given which will stimulate without retarding industry, and thereby be of national benefit?

Mr. Salazar implies that he would welcome not only discussion, but suggestions, and I will therefore take the liberty of attempting to give some answers to the above. But in doing so I will assume that the tendency of the modern law maker is to consider the welfare and interests of the majority before the right and title to monopoly of the individual, and will therefore postulate that the purpose of the patent law is only to grant sufficient monopoly to stimulate and reward endeavour and to regulate the relationship between the owners of patent monopolies and the general public.

We then have to consider the best method of dealing legally with: First, Research workers or pure scientists; second, inventors proper; third, designers and demonstrators; fourth, industrial organizers.

Dealing with the first class, the men who devote their lives to this work as a rule are jealous of honour, but care little for financial reward. They only need money as a means to an end. The type, while being commercially inefficient, is yet of immense value to commerce. Therefore, commerce, industry, and especially monopolies resulting from patents, should be directly taxed for the support of scientific institutions, and the necessary research workers.

Dealing with the second class, it seems only logical that every assistance should be given to the inventor, so as to stimulate him to endeavour, and with this end in view the cost of patenting should be made very low, and means of registering a provisional patent should be provided. A well-equipped institution with every facility for research on former and expired patents should be provided, the costs to be maintained from a tax on successful patent monopolies, and not from the patent fees. In fact, I believe registration should be preferably free. The inventor naturally wishes to obtain by his patent a monopoly which has a commercial value. Therefore a patent once granted should be final, and not subject to reversal by the court, except for proven theft of ideas, or fraud. This necessitates "a priori" research of a very thorough nature.

Nearly every invention is the forerunner of others, and numerous improvements immediately follow. It is, therefore, very necessary to grant a monopoly on such lines that it does not hinder industry or prevent other inventors from manufacturing their improvements. The general public the world over are failing to derive benefits from numerous valuable inventions and discoveries which are lying idle, and locked up, being held to protect some industrial monopoly which is operating inventions of an earlier date.

Bearing this in mind, I would suggest that any person might manufacture, or sell an invention once patented and published, or incorporate another man's patented invention with improvements of his own, without the permission of the inventor, providing only he makes application to the patent office and pays a royalty to the inventor.

All royalties would be based on a percentage of the sale value of the machine, subject to law, and not upon the whim or fancy of the owner of the patent. The effect of this would be to protect and encourage inventors and to prevent financial interests holding idle patents for industrial ends to the detriment of the public welfare.

Any experimentor might write articles or publish or discuss data regarding his experiments or build experimental machines, apparatus or processes, without invalidating his rights to apply for patent protection, providing he makes application within two years.

The publication of data under his name being taken as proof of the genuineness of the invention being his. No royalties can be claimed while a patent is pending and until it has been finally granted.

Provisional patent applications could be amended during the period for which they are granted. Final application would be unalterable, except at the recommendation of the patent authorities. Inventions might be roughly classed as follows: (1) Basic; (2) combination; (3) secondary, i.e., improvement following original ideas; and (4) transfer, the latter being the transferring and adapting of idea from one industry to another.

When search, made by the patent office, shows that an idea brought forward by a person claiming invention is not novel, but has been known of in some form or another before, but has never been actively made use of, owing to the fact that no one has been found who has the courage and energy to test, prove and demonstrate it, a patent should be denied; but a monopoly of another form might be granted, carrying with it the necessity of establishing a demonstration on an industrial scale, and, if shown that it was an improvement in the art and a benefit to industry, the right to collect from others a royalty on a very moderate percentage basis (to be fixed by the patent office), should be allowed. This would cover the third class, and just such cases as the McArthur-Forrest, and at the same time would not be in the nature of an absolute monopoly and a restriction to future trade, such as often results from the granting of exclusive concessions under the fourth class.

The Mining Magazine, March, 1910.—In a leading editorial the Mining Magazine, while speaking in highly respectful terms of the officers and members of the Mining and Metallurgical Society of America, argues that since this organization has a membership of only 160, it has little right to speak for the thousands of engineers, metallurgists, and geologists of America. It is characterized, so in effect continues the Mining Magazine, by a spirit of false exclusiveness. "The attempt of a fortuitous aggregation of individuals to sit in judgment on the members of a profession that includes thousands of men of varying education and occupation has failed utterly." The generous policy of the American Institute of Mining Engineers is, in our contemporary's opinion, much the better of the two.

During 1909 the Rio Tinto Copper Company paid dividends at the rate of 60 per cent. net. The rate for 1908 was 55 per cent. net.

ZINC MINING IN BRITISH COLUMBIA.

The recent authorization by the Canadian Parliament of an expenditure of $50,000 in investigation by the Dominion Department of Mines of processes for the reduction of zinc ores and making experiments in connection therewith, recalls the fact that the question of how the zinc ores of British Columbia can be turned to profitable account has had the attention of owners of mines in the Slocan district, in which zinc occurs in quantity, from time to time during the past six years, and to a smaller extent for a longer time.

Investigation of Zinc Resources.

Early in 1904 an organization, consisting chiefly of owners and managers of silver-lead-zinc mines situated in Slocan district, known as the Associated Silver-Lead Mines of British Columbia, instructed its special committee to memorialize the Dominion Government to engage a high authority on zinc and its treatment to investigate and report on the zinc ores of the Kootenay district. This proposal was endorsed by the Associated Boards of Trade of Eastern British Columbia. In connection with this movement, Mr. A. C. Garde, then resident manager for the Payne Consolidated Mining Co. owning the Payne mine, near Sandon, Slocan district, prepared and published a statement outlining the benefits to be derived from fully investigating the zinc resources of British Columbia as to their extent, value, character, etc., and giving much information relative to the occurrence of zinc in association with silver-lead ores in mines in Slocan district and, incidentally, a brief summary of places elsewhere in the province at which zinc-bearing ores had been found.

In the course of his review, which was a lengthy one, Mr. Garde gave the following information: During ten years to that date zinc ore had been known to occur in British Columbia, especially in districts where silver-lead mining had been carried on, but only in 1903 had much attention been paid to their economic features. The presence of zinc in excess of the smelter's limit of ten per cent. had involved the ore being penalized by the smelters at a rate of 50 cents per unit. It had been found in a number of Slocan mines that lead in large measure gave place to zinc, or that the two metals were so intermixed that separate processes for their recovery, respectively, had had to be adopted. This led to the finding of a market for zinc, much of which had previously been run to waste when concentrating the silver-lead ores. Many difficulties still confronted the mine-owners; some ores were of a complex nature, some had low values in silver, or there were obstacles to effective concentration and in the high cost of transportation. The establishment of zinc reduction works was, therefore, an evident condition to the profitable working of the mines in which lead-zinc ores occurred in quantity. But capitalists would not expend money in erecting and equipping local reduction works until they had been satisfied that the character and extent of the available zinc ores would warrant them in doing so; hence the urgent necessity for a full investigation by a competent authority of the zinc resources of the province, and the conditions attending their utilization. That such an investigation would result favourably there was little doubt, for it was known the zinc resources were extensive. The resultant benefits would not be restricted to zinc mining, for it was believed that in exploring for zinc ores large bodies of lead ores would also be discovered, the two metals occurring in the province in close association.

The varying physical features of the zinc ores of the different districts puzzled both the miner and the metallurgist in one respect, namely, that of the wide difference in the value of their silver contents, some ores carrying only about 6 oz. per ton while others ran high in silver. Within a radius of ten miles of Sandon, though, the average silver content of zinc ores, was estimated at about 25 oz. per ton of 50 per cent. ore. Emphasis was placed on that fact, for the reason that the prevailing opinion was that Slocan ores contained a far higher average in silver, and that until such time as the smelters should be able to pay for more than three-fourths of the silver it would be better to leave in the mines ores running high in that metal, looking to the recovery of a higher percentage of it being eventually made practicable.

An important consideration brought out was that, apart from their silver contents, the zinc ores of British Columbia were worth mining for only the zinc in them. It was believed that there exists in the province an unlimited quantity of zinc ore, suitable for both spelter and zinc oxide production. The zinc mining industry, therefore, should not be hampered by the fact that highly argentiferous zinc ores also occur. These should be regarded as exceptions to the rule and should not be permitted to interfere with the utilization of the large deposits of strictly zinc-bearing ore workable for their zinc contents only. One of the chief objects in view in persistently inviting public attention to the zinc ore deposits of British Columbia was to secure a general realization of their extent and considerable value. Zinc smelters in both the United States and Europe had already awakened to the potentialities of the zinc industry of the province, and as a result zinc ores were being exported to foreign countries to be manufactured into spelter and zinc oxide. That meant that Canada first paid freight on the raw material taken out of the country and afterwards paid freight and duty on the manufactured zinc products it imported. It was estimated that Canada in that way paid more than two cents per pound on all spelter it used and proportionately on other zinc finished products. Heavy losses had been incurred in the large quantity of zinc, together with the silver in it, run to waste in concentrating silver lead ores, the tailing from a dozen 100-ton concentrators assaying from 20 to 30 per cent. zinc, and in the penalties paid the smelters for the excess percentage of zinc in the lead ores marketed. But the position had become much changed, for while it was developing that to a considerable extent zinc was replacing lead at depth in important mines, methods for the recovery of zinc were being steadily improved and—an important consideration—spelter commanded a higher price than did lead. Peculiar and extraordinary conditions had caused the advantages and prospects of the zinc-mining industry to be overlooked, but it was being realized that there was a promising future for zinc in British Columbia, and that it would add a new and distinct branch to the mining industry of the province.

Commission to Investigate Zinc Resources.

As a result of the representations made from British Columbia, the Dominion Government in the summer of 1905 appointed W. R. Ingalls, of New York, "to

make an investigation of the zinc resources of British Columbia and their commercial possibilities." It also designated Philip Argall, of Denver, Colo., and A. C. Garde, of Sandon, B. C., as his assistants, the former to have charge of the field work and the latter to assist him. Henry F. Wood, of Denver, was appointed to investigate the adaptability of the ores of British Columbia to magnetic and electrostatic concentration, etc., Mr. Ingalls was directed to make a tour of the zinc districts of British Columbia after the field work should be sufficiently advanced, to obtain such personal view of the economic conditions as would enable him to form a sound judgment regarding the establishment of zinc smelters, fuel supply and strategical railway locations and such other data as would be necessary for arriving at proper conclusions affecting the development of the zinc industry of British Columbia.

The report contained between 300 and 400 pages and was freely illustrated. In the introductory chapter Mr. Ingalls dealt with the history of zinc mining and smelting in the West, statistics of production, character of the ores, markets for ores, valuation of zinc ores, cost of smelting, value of argentiferous blende, and wet processes of zinc extraction. Other chapters gave much detailed information relative to the zinc mines and the undeveloped zinc resources of British Columbia, methods for concentration, assaying, etc.

Dominion Government to Conduct Experiments.

No considerable progress towards placing the zinc-mining industry on a permanent basis in British Columbia has yet been made. Much money was spent by one company operating mines in the Ainsworth and Slocan mining divisions in the erection and equipment of works designed to produce spelter, but commercially these were a failure. Other works were afterwards built and equipped, these for the treatment of complex lead-zinc ores by electro-thermic energy, but here again results were unsatisfactory and operations were not continued. Meanwhile a duty was placed on zinc ores entering the United States, so those interested in the mines in Ainsworth and Slocan districts held a meeting at Nelson, B.C., last December, and thereafter petitioned the Dominion Government to take the steps necessary to establish a smelting plant capable of treating Canadian zinc ores and of producing manufactured products of zinc, at least to the extent of supplying the Canadian market for the same. Especially it was asked that the Dominion Department of Mines be authorized to take up the matter and conduct experimental work upon such a scale as will determine definitely the practicability of the economical treatment of zinc ores by electro-thermic or electro-chemical process.

On March 21, Hon. Wm. Templeman, minister of mines for Canada, introduced in the House of Commons a resolution providing for the expenditure of $50,000 for the purpose of investigating the processes in use in the production of zinc, and for experiments in the manufacture of spelter and other zinc products from Canadian zinc ores. It is understood the experiments will be made at Nelson B.C., probably at the works in existence there and at which much experimental work has already been done.

In conclusion, it may be mentioned that last year zinc ore and concentrates containing about 11,000.000 lbs. of spelter were shipped from mines in Ainsworth and Slocan divisions. Lucky Jim mine shipped to the United States about 5000 tons or ore averaging about 52 per cent. zinc, while the Whitewater, Ruth, and Van Roi shipped concentrates running about 45 per cent. zinc. Other mines in which it is known zinc occurs in considerable quantity are the Blue Bell, on Kootenay Lake; several mines in Ainsworth camp; the Cork, Province, and Montezuma, on south fork of Kaslo Creek; the Jackson, Antoine, Rambler-Cariboo, and Washington, in McGuigan basin; the Payne, Ivanhoe, Slocan Star, and Richmond-Eureka, near Sandon; several mines near Cody; Monitor and Idaho-Memo, at Three-Forks; Mountain Chief and Bosun, near New Denver; Emily-Edith, Standard, Wakefield, Hewitt, and Galena Farm, in Silverton camp; Enterprise, on Ten-Mile Creek, Slocan Lake; and numerous smaller mines. There is a large deposit of zinc ore in the Arrow Lake division, now being opened by New York men; much zinc in the Monarch mine, near Field, on the Canadian Pacific main line railway; and known undeveloped occurrences of zinc ore in Lynn Creek camp, near Vancouver; at the Britannia mine, on Howe Sound; in the Quatsino Sound district, Vancouver Island, and in other places in the British Columbia coast district.

*Report of the Commission appointed to investigate the zinc resources of B.C. and the conditions affecting their exploitation. 1906, Mines Branch, Dept. of the Interior, Ottawa.

From the smoke pollution investigation that has been in progress for a number of years at Leeds, England, it appears that the solid impurities in the air at the industrial centre are 20 times as great as three miles to the north-east. The soot washed down by rain over four square miles in the industrial centre averages 190 tons per square mile per year, or half a ton per square mile per day, and at one station reaches the rate of 300 tons per square mile per year. The waste in unburnt fuel is represented by about 100 tons per square mile per year. The tar deposited with the soot has been estimated to be 24 times greater in town than 9 miles away, and has been shown to be 80 pounds per acre per annum in the centre and only 14 pounds three miles to the northeast, although the proportion is higher in domestic smoke than in industrial smoke. The free acids—sulphuric and sulphurous—in the air at the centre represent an annual deposit of 90 pounds per acre, or 25 or 30 tons per square mile. The solid impurities in the air often reduce daylight one-half, the tarry matter causes the soot to adhere to buildings and vegetation; the sulphurous acid makes town fog irritating when breathed and is very injurious to agriculture, and the chlorides—chiefly common salt—are sufficient in industrial centres to damage plants. The ammonia and other nitrogenous compounds in smoke, on the other hand, have some beneficial action as fertilizers and in neutralizing the acids.

For the first time on the Rand, mules have been employed for tramming operations underground. This experiment has been made in the Ferreira Deep mine, and it is stated to be successful. There has been considerable opposition in this country to the employment of animals underground, and probably there will also be a similar opposition to their employment in the Transvaal mines.

The lead smelters of the Broken Hill Proprietary Company, at Port Pirie, South Australia, have a capacity of 80,000 tons of lead per year.

Asbestos fibre brattice-cloth is being utilized in several Canadian collieries. There is much to commend it.

ERUPTIVE PRODUCTS.

The products derived from molten magmas can be classified broadly into five groups:—

(1) Normal rocks, plutonic or volcanic.

(2) Ores separated directly from molten material, e.g., nickeliferous pyrrhotite and titaniferous magnetite.

(3) Pegmatites, distinguished in origin from normal igneous rocks by the fact that water has played a more prominent part in their formation.

(4) Mineral veins and certain other mineral deposits, in which water has played a still more important part than in pegmatites.

(5) Products of gaseous or fumarole action (pneumatolitic products).

In this classification the products of eruptive action are confined to those formed beneath the surface of the earth and account is not taken of those originating at the vents of volcanoes.

It is but to be expected, since the five groups of products are so closely associated in origin that types of ore bodies would be found which represent not only each separate class of eruptive product, but various combinations of them. For instance, nickeliferous pyrrhotite and other ores are closely associated with certain rocks, ore grading into rock and vice versa. Cobalt-silver ore deposits furnish a good example of the association of several eruptive products. The diabase so characteristic of the Cobalt area, together with cobalt-silver ores and the aplite or pegmatite of the Elk Lake and Gowganda areas are all considered to have come from one magma. Fissures in the diabase, a rock which can be placed in group (1) of the classification, are occupied by the ores which belong to group (4) and by aplite or pegmatite, group (3). No pneumatolitic products are known to occur in the ore deposits of Cobalt or in the surrounding district. Fluorspar, however, occurs in similar veins of the Port Arthur silver area. Hence it can be said that in the silver areas of Ontario four groups of eruptive products are represented. In the Elk Lake and Gowganda areas ore and pegmatite are so closely associated in certain fissures in the diabase that they can be said to approach closely in origin products of group (2) Practically, therefore, all five eruptive products are represented in Ontario's silver deposits.

W. G. M.

In spite of the gradual reduction of coal consumed per horse-power per hour from more than 10 pounds to 3-4 pound, the total consumption of fuel is increasing in every civilized country. Cheapening of power costs widens its commercial applications.

Under the superintendence of Mr. F. Hille, the Laurentian gold mine is to be operated once again. A new company, composed largely of Detroit investors, has secured control of the property. The corporate name is Merger Mines, Limited.

LEGAL COLUMN.

An Official Guardian for Companies.

Reference was made in this column some time ago to the sale of shares at a discount, and it was there pointed out that the sale of shares at a discount rendered wholly uncertain the value that the purchaser was getting for his money. The elimination of the right to sell shares at a discount would leave only one loophole for the promoter to escape giving the investor value for his money, namely, the right to exchange properties or considerations other than money for fully paid-up shares in the company. This is a right that exists not only in our own systems of company law, but also in the English and American systems. It was President Taft's proposal some weeks ago to cause all properties taken over by companies to be taken over at a value set by Government appraisers which aroused such alarm on the Stock Exchange. I gathered from the weekly market letters that the foundations of commerce were threatened by the proposal.

This idea, however, is not distinctly new or strange. It has been suggested by authorities not generally regarded as anarchistic. In fact it was only after a series of cases in the English courts that the right was established at all, and the judges there have not always been enthusiastic about its merits.

Lord Justice Vaughan Williams, of the English Court of Appeal, in the case of Moseley vs. Koffy-Fontein Mines, Limited, in 1904, said:

"It was established long ago that the obligation of a "shareholder to pay the full nominal value of his "shares need not be satisfied in money's worth. It has "also been held that the Court will not, if it is satisfied "that there is an honest bargain under which the "money's worth is paid, inquire into the adequacy of "the consideration. These two propositions have been "apprised by the higher tribunal and I am not suggesting for a moment that the cases which established "them were not properly decided, having regard to the "terms of the Companies' Act, 1854, but I hope that "the day may come when it will be gravely considered "by the Legislature whether it is not for the advantage "of the community and particularly of the commercial "community, that an Act should be passed that in all "cases the full nominal value of the shares shall be "paid in cash and nothing else. I am satisfied from "my own judgment and experience in the administration of companies that such a law would have a tendency to benefit the companies themselves and also to "check a great deal of unwholesome speculation on the "Stock Exchange, which is largely fed and supported "by operations undertaken by vendors, promoters and "others for the purpose of unloading fully paid shares "which they have been allowed to satisfy by giving "what is called 'money's worth' instead of making a "cash payment."

Perhaps it should be explained that this is the source of all bonus stocks, stocks issued at a discount (other than mining stocks), and all the other manifestations of watering.

This is a very difficult matter to attack. Unless the practice of issuing shares of mining companies at a discount—a malpractice without either legal or moral justification—these decisions are based on a sound principle of contract law, that people must be at liberty to

make their own bargains, and if they are fools, must pay for their folly, or, as Lord Eldon said, mere inadequacy of consideration, unless it be "so gross as to shock the conscience and amount in itself to conclusive evidence of fraud," is not sufficient to annul a contract.

Now a company is in the eyes of the law a person, able to contract and act within its powers as well as a living person. Being able to contract, it is presumed to be able to protect itself. And so the same principle is applied to the sale of stock for money's worth. Lord Justice Cotton: "The Court will decline to rip up a transaction not impeached as dishonest and not proved to be such, merely because the company may have paid an extravagant price for their property." Vaughan-Williams: "The Court ought to go into the question of whether there is real consideration or whether the consideration is a sham—but in my judgment you can only impeach it in cases where the evidence justifies you in saying that the transaction is a colourable one." Lord Lindley in the same case on appeal:" Shares in limited companies cannot be issued at a discount. By our law payment by a debtor to his creditor of a less sum than is due does not discharge the debt; and this technical doctrine has also been evoked in aid of the law which prevents the shares of a limited company from being issued at a discount. It has, however, never yet been decided that a limited company cannot buy property or pay for services at any price it thinks proper and pay for them in fully paid-up shares. Provided a limited company does so honestly and not colourably, and provided that it has not been so imposed upon as to be entitled to be released from its bargain, it appears to be settled that agreements by limited companies to pay for property or services in paid-up shares are valid and binding on the company's other creditors."

That is to say, the ordinary principles of contract law only are to be applied to such sales of stock. But there are other principles of contract law which should be considered.

A company is presumed to be a person, but is a person entirely under the influence of its directors, and they, in such cases as we are considering, are usually the promoters or the vendors. Thus the company is a person that cannot think or act but as the promoters or vendors will. A contract made with a real person under these circumstances would be absolutely unenforceable and could always be set aside. The person contracting must be as regards the other party "placed in such a position as will enable him to form an entirely free and unfettered judgment independent altogether of any sort of control."

The question is settled, however, as far as the courts are concerned without any regard to any argument about "undue influence." What should the legislature do about it? To require all stock to be paid for in cash hardly seems possible. It is hard to conceive of a workable law to that effect that could not be evaded. To require appraisers to value all the various assets that are turned over, appointing as it were an official guardian to companies, seems to suggest complications and delays that the future hardly promises leisure for. Yet there is a considerable parallel between companies theoretically capable but actually incapable of independent acts, and infants whose bargains the court and the official guardian supervise.

It is not so fantastic an idea. The company is a person with full powers up to a certain limit. Beyond that it is not existent—why not create a borderland of infancy where it can act if the court and its guardian approve? In this borderland we might place the sale of stock for money's worth, the issue of prospectuses, mergers and other dangerous acts that will suggest themselves. More than the mechanical supervision of the government is needed. The machinery is at hand. Why not try using it?

BOOK REVIEWS.

REVIEW OF THE COPPER HANDBOOK, VOL. IX.

The ninth annual edition of the Copper Handbook, edited and published by Horace J. Stevens, Houghton, Michigan, is just to hand. This work, which has become a standard authority on the subject, has, in its latest edition, 1,628 octavo pages, containing considerably more than a million words, and, in addition to the miscellaneous chapters, lists and describes no less than 7,751 copper mines and copper mining companies, in all parts of the world, descriptions ranging from two or three lines in the case of companies that have died recently, to sixteen pages in the case of one of the largest mines—a mine, by the way, that employs some seven thousand men and has paid dividends of considerably more than a hundred million dollars. The mine descriptions are the same as in the preceding volume, except that upwards of eight hundred new titles have been added, covering descriptions not contained in any previous edition. The chapter of statistics, containing upwards of forty tables, treating of copper from almost every conceivable standpoint, has been fully revised and brought as nearly as possible to date.

The miscellaneous chapters of the book, twenty-four in number, treat of the subject of copper from a great variety of viewpoints, including the history, chemistry, mineralogy, metallurgy and uses of the metal, and this section of the book also has chapters devoted to substitutes, alloys, brands and grades, and a copious glossary.

The plan on which the book is sold has remained the same for seven years past, the publisher sending the book by mail, fully prepaid, to any address ordered, without advance payment of any sort, and subject to approval after a week's inspection. The price is $5.00. That this unusually liberal plan has proven successful is shown by the statement of the publisher that net losses through returned copies and defaulted payments are less than four per cent. Anyone interested in the subject of copper, as producer, consumer, or investor, should order a copy of the Copper Handbook.

PERSONAL AND GENERAL.

Mr. P. N. Nissen has settled temporarily in Toronto.

Mr. C. S. Herzig, of the Constant-Herzig Company, is examining a mining property in West Virginia.

Mr. H. Mortimer-Lamb is to represent the Canadian Mining Institute at the International Mining Congress in Germany.

The Constant-Herzig Company is about to undertake examinations of properties in Utah and Nevada on behalf of London clients.

Mr. James Bartlett has resigned his position on the staff of the Ontario Bureau of Mines and has accepted a billet with the Hosmer Coal Company, Hosmer, B.C.

Mr. A. J. Beaudette, formerly mining engineer for the Dominion Government in the Yukon, has recently visited Sudbury, Cobalt, and Porcupine. Mr. Beaudette will, during the coming summer, make professional examinations in many parts of Canada. It is probable that he will then make Vancouver his headquarters.

Mr. Alexander H. Smith, engineer for A. E. Osler & Company, and other interests in Porcupine, is in Toronto.

Mr. R. B. Lamb, of the C. L. Constant Company, has returned from a professional visit to Nicaragua.

Mr. T. J. Brown, the general superintendent of the Nova Scotia Steel & Coal Company, recently underwent an operation for appendicitis. He is understood to be making good progress towards recovery.

The following paragraph has gone the round of the newspapers:

IN HANDS OF RECEIVERS.

New York, March 28.—The Canadian Consolidated Mining Company, Limited, at 103 Park Avenue, with an authorized capital stock of $5,000,000, a holding company for several coal mining companies in New Brunswick and Nova Scotia, was put into the hands of receivers to-day, as it was unable to raise money to pay its obligations. Judge Greenbaum, of the Superior Court, appointed Daniel P. Hays and David Davis, receivers, with a bond of $75,000, on application of Julius O. Foote, attorney for Luella N. Von Hagen, who is creditor for $19,500 on a note of the company and owns $1,100,000 of the stock.

Hugo Van Hagen was president of the company. The liabilities are $50,000. The company was incorporated under Maine laws in March, 1909, with a capital stock of $5,000,000, of which $4,840,000 has been issued. It owns stock in the following companies: North Shore Railroad Company, Northern Coal Company, Kent Coal Company of New Brunswick; Kent Coal Company, Maine; Crown Coal Company and Great Northern Coal Company, of Nova Scotia, and Maritime Coal Company, of New Brunswick.

The Montreal Star speaks of this as "Another Mine Bubble Burst." It is hardly correct, however, to speak of Von Hagen's companies as "bubbles," because they were frauds pure and simple. We do not remember to have seen any references of late in "Financial Facts" to the dividends of these companies, and Mr. Henry Roach has been strangely quiet of late on the remarkable possibilities of "Kent Coal." It comes to our recollection that this gentleman in advertising the Great Northern Coal Company of Nova Scotia said that future generations would bless the day they heard of Mr. Henry Roach and the wonderful wealth which reposed in the areas of the Great Northern Coal Company, all unknown to the unsophisticated inhabitants of Maccan. It is more than probable that the trusting servant girls and widows who handed their savings to the unspeakable Roach are to-day doing anything but bless that well-named gentleman. The true history of the Canadian Consolidated Mines Company, Limited, would enrich the Newgate Chronicle, and the makers of that history should be allowed to take their ease in Sing Sing or some other classic residence for gentlemen who defraud and embezzle.

According to Mr. David H. Browne, metallurgist of the Canadian Copper Company, it has heretofore been found impossible to produce by melting copper and nickel together an alloy having the same physical properties as the alloy produced direct from the matte.

Mr. David H. Browne, in a paper read before the A. I. M. E., at the recent Pittsburg meeting, states that experiments on the conversion of copper-nickel mattes led to the following conclusions:—

1. Nickel is not an element replacing iron in matte.
2. Nickel-copper alloys act in the matte-blow like one metal.
3. Nickel-copper alloys follow, during the matte-blow, exactly the same laws as govern the behaviour of copper alone.

In 1908, 140 by-product coking ovens were erected in the United States. The number of completed ovens at the end of the year was 4,007. The net gain over the previous year was, however, only 115, as 25 Semet-Solvay ovens at Sharon, Pa., were dismantled.

The daily production of coal in the Nicola Valley country, B.C., has increased during the past winter. Coal cutting machines are being used successfully.

At the Testing Station of the U. S. Geological Survey, Technological Branch, at Pittsburg, all "permissible" explosives are put through three series of tests. In one, a mixture of gas and air containing 8 per cent. of methane and ethane is used; in another, a mixture of gas, air, and dust, containing 4 per cent. of methane and ethane, is used; and in another, dust and air without gas are used.

Crude oil has been adopted as a preservative by two large American railways. Railway ties treated three years ago, when taken out and examined were entirely free from decay.

Fifty-seven per cent. of the total producer gas horsepower in the United States is developed from bituminous coal and lignite. Two producer gas plants that will utilize peat are in course of construction.

Josephinite, a natural nickel-iron alloy found in placer gravels, contains, according to one analysis, 60.45 per cent. nickel, 23.22 per cent. iron, 0.55 per cent. cobalt, and 12.26 per cent. anhydrous silicates.

EXCHANGES.

The Engineering and Mining Journal, April 16th, 910.—In the Coeur d'Alene district, according to Edward S. Wiard in the latest of his excellent articles on "Ore Dressing in the Coeur d'Alene District," the vanner is the final concentrating machine. Its chief advantage is that a high-grade concentrate can be made and this is attained largely by the shake of the machine. The shaking causes high tailings. To secure low tailings and clean concentrates, Mr. Wiard argues that the vanner should be used in the first treatment of material too fine for successful separation on tables of the Rittinger type. The tailings can then be led to convex revolving buddles, the low-grade made on the buddles being enriched on a vanner and the tailings from the latter returned to the buddle. For retreatment work of this kind, Mr. Wiard regards the buddle more favourably than the vanner. Vanners, he states, might be run better than in most mills.

The Mining World, April 16th, 1910.—The Mining World, referring editorially to the care of machinery, alludes to the necessity of having on hand at the mine duplicate parts of machines that are especially liable to become broken or worn out. Regular inspection should never be omitted. Machinery can thus be kept in proper adjustment and properly lubricated, and weaknesses detected before a breakdown may occur.

The Daily Mining Record, Denver, April 16th, 1910.—The Record has this to say concerning drill-hole ore reserves:—

"A critical attitude toward the drilling operations at the so-called porphyry copper mines of the West has recently developed among followers of the mining share markets. The disposition to scrutinize ore reserves very closely is usually the result of a series of market disasters, and this appears to explain the discussion concerning the permanency and value of the deposits that are calculated from drill hole data. A mistaken conclusion regarding this type of mines has in some quarters been drawn from the recent unfavourable reports concerning the Granby of British Columbia, which does not belong to the same class as Utah Copper, Nevada Consolidated and others like them, and is being operated upon a different system of ore treatment. Nevertheless, the Granby incident has evidently served to bring under review the whole question of ore reserves in the low-grade copper mines and to reflect unnecessary doubts upon the permanency of the so-called porphyries.

"It is certainly true that drill holes 200 feet apart cannot supply data concerning the mineralized character of the ground between them, and that the actual proof of the ore must follow from the usual developments, which precede production, but the inferences from experience are such as to satisfy some of the best mining men in the business. Blocked out ore is not predicated upon the data of drill cores by anyone, and it is just as well that the investor in stocks should fully understand this. The results of drilling can mean that large mineralized areas are present, but they mean also that regular development is necessary before any production can be made. In some quarters it is contended that the ores usually prove to be higher in copper tenor than the drill cores show, but it may require more experience to fully establish this as a rule.

"The ores indicated by drills may be called conditional reserves, but the condition has not yet been shown to be material. Some engineers think such results are ample, and are willing to accept them as close approximations, while others are not willing to accept the figures thus secured and expect verification by the usual standards of development before offering any calculations at all.

"In our judgment it is merely the argument of a stock market 'bear' that seeks to undermine the element of assurance as to the life of 'porphyry' deposits indicated by the drill holes, when these have been put down in great numbers over large areas. It is normally sufficient to urge that exact tonnages and exact values cannot be determined save by development. It may serve the 'bear' to remember that even the best sampling of a mine can give only an approximation. Safe approximations are all that the mine explorer is after, on the hither side of smelter returns."

CANADIAN PATENTS.

The following is a list of Canadian patents granted on April 12th, 1910, relating to mining and metallurgy and furnished by Fetherstonhaugh & Company, 5 Elgin street, Ottawa, Canada, Russel S. Smart, resident, from whom all information regarding same may be obtained:

124928.—A. S. Ramage, Newark, N. J., Methods of recovering iron from ores and preparing iron alloys. The Electrical Steel Company of Canada.

124968.—Wm. H. Fletcher, Jackson's Drift, Transvaal. Mills or apparatus for crushing or pulverizing ores, minerals and the like.

124980.—A. H. Kidney, New York, N. Y. Means of exhausting and condensing furnace fumes.

124993.—Chas. M. Mullen, Portland, Ill. Car roofs.

124989.—F. D. Melhuish, Atlanta, Ga. Ore concentrators.

124990.—C. Miele, Gutersloh, Westfalia, Germany. Processes of producing a uniform metallic coating.

124991.—Jas. E. Moody, Toronto, Ont. Centering molds.

125008.—A. Poulson, Farnworth, near Wednes, County of Lancaster, Eng. Manufacture of gelatinous silica.

125011.—A. S. Ramage, Buffalo, N. Y. Processes of producing electrolytic copper.

125012.—A. S. Ramage, Buffalo, N. Y. Processes for the separation of mineral combinations.

125013.—A. S. Ramage, Buffalo, N. Y. Processes of recovering metals from ores.

New Brunswick gypsum compares very favourably in point of purity with gypsum from other countries. Hillsboro', N. B., gypsum contains 79.55 per cent. calcium sulphate, 20.94 per cent. water of combination, and not more than 0.10 per cent. of any one impurity.

Meteoric iron, according to analyses by chemists of the United States Geological Survey, ranges from 4.81 per cent. to 14.95 per cent. nickel.

The Commonwealth Oil Corporation, an English concern formed to exploit the oil-shales of New South Wales, will depend largely upon government protection in marketing its products.

CORRESPONDENCE.

To the Editor Elk Lake, April 21st, 1910.

The Canadian Mining Journal, Toronto.

Sir, — I should like through the medium of your paper, to draw the attention of those interested in mining matters throughout Ontario to the law pertaining to the survey of claims as laid down in The Mining Act of Ontario, sections 113-116.

In section 113, clauses 2, 3, 4 and 5, the method of surveying claims is laid down for the benefit of the surveyor, but this method doesn't do the prospector or owner of a claim much good.

If the surveyor ties up his posts, and runs a tie line to the nearest known point, his duties are apparently ended.

But it often happens that claims overlap, and two or even three parties may imagine that they own the same ground.

The survey then is of no use, except to outline the ground in dispute, and the result is generally an expensive lawsuit, a luxury which very few prospectors can afford.

I quote the following case, (similar to many others), which was brought to my notice yesterday by a disgusted prospector.

He, or his partners, staked a fraction near Leroy Lake, Gow Ganda district, which fraction is surrounded by claims since proved to be very valuable.

To make sure of doing his work within his boundaries, he had his fraction surveyed, did his thirty days' work, and got a certificate of record.

This was last year. Twice the property was nearly sold. The "Abstract" showed it to be in "good standing."

Lately, however, he returned to Leroy Lake to do his second year's work and was astonished to find that someone else had done some considerable trenching on his ground.

Not understanding the reason for this, he took a trip to the Recording Office at Gow Ganda, and found that another party held a certificate of record covering the same ground, and that a third party also had done work on, and claimed the property.

How can a law which permits such a mix-up to be possible, benefit the prospector.

My friend is out the price of the survey and thirty days' work, and was told candidly enough by the recorder at Gow Ganda, that the best thing he could do was to let the claim go, as he hadn't a leg to stand on if he tried to fight the case!

And supposing he had done his second year's work last autumn, instead of leaving it till the spring, he'd have been out that much too, and apparently he has no redress.

I should like to see the survey of claims carried out throughout Ontario on similar lines to the survey in British Columbia.

Before starting out to survey a claim or group, let the surveyor, having access to the recorder's office and working in conjunction with him, examine the books showing applications of record for surrounding claims.

Then let him CUT OUT those portions of claims overlapping the claim he is surveying and which have prior rights to that claim.

The claim then as surveyed, or what is left of it, will beyond doubt be the ground to which the locator is entitled.

This doesn't mean much more work for the surveyor, but it means a great deal more satisfaction for the prospector.

And after all who is entitled to the protection of his interests more than the prospector, who for the most part spends what he gets in developing the country.

One more point I should like to bring forward.

The survey of a mining claim in British Columbia is equivalent to an assessment, and is recorded as such—the assessment being valued at $100.

The advantage to prospectors and would-be prospectors, of having claims surveyed is obvious—the boundaries are absolutely defined, and its location.

Why not, then, let it take the place of thirty days' assessment work out of the 240 days which has to be done before a patent or lease can be granted.

After all, does thirty days' work more than counterbalance the benefit gained by definitely outlining a locator's claim?

As things stand at present too much money is spent by prospectors and claim owners in lawsuits, which are prejudicial to a mining community.

The government would lose nothing by the change and the prospector would benefit much.

Yours truly, R. O. Hawtrey.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, April 14th, 1910.—The weather conditions in the Gulf of the St. Lawrence have been most favourable to an early opening of navigation, and the collieries have taken advantage of the absence of drift-ice and the open state of the river to make early shipments of coal to Montreal. The first steamer to arrive from sea at Montreal was the Kron Prinz Olaf, which reached Montreal on the 12th of April. The earliest recorded arrival from sea at Montreal previously was the 22nd of April, so that this year's performance will doubtless establish a new record that will stand for a long time. Both Sydney and Louisburg have been completely free from drift-ice this spring.

The annual meeting of the shareholders of the Dominion Coal Company was a notable one in many respects. In commenting on the decreased earnings of the Coal Company many of the newspapers stated that the United Mine Workers' strike had caused an expenditure of $1,250,000, which is an entirely incorrect view of the matter. In comparing 1909 with the years immediately preceding it, it must be remembered that the Coal Company's earnings included the excess price paid by the Steel Company for its coal during the contract litigation. It must also be noted that the first part of 1909 was a period of depression in the coal trade. In view of these two facts and the strike it is distinctly encouraging to coal shareholders to know that their property was able to earn $1,100,000 on an output of 2,734,000 tons, which is just about one million tons less than the output capacity of the mines. That such a result should have been obtained says a good deal for the manner in which the officers of the company fulfilled their duties in the face of great difficulties. One of the company's mines was idle practically the whole year, and another mine had not fully recovered from the effects of a disastrous fire.

The company has been compelled to police practically a whole county, and it seems not a little anomalous that a Canadian corporation in which a large amount of Canadian capital is invested, should have been allowed to be harassed by the

alien delegates of a foreign organization. The situation partakes of absurdity when it is also considered that a bill was actually presented to the Commons of Nova Scotia proposing that recognition of this union should be made compulsory on the coal companies. In view of what has passed, a legislature that should dare to enact such a law should be impeached for treason. The courts of Nova Scotia were also used by this alien union to further harass the coal companies with the aid of funds from the United States. This American union has no respect for our courts of justice. The restraining injunction of Judge Lawrence has so far been treated with absolute contempt, and not only have the foreign officers of the U. M. W. refused to obey the injunction of the Nova Scotia Supreme Court, but they have openly advised their followers to pay no attention to it. The argument of the international unions is that Labour should not be refused the right to international affiliation and combination, while Capital is under no such restrictions. This argument cannot wholly be gainsaid, but the fallacy lies in the fact that combinations of capital are made under the law of the land for a lawful and usually beneficial end, whereas the actions which have been pursued by the United Mine Workers in the strike at Glace Bay, have been unlawful, and the persons who have been sent here from the United States to direct the operations of the U. M. W. are not amenable to the laws of this country—laugh at them in fact. There has been a virtual state of war in Cape Breton for the past nine months, but the enemy that has attacked our home industry has been under the protection of Canadian laws, and no contraband has been declared against his munitions of warfare. As the Canadian law stands to-day, no industry in this country is safe should the head of a United States labour organization decide to concentrate the resources of that organization against one particular company. Surely our industries are entitled to some protection against the foreigner. It is true that no part of the Empire has as a neighbour so populous and wealthy a nation as the United States, but considering even this fact it is almost unthinkable that such a state of affairs as exists at Glace Bay to-day could be permitted in any other part of the British realm. It has been said,—and who can contradict it?—that the unrest which the U. M. W. have caused in Nova Scotia is viewed with favour by coal operators in the United States, because it serves their ends and their designs upon the Canadian coal market. If this were so the laws of Canada afford no remedy, and the Canadian shareholder must bear the brunt. Persons travelling by the Sydney & Louisburg Railway may any evening see workmen living along the line side escorted to their homes by policemen, and will notice that the houses of the men who dare to work, despite the mandate of a gentleman in Indianapolis, U.S.A., are all shuttered with heavy boards to prevent stones and other missiles from being thrown through the windows at the occupants. This is one example among hundreds of the state of affairs which has been allowed to continue at Glace Bay and around the collieries. Until the arrival of this American organization, with its medieval methods, the colliery districts had been remarkably orderly, considering the mixture of nationalities and the quality of the whiskey which is dispensed in the saloons of Glace Bay. The town of Glace Bay had a very limited number of policemen, and one solitary constable constituted the protection which the Coal Company considered necessary for the property and the persons of its workmen. The collieries were all unfenced and completely open to the public. To-day every colliery is enclosed by a fence, which is illuminated at night. The company has to maintain a large force of uniformed constables, and hitherto innocent citizens go about "heeled" like a Western desperado. The change is a remarkable one, but it is also one which has marked the advent of the United Mine Workers in other places. This unfortunate state of affairs could not have come about had not the leaders of the U. M. W. worked their astute and ancient game of setting the political parties of this province by the ears—not that this is a difficult matter—but surely it is by this time apparent to both Liberal and Conservative that the unfortunate miners who have followed the lead of the U. M. W. are being heartlessly exploited by this organization, and that eventually, unless this pernicious nest of disturbers is driven from our province, these deluded men will lose all they have and be driven either to leave the country or become paupers on a county already saddled with extraordinary expenses also due to the presence of the U. M. W. in Cape Breton. Many of the strikers are men enthused with the martyr spirit, confident that they are fighting the battle of right, and they are content to be herded together, as one of themselves worded it "like rats in a hole," while their leaders eat dollar dinners on the Intercolonial Railway, and attend conventions in the Land of the Stars and Stripes. The officer who shares the hardships of his men gains their respect and confidence, but the "walking delegate" from Indianapolis, Kansas and Alabama, as we know him in Glace Bay, is a parasite, and sooner or later must meet with the fate that befalls all such creatures when their victims realise their presence.

ONTARIO.

Cobalt.—The agreement between the Chambers-Ferland Mining Company, and the Ontario Government regarding the royalty reduction has at last been signed. The Chambers-Ferland has done practically no shipping for a year, waiting, it is said, in the hopes of getting the royalty reduced, and now that it is a settled fact they will join the list of regular shippers. It is understood that there is a considerable quantity of both high and low grade ore on hand. When this is shipped it will, of course, come under the reduced royalty. Formerly this company paid 25 per cent. of the gross proceeds of the ore, but now they only pay 25 per cent. of the net proceeds. At present there are three high grade veins being worked and the second class ore which runs in the neighbourhood of 250 ounces, is an important consideration. Several promising veins have been discovered on the Nipissing property near the Chambers-Ferland and this section will be thoroughly prospected this summer.

Another ore shoot has been opened up on Peterson Lake lease of the Little Nipissing. From the bottom of the winze, which is down 240 feet, a cross-cut was run and when in about 20 feet the vein was cut. It shows from two to three inches of smaltite carrying native silver. This property is now getting air from the Mines Power and it is the intention of the management to operate four drills. The property was formerly greatly hampered on account of the lack of power.

The shipments for the month of March were quite heavy and show an advance of about 420 tons over the previous month, and are about 100 tons greater than the shipments for the corresponding month of last year. Altogether eighteen mines sent out 84 cars aggregating 2,601 tons Three new shippers have been added to the list, the Waldman, the Hagraves and the Chambers-Ferland. With the exception of the Provincial Mine, the Waldman is the first property to ship ore from the Gillies Limit. The McKinley-Darragh shipped more high grade ore during the month than any other property, and with its increased mill capacity it is expected that it will be able to maintain a large output.

The Hargraves has cut the No. 1 vein at the 125-foot level in a cross-cut from the shaft. Where cut the vein was about four inches wide and carries high values in silver. This vein was found near the Drummond boundary on the surface and at the 75 foot level good ore was found in the conglomerate. The shaft was then continued and the vein picked up on the lower level. At the lowest level of the No. 3 shaft a winze is being sunk on the vein and will be continued for about 60 feet.

Since the Bailey obtained power to run its hoist and com-

pressor, underground work is proceeding much more rapidly and good results have already been obtained. A winze has been put down twenty-five feet below the tunnel level, and has disclosed a considerable body of medium grade ore. There is about four feet that will assay nearly five hundred ounces. The main values, of course, are carried by several stringers of high grade ore, but the rock lying between these is also well mineralized. The main shaft is to be sunk an additional fifty feet, and from the bottom a cross-cut will be run to open up the Bailey vein, which is the principal ore body so far discovered on the property. The plant consists of the first half of an electrically driven twelve drill compressor and an electric hoist. The compressor will in all probability be shortly discarded for the Power air. Arrangements have been made with the Cobalt Central to treat 500 tons of the Bailey ore in the former company's mill.

Judgment has been rendered in the action brought by the Peterson Lake Mining Company against the Nova Scotia, with regard to the latter company's lease on Peterson Lake. The Peterson Lake had an injunction issued restraining the Nova Scotia from mining the lands covered by the lease. This has been dissolved. The Peterson Lake also claimed the lease to be forfeited on account of non-compliance with its conditions. The judge stated that he was unable to find any evidence pointing to fraud and that although there might have been failure in some cases to comply with the literal terms of the lease, such failure was acquiesced in by the representatives of the plaintiffs. The royalty has been fixed at 25 per cent. of the gross value of the products and not 25 per cent. of the net proceeds, as claimed by the Nova Scotia.

At least three promising properties in South Lorrain have changed hands during the past two weeks, and negotiations are under way for several others. The Mitchell-Brocklebank claim in the vicinity of Ox Bow Lake has been sold for $25,000. Practically no work has been done on this property, but several promising veins, some carrying smaltite, have been uncovered on the surface. The Martin claim, in the same locality, has also been sold to New York and Philadelphia people for a good figure. This property has not been developed, but a company is being formed to take it over and work it this summer. New York people also purchased the claim known as H. R. 227 for the sum of $15,000. The district of South Lorrain is growing in importance every day and should become one of the most important camps outside of Cobalt. The installation of the substation by the Mines Power Company for the distribution of electric power, will have a very beneficial effect. This power is to be sold at $50 a horse-power year and will mean a tremendous decrease in power costs. The Maidens property has another good ore shoot in their vein. In sinking the vein practically pinched out for a short distance, but on going down a little further the ore came in again, carrying as high values as formerly. The Haileybury Frontier has been getting good ore in the drift, and assays of over 3,000 ounces have been obtained. The shaft will be sunk as rapidly as possible and arrangements have been made with the Keeley to supply air for one drill for this purpose.

A new concern, to be known as the Dominion Reduction Company, is being formed for the purpose of building a customs concentrator to mill the low grade Cobalt ores. It is expected that it will be erected in the vicinity of Giroux Lake, in close proximity to the T. & N. O. Railway's branch line to Kerr Lake. The promoters expect to build a mill of from 50 to 60 tons capacity, and state they will have it running within four months of the date work is started on it. At the present time there are two customs concentrators in camp, the Northern Customs and the Nipissing Reduction. These mills have all that they can handle for some time to come, so that there should be a good opening for another one.

The Temiskaming mill is now running steadily and is putting through about eighty tons a day, and the shipments from this property, which have been small for the last several months, will show a material increase. The main mill is several hundred feet distant from the crushing plant and the two are connected by an aerial tramway. Considerable high grade ore is now coming from the 350-foot level, and in the process of winning it large quantities of low grade ore are also being produced. The main tonnage for the mill is, however, coming from the dump.

Another high grade vein has been found on the Wyandoh property in the Gillies Limit. It is, however, very narrow, being only about half an inch wide, but carries a good deal of native silver. Work is to be started shortly on several of the Limit lots, but so far this section of the camp has been very disappointing. It is probable that the Government will have other sales this summer, but the project will not meet with any great favour from investors in this section of the country.

The Hudson Bay has struck a high grade ore shoot in the No. 5 vein on the first level. The ore is about two inches in width and runs over four thousand ounces in silver. A small shipment from the dump was made to the Cobalt Central mill to get an idea of its average value. The results obtained were satisfactory.

Since power has been turned on at the Peterson Lake leases there has been a great increase in activity in that part of the camp. The Kerry Mining Company has opened up an ore shoot on the 200-foot level. A cross-cut will also be run from the Kerry shaft to the Scott lease. The Peterson Lake is opening up the vein from which it got its last car of high grade, and will probably have another car before long.

The long-drawn-out suit between the Coniagas Mine and the town of Cobalt has at last been settled. The case was finished some time ago, but judgment was only given within the last few days. The suit arose out of the fact that the Coniagas contended that it had the right to mine on any of the lots or streets under which it had the mineral rights. As part of its mining lands take in one of the principal sections of the town, this was a very serious matter and suit was accordingly brought. The trouble was started by the arrest of some of the company's officers for having a prospecting trench dug upon one of the streets. The mine's contention was upheld by the courts, and it is at liberty to use the surface for any mining operations it sees fit. As regards the streets, the company will have to submit a plan of proposed operations that will have the approval of the town engineer before the work can be started.

PORCUPINE AND OUTLYING DISTRICTS.

Eleven more of the claims staked by Wilson and Edwards in Porcupine, have, it is stated, been sold to the Dome Mining Company and McCormick Bros., of New York. The price is believed to be in the neighbourhood of $1,200,000. The Dome Company purchased six of the Wilson claims some time ago, among them the famous claim which was responsible for the rush into that district. McCormick Bros. were negotiating for this property but they failed to come to any agreement. On the eleven other claims just purchased the initial payment of $35,000 has been made, and the balance is payable in installments. The car shipped from the Timmins property to the States is still held up at the border, awaiting the customs clearance papers. It will be sent on to its destination in the course of a day or two. The Scottish Ontario Gold Company is at present installing its machinery, and as soon as this is in working order its force of men will be considerably augmented. The values in the bottom of the shaft are stated to be very good. The Canadian Northern Silver Mines are negotiating for the four Dixon claims. The price asked is in the neighbourhood of $50,000. A new company, known as the Porcupine Gold Mines Company, has been formed with a capitalization of $2,000,000, to work several properties known as the Vipond claims. Camps have been erected and a force of men will be employed this summer in thoroughly prospecting the company's holdings.

A short time ago Northern Ontario was startled with the report of a new gold discovery south of Matheson, and for a time the greatest excitement prevailed. Two prospectors arrived in Haileybury with samples of telluride ores which they claimed to have taken from claims they had staked near Caribou Lake, about twelve miles west of Bourke's siding on the T. & N. O. Railway. These samples were shown to several prominent men in the town and the prospectors are stated to have raised a considerable sum of money upon swearing to an affidavit that the samples came from their claims and promising to lead these men into the place. Engineers were engaged to go in and look over the ground, but before they were ready to start the news leaked out and prospectors began swarming in from all directions. In order to be first on the ground the engineers hired a special train to take them to Bourke's siding. The country proved to be practically impassable, consisting mainly of swamp and muskeg. When they arrived at their destination they found that they had been tricked and that the only sign of mineral was a quartz vein worked by one of the old settlers, on which a twenty-foot shaft had been sunk. The best assay ever obtained from it was ten dollars in gold and there were no signs of tellurides. Other prospectors going in fared badly, and one party is known to have spent three days in getting twelve miles. Blackburn and his partner are supposed to have brought their samples from the West. As soon as the engineers arrived at the railroad they telegraphed orders to have Blackburn arrested, but neither he nor Jones have been seen since It is believed that there were fully 250 men starting in to the scene of the reported discovery within two days of the time the news leaked out, and they are all swearing vengeance against the men who misled them.

The change in the mining laws of Quebec has resulted in an influx of prospectors, with the result that several promising discoveries of silver and copper have already been reported. One or two small plants are now working in the vicinity of Fabre township, and if good results are obtained a great deal of activity may be expected in this section.

Navigation has opened on the Montreal River and boats are now running between Latchford and Elk Lake. For the present there will only be one boat a day leaving each end, but a little later the Navigation Company will run two trips daily.

BRITISH COLUMBIA.

Rossland.—It is noted that the Dominion Government is taking under consideration the question of coining a one-dollar piece to take the place of the filthy one-dollar bills now in circulation. This is a laudable move. It is hoped, however, that the large silver dollars, as used by many foreign countries, will not be decided upon, as when all is said and done they are rather heavy. A coin of some more valuable metal than the ordinary silver coin could be made of a size midway between the twenty-five and fifty-cent piece that would fill the bill admirably. Something of this character would be a great advance over the heavy silver dollar and the germ-laden one-dollar bill now in daily use in the Dominion. It is estimated that from 4,000,000 to 90,000,000 germs of smallpox, typhoid, tuberculosis, diphtheria, etc., may be found on the dirty dollar bills in circulation. Surely this would warrant a clean coin being put out and the retirement of most of the one-dollar bills.

It is a pleasure to note that committees are being appointed by the Government to make a general modification of the mining laws of Canada. This will do away with the present confusing state of affairs in that direction. It is to be hoped that the committee in charge of this work will extend its labours to the question of boiler inspection, and will straighten out the existing anomalies in the various and sundry Acts on this question, which appear to be working a hardship on both mining and mill men and the manufacturers, as to some extent personalities enter into the subject, often to the detriment of those most concerned. No doubt this phase of the situation is to be considered by the committees.

The outlook at the Le Roi Mine here remains the same as for some weeks past. Mr. A. J. McMillan, in a recent interview sized the thing up in the following words: "We are diamond drilling from the 1650-foot level and have already put a number of holes down to a depth of 2,200 feet. Our plans call for a systematic exploration of our ground in this manner and we are hopeful of being just as successful in locating pay shoots as our neighbours, the War Eagle, have been."

Nelson.—The zinc miners of East Kootenay seem to think that a portion of the money appropriated for experimental work should be expended in their district. This would be all right if the work could be done economically and something would be gained. It is considered here that the experiments can be carried out locally in a very economical manner and if the results are favourable, of course, it will redound to the good of all of the zinc property in this country. There is already an experimental zinc smelter in Nelson; power from Bonnington Falls for electrical smelting can be obtained at reasonable rates and many of the important zinc mines are contiguous to this city, all of which would aid toward an economical expenditure of the money appropriated.

The Blue Bell, zinc mine, has closed down, and will no doubt remain inactive pending results of some of the experimental work on the zinc question. The Blue Bell concentrator has been treating about 900 tons of low-grade ore per week and has shipped approximately 1,100 tons of concentrate since the first of the year. Most of this ore came from the adit level, however, and while there are large deposits of this ore below these workings the mine is not properly equipped to handle it economically, so that an addition to the plant is contemplated.

The season's outlook for the surrounding districts augurs well and good strikes of ore are reported from the Rambler-Cariboo, Slocan Star mine, Mother Lode, Yankee Girl and others. A body of galena averaging 50 per cent lead and 200 ounces silver was located on the Hidden Treasure claim of the Slocan Star group. A streak of grey copper was also found on the same property. The Lucky Jim zinc mine is once more shipping to American smelters and is trying to arrange for a steady production of 100 tons per day. The company is contemplating the building of a 100-ton concentrator at Kaslo, which would enable it to put out a quantity of its second-class ore. It is pleasing to note that a force of men has been put back into the upper workings at the St. Eugene, Moyie. This property is now shipping about 800 tons of concentrate per month to Trail smelter.

The McGillivray Creek Coal & Coke Company is gradually increasing its output. The new tipple is now working. Electric fans have been installed and work on the new adit begun.

Phoenix.—Considerable comment is being made upon Granby affairs lately, owing to the recent slump in the company's stock, which was caused by adverse reports emanating from the company's officers. Much has been said on both sides of the question and at this date nothing definite has resulted. An engineer who recently made a hurried examination of the property claims they only have about 6,000,000 tons of ore "in sight." The report of this company for the half year ending December 31st, 1909, shows that the smelter treated 572,371 tons of its own ore. At this rate there is five years' ore in sight. But if we understand the situation rightly there are still the factors of probable ore and possible ore to be taken into consideration, and the "personal equation" of the engineer reporting enters into the calculations at this point. Some local mining men state that the company is over-capitalized and cannot earn 8 per cent. Unless the writer's memory fails him, Mr. Lyman A. Sisley, of the "Mining World," who follows these matters closely, has figured that the dividend-paying copper properties of the United States average in the aggregate about 5 per cent. net, so that

it is only fair to compare Granby capitalization on the same basis as the other big copper producers and not on an 8 per cent. basis. We could name several dividend-paying mines in this country that have not more than eighteen months' ore in sight. With these Granby compares very favourably. There is one thing certain, while the officials of the company may not be to blame, and that is that the stock was manipulated on the New York and Boston exchanges. If the insiders had been possessed of doubts they would have sold out quietly, and the thing came on too quickly to be a general rout of the average shareholders. While there are probably only three or four men who know the exact situation, we are inclined to be optimistic here and will have to be shown that all this gossip is true before believing. This company owns a block of ground in a widely mineralized district four miles long and two miles wide and a patch of this, 3,000 feet long and 1,500 feet wide, is all that has been worked so far. The report referred to above shows that it cost the Granby Company for that period $2.86 per ton to mine and treat its ore. It will be agreed that this is fairly low. The cost of copper produced, per pound, was 10.4 cents and the average price received was 13.139 cents. The balance sheet of the company, December 31st, 1909, read as follows: (Assets) Cost land, machinery, etc., $15,505,417; stocks and bonds, $994,822; supplies, $257,544; cash and copper, $801,284; total, $17,559,077. (Liabilities) Capital outstanding, $13,500,000; dividends held, $120,956; cash loan, $875,000; account payable, $97,152; advance on copper, $250,000; surplus, $2,715,969; total $17,559,077.

There is much activity in store for Nickle Plate camp, Hedley this season. The new Rand 2,300-foot compressor is now running smoothly and furnishing a full supply of air for all presen purposes. The 40-stamp mill is treating about 150 tons o ore per day, the mineral content being saved at present b means of amalgam plates, Frue vanners and the cyanide plant An Allis-Chalmers tube mill and a set of Deister tables, witl filter presses, etc., have been ordered, with a view to makin a better extraction. In order that the mining and millin plant of the Daly Reduction Company may be run all the yea round a steam auxiliary plant has been ordered. This will con sist of three 150 horsepower return tubular boilers, a 275 kilo watt generator and a 375 horsepower high speed engine. The generator may also be operated by water power, of which the company has a plentiful supply at certain seasons of the year Motors will be put in the mine and mill and the current from the power plant transmitted to points where it is needed. Much of the machinery in the mill is now operated by independent water wheels, which has resulted in a shut-down in the past when water was scarce. This will be overcome by means of the new plant, which will enable the company to work on a larger and more steady scale.

GENERAL MINING NEWS.

NEW BRUNSWICK.

St. John, N.B., April 16.—At a stormy meeting of directors of Disraeli Asbestos Company yesterday J. M. Healy, treasurer, resigned and two other St. John directors were asked to retire.

Mr. R. D. Isaacs has been away from the city three weeks, but his wife says she expects him back in two weeks.

On Thursday Roch. Gagne, L. A. Codere and F. X. Lebranche, accompanied by their legal adviser, W. Banks, B. F. Campbell and A. W. Warrell, who have considerable interest in the concern, arrived from Sherbrooke, and after holding several meetings and examining the books came to the conclusion that the interests of the shareholders demanded the resignation of Mr. Isaacs, as managing director, and other members of the board residing in St. John.

Their investigation revealed, it is said, the fact that the company, which is incorporated under the laws of the State of Arizona, had not taken out a license to do business either in New Brunswick or Quebec.

The directors declare that the shareholders had no particular occasion for alarm. The irregularities in regard to incorporation of the company could easily be straightened out, and its properties were undoubtedly valuable, and with energetic management could be easily made to yield large returns.

Headquarters will probably be removed to Sherbrooke.

ONTARIO.

Cobalt, April 15.—On the four hundred foot aerial tramway between the Temiskaming rock house and the mill the half-ton skips are now travelling regularly to the hundred ton concentrator on the rise above the Temiskaming and Beaver mines. All last week the mill was running, sometimes ten, sometimes twenty, stamps, but with the additional h.p. permitted, the whole battery of thirty stamps was running.

So far the results obtained have averaged up to tests. Much of the high grade ore that is now being brought to the surface is from the 350 foot level, and in the process of mining it, much low grade is taken out and is passed on to the mill.

Upon another tramway cars are running to the dump and returning to the rock house, where it is fed into the big crusher and passed through the screen, the undersize going directly to the skips and the mill, while the oversize passed to rolls. Nothing above three-quarters inch goes to the mill.

On the top floor of the mill the metallics are taken out in four trommels, three jigs and tables, and before it leaves 65 per cent. of the estimated extraction has been made.

The jig concentrates are running about 3,000 ounces, and the table concentrates between three and four thousand. The motors, both in the mill and the rock house, are now running smoothly, and since the addition of power the stamps have been falling regularly. From now the Temiskaming mill will treat in the neighbourhood of a hundred tons a day.

Sudbury.—The Mond Nickel Company has taken an option on the Mount Nickel locations, belonging to the Great Lakes Mining Company. Two diamond drills are now at work and it is hoped that the continuation of good ore will be found in depth.

The Canadian Copper Company is drilling in the same neighbourhood, between the Stobie and Frood mines.

Wabigoon.—Following are the officers of the Merger Mines, Limited, which is about to commence the development of the famous Laurentian mine in the Manitou:

President—E. E. Hedges.

Vice-President and Treasurer—J. P. Kaiser.

Secretary—John B. Corliss.

Directors—E. E. Hedges, J. P. Kaiser, John B. Corliss, E. R. Warner, and Carl Hoffman, all of Detroit with the exception of Hedges, who is a Boston man.

The capital is 3,000,000, in one dollar shares.

Mr. F. Hille, M.E., has been appointed consulting engineer and will have charge of organizing the forces at the mine.

The new company comes into control of 1,200 acres, which includes, besides the Laurentian, several other properties in great or less stages of development.

A force of men is now engaged in cutting wood and putting things to rights around the mine, though for the matter of that ever since the Imperial Bank closed down on the property it has been carefully looked after. Water was not allowed to accumulate in the shaft and work can be started just as soon as the organization of the working forces has been completed.

BRITISH COLUMBIA.

Nicola.—It is given out that the Nicola Valley Coal & Coke Company's mines at Middlesboro will shortly be producing 1,500 tons of coal daily. A progressive policy of development has been inaugurated and if the C. P. R. provides the cars the maximum output will shortly be reached. At present 300 men are employed, but this staff will steadily be increased.

Two new tunnels are now being bored which will give a greater coal area. These will be completed in a few weeks' time. The company has completed arrangements with Scottish and English capital for the installation of 1,000 coke ovens. The work will not be undertaken until the construction of the Kettle Valley Railway is well under way and there is assurance of early completion. The coke will be shipped to the boundary, where it is thought there will be a splendid market.

The new tunnel in No. 3, which is being built, will connect with No. 2. A new mine is being opened up in No. 1 mine.

In No. 5 mine a 5-foot seam was struck. It is claimed by those who know that it is the finest and cleanest coal yet struck in the camp, there being no indication of any rock whatever.

An electric plant is to be installed this summer which will run the whole works. This is particularly required to move cars from No. 2 tipple to No. 1 tipple. This plant will be sufficiently large enough to furnish Merritt with electricity if the citizens here desire such a much-needed improvement.

Nelson.—At the Mother Lode Mine, Sheep Creek, a promising vein was recently struck on the 300-foot level. The Mother Lode is controlled by Mr. John McMartin, formerly of the La Rose Syndicate.

YUKON.

White Horse.—The holdings of the Yukon-Pueblo Mining Company at White Horse have been purchased by the Atlas Mining Company. The latter company is organized under the laws of West Virginia. The stock is largely held in Spokane. The mine will in future be known as the Atlas.

MINING NEWS OF THE WORLD.

RUSSIA.

From the middle of January last until the present time there has been an almost complete absence of any illuminating oil at Batoum for export abroad and to the inner ports. Tank steamers are waiting in the port for weeks without any chance of their being loaded, as oil comes from Baku in exceedingly limited quantities. Instead of the usual 1,500 to 1,750 tons arriving daily through the pipe-line, scarcely 200 to 250 tons are pumped now. The main reason for this state of things is that the refiners are abstaining from sending their oil until the new reduced tariff comes into force.

NEW ZEALAND.

Wellington, 4th April.—The New Zealand gold output for March amounted to 36,449 ounces, valued at £142,841, as compared with 40,044 ounces, valued at £156,522, during the corresponding month of last year. The silver output for the month was 110,204 ounces, valued at £11,029, as compared with 204,008 ounces, valued at £20,343, during March, 1909.

SOUTH AFRICA.

A co-operative smelting works, of which the various mining companies on the Rand have become members, has been formed, which is likely to prove of considerable convenience to the industry. The blast furnace of the Robinson Gold Mining Company has been taken over, and alterations and additions are being made to enable the new company to begin smelting operations at once.

The Transvaal Coal Owners' Association has effected an arrangement whereby rate cutting has been abolished. The association laboured under the disadvantage that several important properties were not included therein, such as Messrs. Lewis and Marks' Vereeniging undertaking and the Witbank Colliery, the expanding outputs from which were a menace to those who were included in the combination. This amalgamation of interests has long been the desire of the leading financial houses, and we are informed that pending its completion Messrs. Eckstein held back a very substantial contract which has now been placed.

UNITED STATES.

New York, April 15.—Following an announcement yesterday of an increase in pay for employees of the United States Steel Corporation and its subsidiaries, Elbert R. Gary, chairman of the executive committee, made public this afternoon details of a plan for the relief of employees injured at work and the families of men killed. The plan will be put in operation May 1, for a year's test. The cost will be several millions a year and employees do not contribute.

For temporary disablement, single men will receive 35 per cent. of their wages and married men fifty per cent., with an additional five per cent. for each child under 16, and two per cent. for each year of service above five years. For permanent injuries lump payments are provided, based upon the extent to which the injury interferes with employment and the annual earning capacity of the victim.

Where employees are killed, their families will receive a sum equal to his wages for a year and a half, with an additional ten per cent. for each child under 16, and three per cent. for each year of service above five years. In case of injury a period of ten days must elapse before relief begins.

Goldfield, Nev., April 16.—General Manager J. R. Finley of the Goldfield Consolidated Mines Company has given out the following statement concerning the conditions at the big mill, which was damaged by fire last week:

"We hope to have the 80 uninjured stamps of the mill running in about 30 days, which is the very shortest possible time in which arrangements can be made to get ore into the mill. Practically all equipment has been ordered, and as fast as it comes in all the men that can be worked on reconstruction will be busy. A big force of men is now engaged in clearing away the wreckage where it is not too hot to handle. Of course there will necessarily be some curtailment of mining operations, but this is only on the ore extraction end. We have no place to put the ore now. But the force working on development will be largely increased. We will endeavour to find a place for every man employed by the company, and will use many of the men who are out of their regular work by the stoppage of the mill in helping clear away the debris and in reconstruction work."

Ely, Nev., April 13.—It is officially announced that the plant of the International Smelting & Refining Company at Tooele, Utah, will be ready to receive ores by about the middle of May. By that time, or not long thereafter, the Giroux Company should be able to ship high grade ore from the lower levels of the Alpha shaft if the management desires to do so.

Globe, Ariz., April 13.—The Detroit Copper Company has filed an answer to the complaint of the Mine & Smelting Supply Company, which charges the mining company with purchasing ore concentrates which infringe on the Wilfley patents. The answer is a general denial of all material allegations in the complaint of the defendants, stating that it has no knowledge that Arthur R. Wilfley was the first and sole inventor of the ore concentrator or that these improvements have gone into great and extended use and have displaced or superseded to a great extent all other apparatus and means for ore dressing by concentration. The company also denies that it purchased any concentrators containing and embodying the invention set forth in the complaint.

A showing also is made in the answer that the making and using of concentrating tables is an old and well known art patented and used in many forms before Wilfley's time and cites letters patent from that of Baran No. 35,197, granted in 1862, to that of Pike No. 586,534, in 1896, while the Wilfley patent was issued as No. 490,675 and was for "narrow and specific improvement in an old art."

The answer is signed by Robert S. Taylor, counsel for the defendant, E. E. Ellinwood, and W. K. Flora. Mr. Taylor is chairman of the committee on patent law of the American Bar Association, and has been retained by the Deister Concentrator Company to defend the suits brought against companies purchasing the Deister concentrators.

COMPANY NOTES.

CALUMET AND HECLA.

The report of the Calumet & Arizona Mining Company for 1909 shows total receipts of $5,054,664, as compared with $4,204,608 for the year 1908. Dividends paid amounted to $800,000, which was the same as in the previous year. Cash on hand at the end of 1909 was $813,360, as against $73,259 at the end of 1908. The company produced 27,630,050 pounds of refined copper in 1909, as against 28,048,329 in 1908. The average price received was a trifle over 13 cents a pound, as compared with a little less than 13 cents in 1908. The gold and silver produced during the year amounted to $211,760, as compared with $234,358 in 1908.

DIVIDEND ON KERR LAKE.

Kerr Lake directors on April 13th declared regular quarterly dividend of 25 cents per share, and 25 cents extra, payable June 15, to stockholders of record June 1.

PROFITS OF B. C. COPPER COMPANY.

The returns of the British Columbia Copper Company for January and February of this year, operating in the Boundary district, indicate net profits of $73,500 for the two months. The copper output was 1,339,707 pounds, with 15,151 ounces of silver and 5,073 ounces of gold. After crediting these gold and silver values the company was able to lay copper down in New York refined at a cost of less than eight cents per pound. The production follows:

	Jan.	Feb.
Copper, lbs.....	656,573	683,234
Silver, ounces	7,530	7,627
Gold, ounces	2,513	2,560

The returns from the smelter for the first three months of the year indicate approximately the same amount of ore reduced as in the corresponding months in 1909, but the gold and silver values have been running higher this year. It is expected that when ores from the Jackpot mine will be treated, a still greater increase in gold and silver values will be shown.

It is probable the work of enlarging the reduction works will commence immediately, increasing its capacity to about 3,000 tons per day. By the time the enlargement shall have been completed the company will likely have controlling representation on the directorate of the New Dominion Copper Company, whose mines are being got in readiness.

The McKinley-Darragh Cobalt Mine's report for the year ended December 31 last shows a total surplus of $120,687, an increase of $74,000.

ANNUAL MEETING DOMINION COAL COMPANY.

The Dominion Coal Company's annual meeting was held in Montreal on April 12th. President Plummer's statements were well received and no animus was shown.

In answer to questions Mr. Plummer gave it as his opinion that the merger would assuredly benefit shareholders in both companies.

After the report had been read and adopted, the President expressed his gratification at the fact that the new board had been able to accept the figures prepared by the old management without change. He also called the shareholders' attention to the fact that the falling off in the year's earnings was due entirely to the strike. He advised that the shareholders should not be discouraged by the report. They had a property in excellent condition, he said, and with established earning power. Only patience was needed, with present difficulties, before the company emerged from its troubles and entered once more upon a season of prosperity.

The company's real earning power, according to Mr. Plummer, should be based upon the earnings of the last previous unbroken year rather than upon that for the past year, when the company had been hampered and its output curtailed by serious difficulties. The policy of this new board would be to treat the shareholders with absolute frankness and to let them at all times know the exact facts.

The dispute with the Steel Company was referred to feelingly by the president who declared that he sincerely hoped that this would be the last time it was ever mentioned in an annual meeting of the Coal Co. There was a sum of $3,550,000 to be paid to the Steel Company under the decision. This was not dead loss but merely meant the repayment of a sum which had been held outstanding, and refunded when the decision was announced.

The strike was largely responsible for the heavy loss which had led to the bond issue.

Since the report had been issued two or three matters had taken up the Board's time. One was the question of the price which the Steel Company was to pay for the coal supplied. This had finally been fixed at $1.55 per ton. Mr. Plummer said that this price left a margin of profit above the cost of production.

One good result of the dispute was that the ground had been cleared and the companies were now on a definite working basis.

The normal output of the company at this time of year was 10,000 tons per day. This was the present output also. Later in the year the output increased considerably.

The total yearly output might easily be increased to 4,000,000 tons, and it was the aim of the board to accomplish this.

Whatever agreement might finally be made, the proposals would have to be submitted to both boards. The supposition had gained ground that the Steel Company could force the Coal

Company into a merger against the wishes of the Coal shareholders. Mr. Plummer pointed out that some forty or fifty thousand shares would have to accept the terms. He thought that this clause fully protected the Coal shareholders.

Many conditions there were that made it very difficult to come to an agreement. There was no way out unless both sides were prepared to give and take. Immense benefits would accrue to both companies if such an agreement became an accepted fact.

The earnings of both companies were substantial. The earnings of the Steel Company would no doubt be less in some years to come and also in other years would be more. The same thing was true of the Coal Company. The alliance of the two companies and the uniting of the earnings would have a balancing effect, the value of which could not be overestimated.

Mr. Plummer here made an interesting comparison of the two companies' assets. Excluding ore deposits, the values of which were very difficult to determine, the assets of the Steel Company are $20,000,000; of the Coal Company $12,000,000.

The new plants of the Steel Company would increase the company's earning capacity thirty per cent. On the other hand, there was to be considered the removal of the steel bounty and other depreciation, which would imply a loss for the Steel Company of from $225,000 to $230,000 yearly.

A resolution supporting the board in its determination to hold out against the demands of the U. M. W. A. in the strike was unanimously adopted. Mr. M. J. Butler, the general manager, presented some figures on the present conditions in regard to the strike. He was at the present time some 1,350 men short, but he was replacing these every day with new arrivals.

There were elected to the Board of Directors Col. James Mason, of Toronto, representing Toronto shareholders, and Sir William Van Horne, to represent the Steel interests.

STATISTICS AND RETURNS

INTERNATIONAL COAL COMPANY.

Shipments, March, 1910	22,115 tons.
Shipments, March, 1909	22,848 tons.
Decrease, March, 1910	733 tons.
Shipments, 3 months, 1910	59,283 tons.
Shipments, 3 months, 1909	60,911 tons.
Decrease, 3 months, 1910	1,638 tons.

ACADIA COAL COMPANY.

Shipments, March, 1910	19,630 tons.
Shipments, March, 1909	14,828 tons.
Increase, March, 1910	4,802 tons.
Shipments, 3 months, 1910	64,717 tons.
Shipments, 3 months, 1909	57,867 tons.
Increase, 3 months, 1910	6,850 tons.

INVERNESS RY. & COAL COMPANY.

Shipments, March, 1910	20,641 tons.
Shipments, March, 1909	7,021 tons.
Increase, March, 1910	13,620 tons.
Shipments, 3 months, 1910	59,468 tons.
Shipments, 3 months, 1909	26,412 tons.
Increase, 3 months 1910	33,056 tons.

NOVA SCOTIA STEEL & COAL COMPANY, LIMITED.

Shipments, March, 1910	29,218 tons.
Shipments, March, 1909	21,474 tons.
Increase, March, 1910	7,744 tons.
Shipments, 3 months, 1910	103,565 tons.
Shipments, 3 months, 1909	81,247 tons.
Increase, 3 months 1910	22,318 tons.

MARITIME COAL, RY. & POWER COMPANY.

Shipments, March, 1910	14,851 tons.
Shipments, March, 1909	8,540 tons.
Increase, March, 1910	6,311 tons.

B. C. ORE SHIPMENTS.

The ore shipments and smelter receipts for the week ending April 9th are well up to the average for the year. Appended are the details:

Boundary.

	Week.	Year.
Granby	24,432	355,885
Mother Lode	9,500	125,805
Oro Denoro	350	4,130
Snowshoe	3,114	52,790
Total	50,002	713,710

Smelter Receipts

Granby	24,432	356,005
Cons. Co.	9,566	141,315
B. C. Copper Co.	9,850	129,935
Total	43,848	627,255

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending April 15, and those from January 1, 1910, to date:

	April 15. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	62,650	585,178
City of Cobalt	.....	300,445
Chambers-Ferland	64,300	122,300
Cobalt Central	.....	205,186
Cobalt Lake	64,000	196,000
Cobalt Townsite	68,000	68,000
Colonial	.....	107,260
Coniagas	.....	434,096
Crown Reserve	83,800	1,591,370
Drummond	.....	664,200
Hargraves	.....	41,800
Hudson Bay	.....	123,695
Kerr Lake	238,444	2,157,523
King Edward	.....	134,506
La Rose	331,820	3,814,070

McKinley-Darragh	148,550	873,991
Nipissing	208,631	3,161,635
O'Brien		453,006
Peterson Lake		170,450
Right of Way		509,717
Silver Cliff		66,010
Temiskaming		238,300
Trethewey		254,650
Waldman		63,992

Ore shipments for week ending April 15 were 1,270,196 pounds or 635 tons.

Total shipments from January 1 to April 15 were 16,337,380 pounds, or 8,168 tons.

SHARE MARKET.

Courtesy of Warren, Gzowski & Co.

Miscellaneous.

	Bid.	Ask.
Amalgamated Asbestos	26½	
Dom. Coal, com	..	68½
Dom. Steel com	68¼	68½
N. S. Steel	..	82
Granby	48	49
Consol. Smelting	82	87
Crows' Nest Pass	..	86

Cobalt Stocks.

Amalgamated	.04	.05
Beaver Consolidated	.34	.34½
Buffalo	2.17	2.60
Chambers-Ferland	.31¾	.33½
City of Cobalt	.28	.29
Cobalt Central	.11	.12
Cobalt Lake	.27⅜	.27¾
Coniagas	5.50	5.60
Crown Reserve	3.23	3.26
Gifford	.08½	.09
Foster	.14	.19
Green-Meehan	.03½	.05
Great Northern	.08¾	.09½
Hudson Bay	104.00	109.00
Hargraves	.33¾	.34
Kerr Lake	8.65	8.80
La Rose	3.65	3.72
Little Nipissing	.23¾	.24
McKinley-Darragh-Savage	.92	.95
Nancy Helen	.07	.08
Nipissing	9.80	10.00
Nova Scotia	.36	.38
Otisse	.05½	.05¾
Peterson Lake	.22½	.23
Right of Way	...	...
Rochester	.17	.17½
Silver Leaf	.07¾	.08
Silver Bar	.06½	.07¾
Silver Queen	.10	.14
Temiskaming	.67⅜	.67½
Trethewey	1.35½	1.36
Watts	.09	.12
Ophir	.68 offered	
Wettlaufer	.95	1.02

New York Curb.

Boston Copper	18	20
Brit. Col. Copper	6¼	6½
Butte Coalition	21⅞	22½
Chino Copper	12¾	13
Davis-Daly Cop	2	2¼
Ely Consolidated	⅝	11/16
Gila Copper	6	6½
Giroux Mining	8	8¼
Goldfield Consol	8	8⅛
Green-Can	9	9¼
Harcuvar Copper	35	41
Inspiration Copper	7⅝	7 11/16
Miami Copper	23½	23⅞
New Baltic Copper	6¾ bid	
Nevada Con. Copper	20⅝	20⅞
Ohio Copper	3½	3 9/16
Rawhide Coalition	37	38
Ray Central	3	3 1/16
Ray Consolidated	18¾	19
Union Mines	1⅞	1 15-16
Yukon Gold	4⅜	4½

TORONTO MARKETS.

Metals.

April 20.—(Quotations from Canada Metal Co., Toronto.)
- Spelter, 5¾ cents per lb.
- Lead, 3.70 cents per lb.
- Antimony, 8 to 8½ cents per lb.
- Tin, 34.25 cents per lb.
- Copper, casting, 14.10 cents per lb.
- Electrolytic, 14.10 cents per lb.
- Ingot brass, 9 to 12½ cents per lb.

April 20.—(Quotations from Drummond McCall Co.)
- Summerlee No. 1, $23.50 to $24 (f. o. b. Toronto).
- Summerlee No. 2, $23 (f. o. b. Toronto).
- Midland No. 1, off the market.
- Coal, Anthracite, $5.50 to $6.75.
- Bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

April 15.—Connellsville coke (f. o. b. ovens).
- Furnace coke, prompt, $1.70 to $1.80 per ton.
- Foundry coke, prompt, $2.25 to $2.35 per ton.

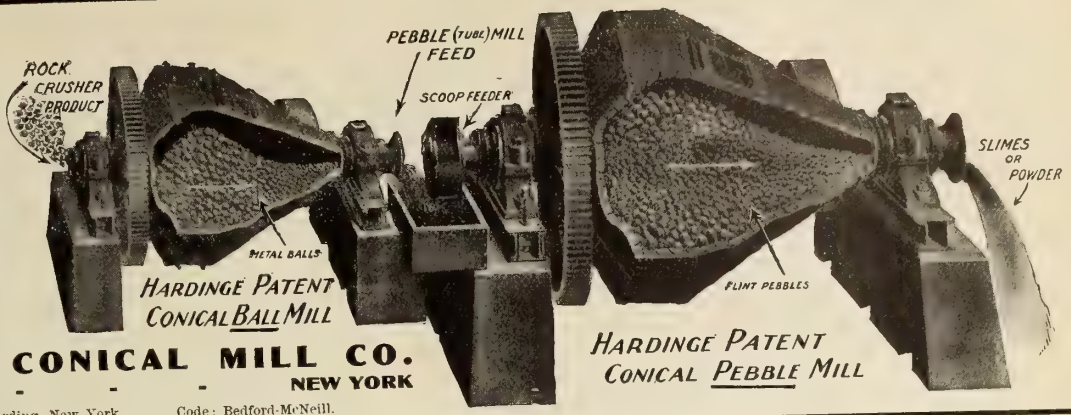
April 15.—Tin (Straits), 33.10 cents.
- Copper, prime lake, 13.12½ to 13.37½ cents.
- Electrolytic copper, 12.85 to 12.95 cents.
- Copper wire, 14.25 cents.
- Lead, 4.45 cents.
- Spelter, 5.60 to 5.70 cents.
- Sheet zinc (f. o. b. smelter), 7.75 cents.
- Antimony, Cookson's, 8.37½ cents.
- Aluminium, 23.50 to 24.00 cents.
- Nickel, 40.00 to 49.00 cents.
- Platinum, ordinary, $29.50 per ounce.
- Platinum, hard, $35.00 per ounce.
- Bismuth, $1.75 per lb.
- Quicksilver, $48 per 75 lb. flask.

SILVER PRICES.

	New York. cents.	London. pence.
April 7	52⅛	24
" 8	52¼	24 1/16
" 9	52½	24 3/16
" 11	53	24⅜
" 12	53⅛	24 7/16
" 13	53⅜	24 9/16
" 14	53¼	24½
" 15	53½	24⅝
" 16	53½	24⅝
" 18	53⅜	24 9/16
" 19	53⅜	24 9/16
" 20	53¼	24½

STEP REDUCTION
Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of."



HARDINGE CONICAL MILL CO.
37 Wall Street, - - - NEW YORK
Cable Address: Halharding, New York. Code: Bedford-McNeill.

NOTICE

STUDENTS EMPLOYMENT REGISTER,

The CANADIAN MINING JOURNAL has opened an employment register for students taking mining or metallurgical courses at Canadian Universities or Technical Colleges. Mine operators who wish to employ students during the summer months are requested to communicate with the Business Manager.

Students are requested to send in their names, along with brief records of experience. These will be filed and no effort will be spared on our part to place applicants in immediate communication with possible employers.

SAFETY — SPEED — SPLENDOR
CANADIAN PACIFIC RAILWAY CO'S
"EMPRESSES" of the ATLANTIC
FASTEST and FINEST in the Canadian Service

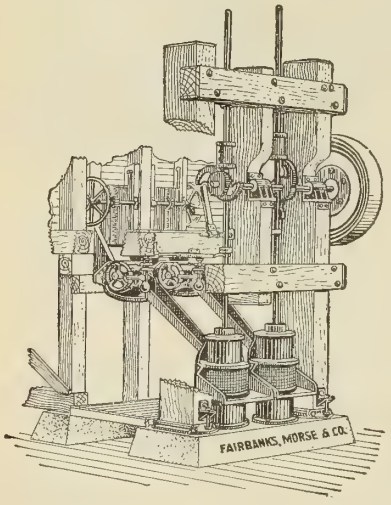


An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records between Liverpool and Canadian Ports
900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA
For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to
W. G. ANNABLE, General Passenger Agent, Board of Trade, MONTREAL

The Nissen Stamp

In Cobalt



NORTHERN CUSTOMS CONCENTRATORS, LIMITED.
COBALT, ONT., December 31st, 1909.

The Canadian Fairbanks Co., Toronto, Ont.

Dear Sirs :—

In answer to your enquiry regarding the Nissen Stamps supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one-inch hole.

The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening .018. With a coarser screen the tonnage would of course be larger.

The shoes and dies wear even, and the splash is well distributed over the screen.

The arrangements for keeping up the weight of the stamps are very good. I can recommend the Stamps.

Yours truly, (Sgd.) F. J. Bourne, Superintendent.

CATALOGUES AND DESCRIPTIVE PAMPHLETS UPON REQUEST.

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines

Montreal, Toronto, St. John, N.B. Winnipeg, Calgary, Vancouver.

Take Advantage of Several Specialists in One Organization.

¶ We analyse ores, minerals, metals and furnace products. Speed and accuracy are the features of our laboratories. We weigh, sample and assay lots for shippers. Let us represent you at Smelters and Refineries.

¶ Each department headed by a Specialist. We are fully organized to take entire charge of the technical work of mines or mining properties.

¶ Consult us about your mine equipment, your mill or your cyanide plant.

EXAMINATIONS AND REPORTS - - MINE MANAGEMENT

C. L. Constant Company

42 Broadway, New York City

Mining and Metallurgical Engineers, Analysts and Assayers.

CABLE ADDRESS: CHACONSTAN. CODES: WESTERN UNION, BEDFORD McNEILL.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining ngineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show gns of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a orough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
McGee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
42 Lawlor Building, Toronto

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
U. S. Headquarters:
61 Waldorf Court, Brooklyn, New York
Canadian Headquarters:
King Edward Hotel, Toronto, Ont., Can.
Geological Reconnaissances, Explorations and Examinations of Ore Bodies a Specialty
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. Sc
MINING ENGINEER
24 Adelaide St., West, Toronto, Can.
Cable Abmott Phone Main 5063

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers aad Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
EXAMINING AND REPORTING ON PROPERTIES A SPECIALTY.
Box K, Sudbury Box 990, Cobalt

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quernac, Toronto.

S. F. KAVANAGH
Assayer
Mining Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Civil Engineers.
Contractors. Assayers.
Mining Properties bought and sold.
Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont.
Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq.. Buffalo, N. Y.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

DOBBS & YOUNG
PROPERTIES LISTED and
INVESTMENTS DIRECTED
MINING BROKERS and CLAIMS AGENTS
Wire or write us for particulars to
Box 541, COBALT, ONT.
WATCH THIS SPACE

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

J. R. SPEARMAN, BOX 184, COBALT, ONTARIO

Real Photograph Post Cards of Cobalt and its Silver Mines at 75c. half dozen, $1.00 per dozen. Also, views taken of any mine desired. Write

J. R. SPEARMAN, BOX 184, COBALT, ONTARIO

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

EXPLOSIVES

Of Every Description

TRADE MARK — CURTIS'S & HARVEY LTD. LONDON — DRAGON BRAND

BEST QUALITY ONLY

Blasting Powder, Compressed Pellets, Dynamite, Gelignite, Gelatine Dynamite and Blasting Gelatine.
Cheddite will not freeze or etude.

Permitted Explosives for Gaseous Mines

Bobbinite has the largest sale of any Permitted Explosive.
Excellite, Kolax, Curtisite, Rippite, Etc., Etc.

Only makers of the Celebrated "Diamond ◆ Grain" Black "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

Manufactured by

Curtis's & Harvey, Limited

Head Office: 3, Gracechurch St., London, E.C.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

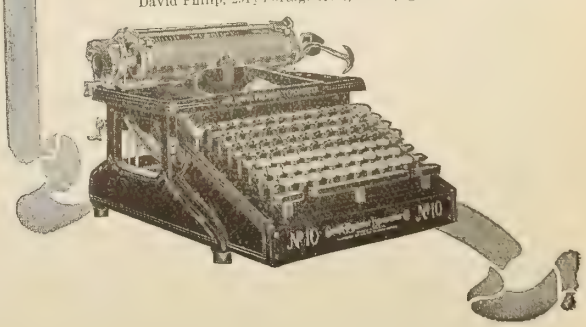
Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 201½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners

Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:

32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES

43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mir es. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

The Crow's Nest Pass Coal Co.

LIMITED

OFFICES

Manning Arcade, Toronto
Fernie, British Columbia

Gold Medal—Coal and Coke—Lewis & Clark Exposition, 1905.
Silver Medal—Coal and Coke—Paris Universal Exposition, 1900.

Mines and Coke Ovens at Fernie, Coal Creek, Michel and Carbonado.

Annual Capacity of Mines, 2,000,000 tons. Coke Ovens, 500,000 tons.

We are shipping domestic coal to points in Manitoba, Alberta, Saskatchewan, British Columbia, Montana, Washington and Idaho, a territory of over 400,000 square miles, and WE ARE GIVING SATISFACTION.

We are shipping steam coal from Winnipeg to the Pacific Coast, and not only is it used in that vast area by the Railways and the largest firms, but also by the Great Northern Steamship Company's liners plying between Seattle and the Orient.

Our Michel Blacksmith coal is used in Railway forging shops in Winnipeg, seven hundred miles East, and in Vancouver, four hundred miles West.

Ask a British Columbia smelter Superintendent what coke he uses, and what coke gives him best satisfaction.

Our Analyses Speak for Themselves.

CHAS. SIMISTER, General Superintendent.

J. D. HURD, General Manager.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.
BRAUN'S Modern Laboratory Appliances.
WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MIMERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1.00.**

DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **1.50** paper cover; **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of those books in their library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ackroyd & Best, Ltd xii
Allan, Whyte & Co. v
Asbestos Mfg. Co., Ltd.....outside B.C.
Astley, J. W. xix
American Diamond Rock Drill Co.xvi

B

Bateman & Brown.....xix
Beatty, M., & Sons, Ltd. ix
Bazzanger, Jacques & Co.....xi
Belliss & Morcom, Ltd i
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons. xv
B. C. Assay and Chemical Supply..... xxvii
Behrend Concentrators Ltd..... xi
Brown A. H. xx
Bruce Peebles.....viii

C

Canada Metal Co..... ix
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Curtis & Harvey, Ltd.....xxiii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xxiii
Canadian Fairbanks Co. Ltd ... xviii
Crabtree.... xiv
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks....xxiv
C. L. Constant Co.....xviii
Cobalt Electric Equipment Co., Ltd.....xiv

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus.....iv
Dominion Coal Co., Ltd. xv
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables.....iv
Davis, John & Son..... .. xvi
Dessau's, S. Sons..... .. vii
Deloro Mining & Reduction Co...xxiv

E

Evans, J. W.....xix

F

Fleck, Alex., Ltd. xii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.... ..v

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii
Hardinge Conical Mill Co.....xvii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. ii
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C. xx
Laurie & Lamb i
Lymans Ltd.....,xii
Link Belt Co. xi
Leckie, J. Edwards xx
Ledoux & Co xx
The Lancashire Dynamo and Motor Co., Ltd..... xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel:...xxix
Montreal Steel Works xxxi
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxvii
Nova Scotia, Province of.....xxvi
Nissen Stamps.....xviii
Northern Canada Supply Co. Ltd..xiv

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros.....vi, vii, x
Patterson Mfg. Co. i

Q

Quebec, Province of xx

R

Robb Engineering Co. i
Ryckman, Kerr, MacInnes & Mahon x

S

Sullivan Machinery Co. i
Standard Diamond Drill Co.....xi
Stanley, W. F., & Co., Ltd.....x
Smart-Turner Machine Co., Ltd. xv
Scott, O. N. x
School of Mining xxii
Simpson, Robert, Co., Ltd., Inside Back Cove
Standard Explosives, Ltd., Back Cove
Smith Premier Typewriter Co....xxi
Smith, Thos. & Wm. Ltd xxi

T

Tyrrell, J. B. x
Toronto University xxvi

U

United Typewriter Co,. Ltd x

V

Vandeleur & Nichols..... vii

W

Waterous Engine Works Co..... v
Walker Bros. v
Willmott, A. B. x
Ways Pocket Smelter Co. ...xxvi
Wetherill Separating Co..... xiv

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST. JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despat If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertis kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings (Diamond —
Montreal Steel Works, Limited
Peacock Bros.

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Peacock Bros.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Ore Sacks—
Canadian Bag Co.

Pneumatic Toools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

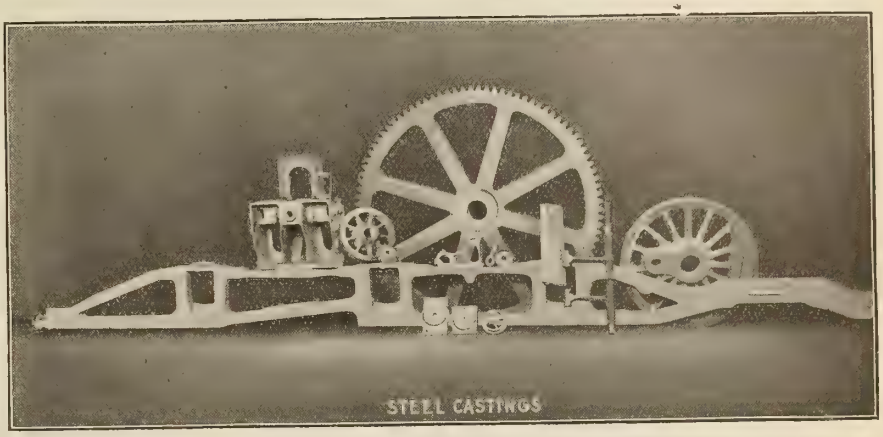
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

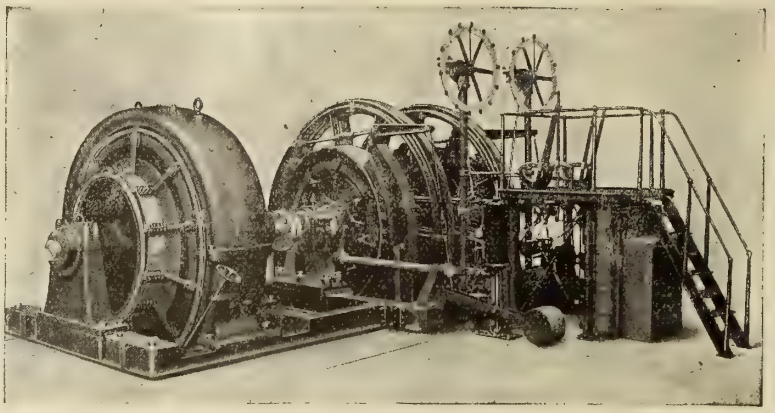
"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.



We illustrate the Hecla Mining Company's Hoisting Plant at Burke, Idaho, one of the largest of its kind and a good example of

The Westinghouse Equalizer Hoisting System

Some particulars of the installation follow:

The hoist motor is a Westinghouse 450 h. p., 600 Volt, 60 R.P.M. Direct-Current Motor, which obtains its power through a Westinghouse Fly-Wheel Motor—Generator Set, consisting of a 450 h.p., 2300 Volt Type H. F. Induction Motor, a 30,000 lb. Fly Wheel and a 450 K. W., 600 Volt, Direct Current Generator. The normal duty of the hoist is 6,000 lbs. unbalanced load; maximum speed 2,000 R.P.M. ultimate depth of shaft 2400 feet.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
252 St. James Street, MONTREAL.
92 Hollis Street, HALIFAX.

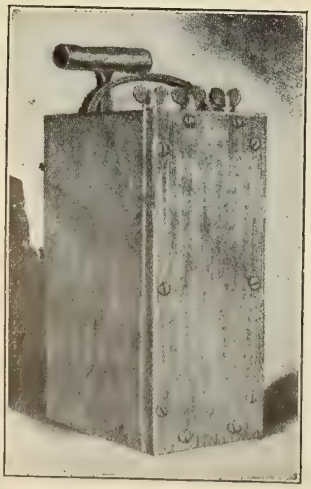
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

The Greatest Tent Value Ever Offered in Canada!

$9.90



$9.90.

This is a photographic illustration of our

SPECIAL CAMPER'S TENT.

which is made of 8-ounce duck with double sewn seams and re-inforced strain points.

Notice the outside lacing of the Ridge.

This means a top that is both storm and insect-proof, and it is the most satisfactory arrangement for attaching the tent to a ridge rope (stretched between trees) when the utmost portability is desired, using no poles.

Dimensions	Height	7 feet
	Length	12 "
	Width	10 "
Height of Walls		3 "

Complete with guy-ropes

$9.90

(If poles and pegs are desired, they will be supplied for 95c. extra.)

THE ROBERT SIMPSON COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE

ASBESTOS MANUFACTURING COMPANY

LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

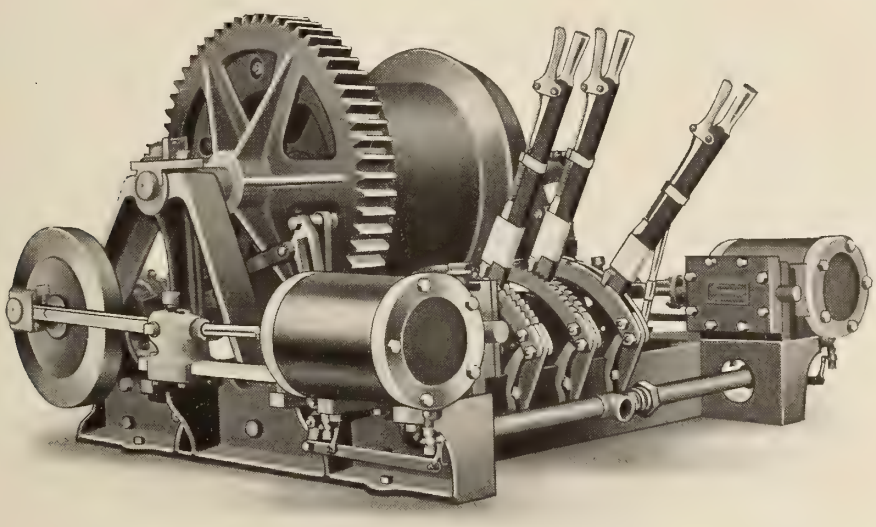
THE CANADIAN MINING JOURNAL

L. 31 TORONTO No. 10

IN STOCK

SMALL MINE HOISTS

Let us send you Catalogues and Prices.



We also stock Pumps, Buckets, Cars, Rails, Drill Steel, Fuse, Picks, Shovels, Chain Hoists, Etc.

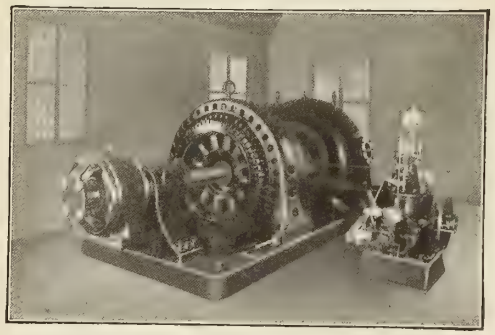
MUSSENS LIMITED

MONTREAL, 318 St. James St. | TORONTO, 73 Victoria St. | COBALT, opp. Right of Way Mine | WINNIPEG, 259-261 Stanley St. | CALGARY, Crown Bldg. | VANCOUVER Mercantile Bldg.

ELECTRIC POWER

FOR

MINING OPERATIONS

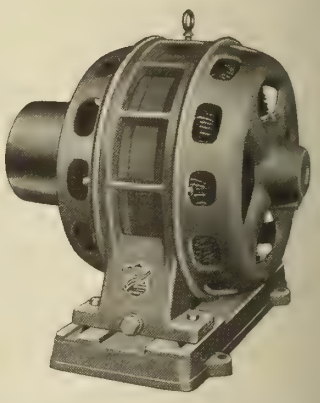


HYDRO-ELECTRIC PLANTS.

360 H.P. Water Wheel and 250 K.W. Alternator, with auxiliary apparatus built by Allis-Chalmers-Bullock Ltd.

Electric drive is the most convenient and the easiest available power for mining operations. We are the only firm in Canada which builds complete hydro-electric plants including water wheels, generators, transformers and all auxiliary apparatus.

Our induction motors are designed to withstand hard usage and are especially suitable for driving rock crushers, stamp mills, crushing rolls, hoisting engines, tube mills, turbine pumps, jigs, vanners, etc.



A RELIABLE MOTOR.

ALLIS-CHALMERS-BULLOCK

LIMITED

WORKS - - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

FAN ENGINES
FOR MINE VENTILATION

BUILT BY

BELLISS & MORCOM
BIRMINGHAM ENGLAND

The largest single ventilating set in Great Britain, consists of a Belliss Tripple Expansion Engine direct coupled to a 154" Fan, installed at the Cambrian Collieries, South Wales.

SOLE CANADIAN AGENTS

LAURIE & LAMB
ENGINEERS

211-212 BOARD OF TRADE BUILDING, - - MONTREAL

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

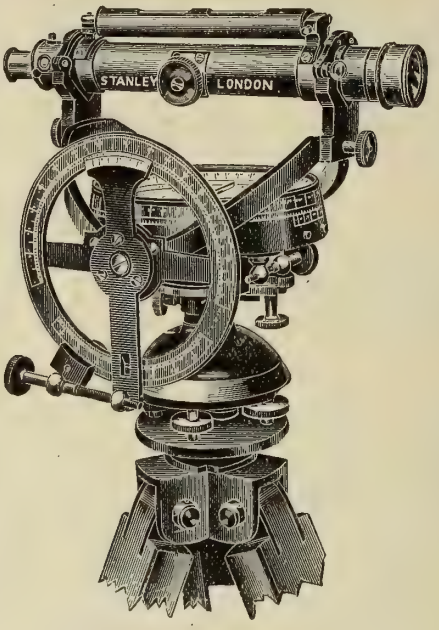
For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

STANLEY, LONDON



Combined Mining Dial, Level, and Theodolite

The Largest Manufacturers of Surveying and Drawing Instruments in the World Please send for our J65 Catalogue, &c. (post and duty free) and compare our prices with those of other first-class makers.

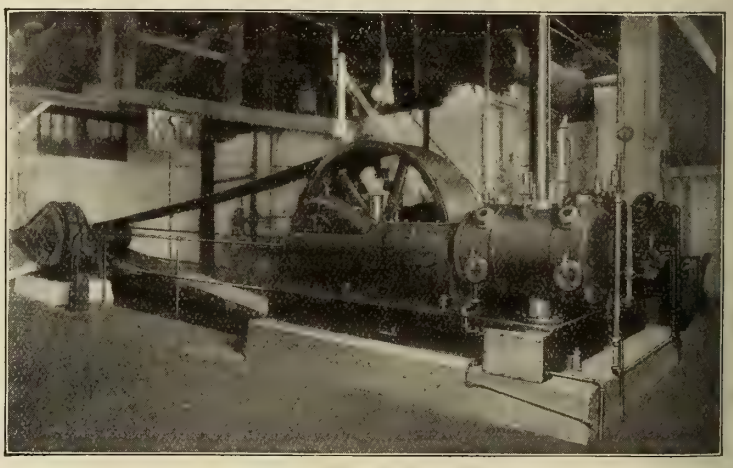
TRADE STANLEY MARK

W. F. Stanley & Co.
LIMITED

Great Turnstile, London, England

Air Compressors of "Class"

You can rely on Sullivan compressors to run quietly and smoothly, to run at the highest efficiency attainable with given types and conditions, and to run all the time, because Sullivan Standards of engineering and workmanship insure nothing less than the best service. They are compressors of "Class."



Sullivan Class W J Compressor, Duplex, Belt Driven.

CATALOG 658

Diamond Drills **Coal Cutters** **Hammer Drills** **Channelers** **Rock Drills**

Sullivan Machinery Co.

BIRMINGHAM
BUTTE
DENVER
JOPLIN
KNOXVILLE
NEW YORK
PITTSBURG

CHICAGO, ILL.
CLAREMONT, N. H.

PARIS, FRANCE
ROSSLAND
ST. LOUIS
SAN FRANCISCO
SALT LAKE
SEATTLE
SPOKANE
SYDNEY, AUS.

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE

CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed wtth Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

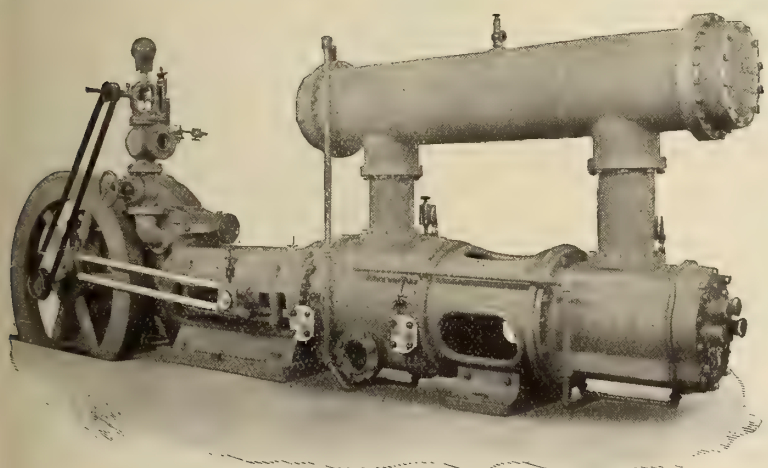
Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

Address nearest office to-day.

PATERSON MANUFACTURING COMPANY, LIMITED,
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Simple Steam Compound Air Compressors



A Straight Line Design with power applied to load in the most direct, positive manner, with the minimum of friction, fewest parts and utmost simplicity.

An ideal machine for the mine, strong, rugged, self-contained with large air output and economical steam consumption.

Ask for our new pamphlet, K-83.

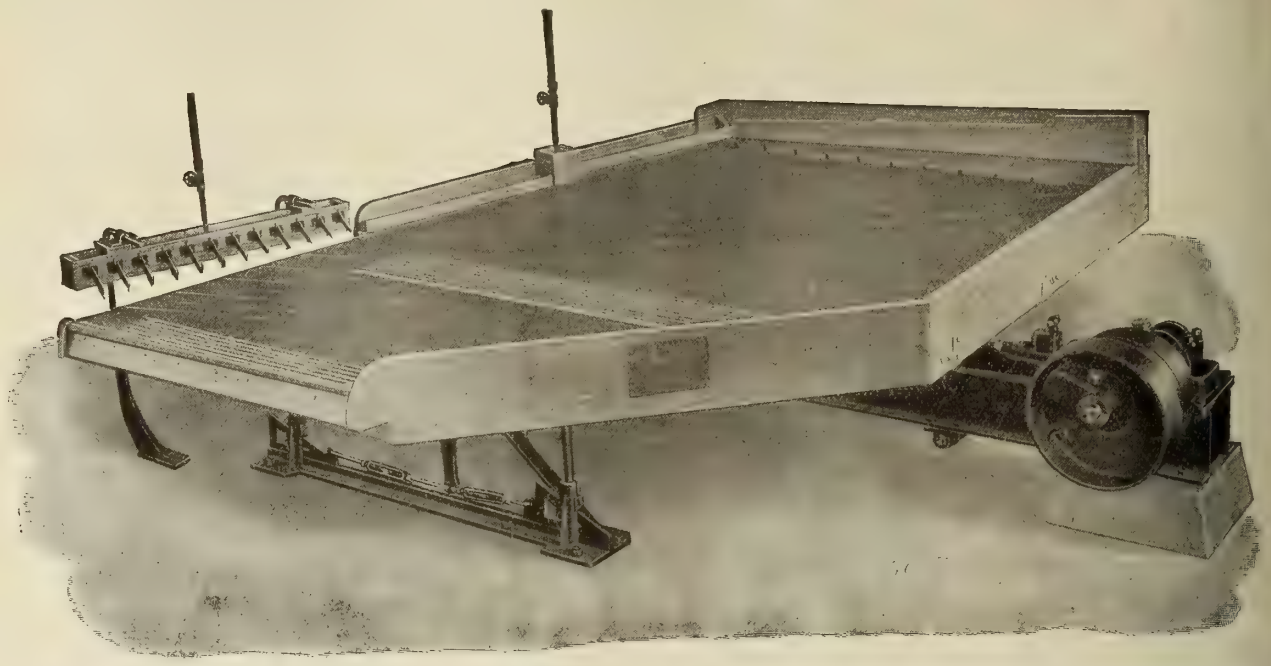
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO. COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the msrket—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noisless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

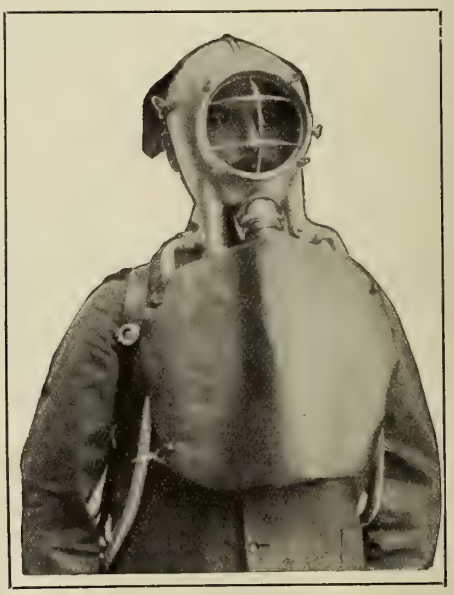
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON

70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

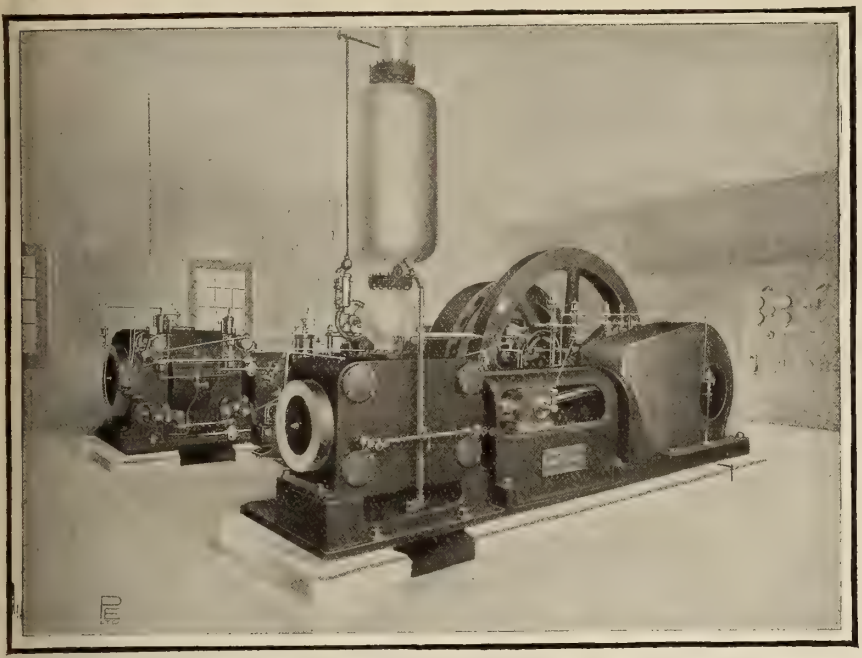
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



POWER PLANTS FOR MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

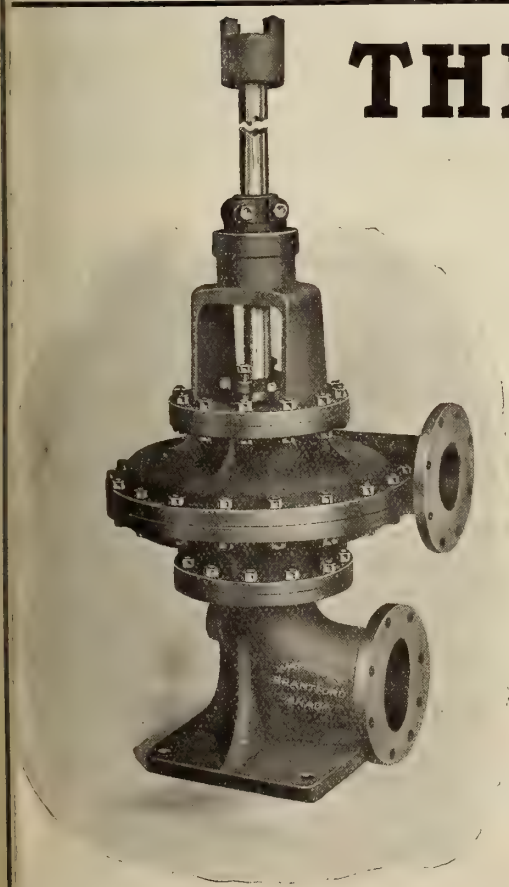
WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.



THE BEST PUMP

for use in Mine Drainage, because it is built for just this work.

Compact—Simple—Durable.

These three characteristics are combined in such a way that the Pump can be readily handled, easily operated and will withstand the hard usage it is subjected to without breaking down.

Built for wet or dry pit work, this Pump is particularly adapted for Vertical Motor Drive. Runners and all working parts of the best material and of specially strong design.

Built in sizes up to 14" discharge opening, in both Vertical and Horizontal types.

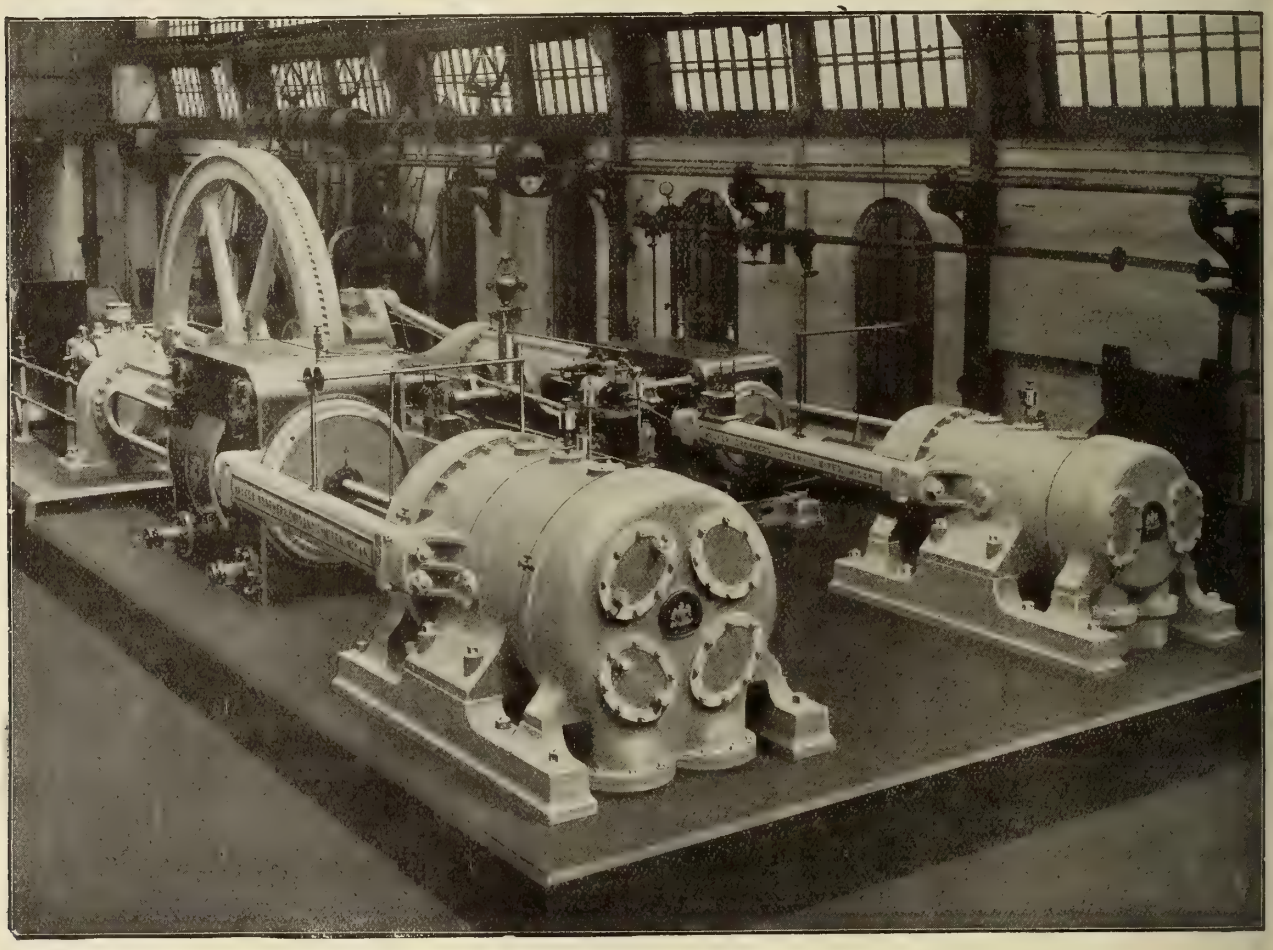
Fully described in Bulletin 200.
Send for it.

The Waterous Engine Works Co. Ltd.

BRANTFORD, CANADA.

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

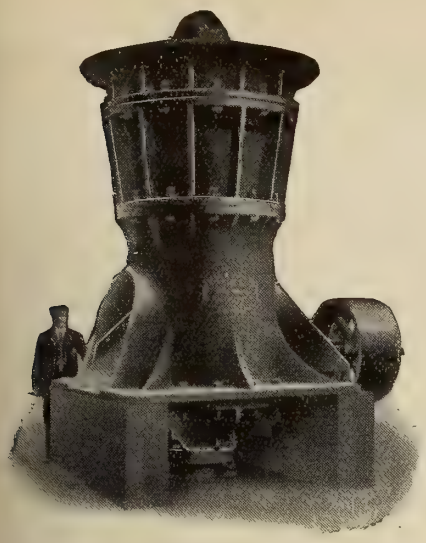
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jacks Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

lucluding
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

COAL MINING MACHINERY

Revolving Tipples, Screens, Picking Belts, Chutes, Car Hauls, Complete Plants Designed and Built, Mine Cars, Hoists, Pulleys, Transmission Machinery and Conveyors.

Correspondence Solicited

THE BROWN MACHINE COMPANY, Ltd.

ENGINEERS

NEW GLASGOW = NOVA SCOTIA

STRONG, LIGHT, RELIABLE.

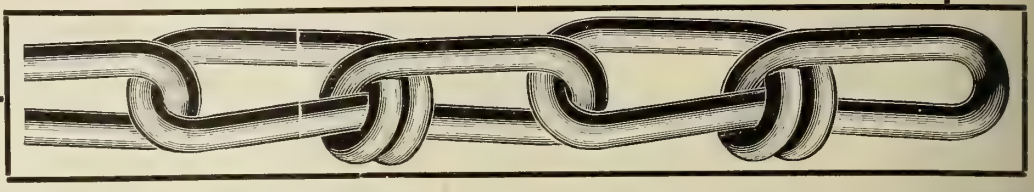
These are the qualities you require in any chain used in your business. And they are the very qualities that have built up an enormous demand for

GREENING'S STEEL WIRE CHAIN

Greening chain is perfect in mechanical construction. It is made from Hard Drawn Steel Wire—drawn and tested in our own plant. It would pay you to get our Catalogue.

THE B. GREENING WIRE CO., LIMITED

Hamilton, - Ontario
Montreal, - Quebec



NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

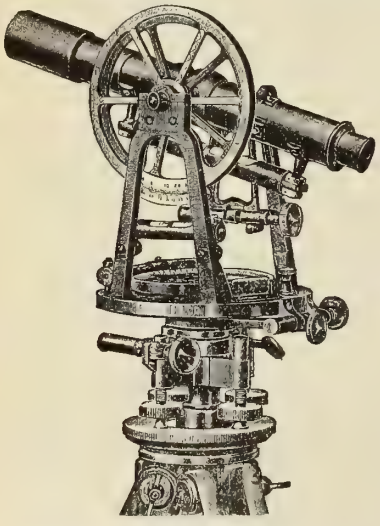
Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

Our Light Mountain and Mining Transit



The 4½in. horizontal limb is graduated to ½ degrees, on solid silver and is read by two double opposite verniers to single minutes; the circle has two rows of figures.

The vernier openings are at an angle of 30° to line of sight. The compass needle is 3ins. long, variation ring with index point, and the vertical circle 4½ins diameter and is protected with an aluminum guard. The erecting telescope is 7½in. long, has a magnifying power of 16dia., is provided with dust guard over object slide and a 4in. sensitive level.

Weight of instrument 5½ pounds, Weight of light extention tripod with thumb nuts 5 pounds.

Eugéne Dietzgen Co.

Limited

MANUFACTURERS OF

FIELD INSTRUMENTS

For Civil, Mining Engineers and Land Surveyors

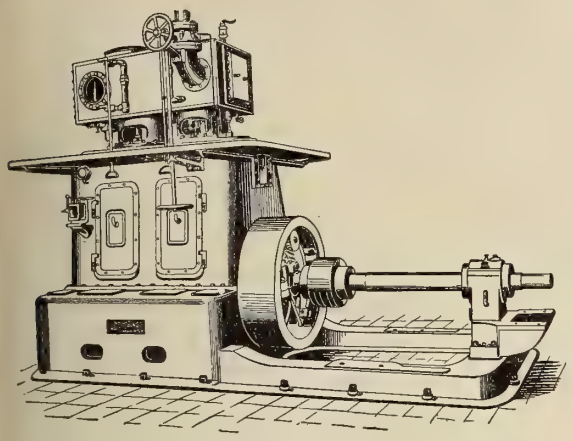
Draughtsmen's and Engineers' Supplies

Catalogue Sent on Request

Eugéne Dietzgen Co., Ltd.

10 Shuter Street, - Toronto, Ontario

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

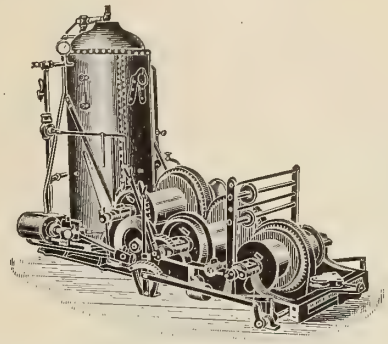
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.
Sole Canadian Maker Williams "Faivrette" Clams
Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.
BRIDGES
TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds
BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



LEAD
COPPER
ANTIMONY
TIN

We Manufacture
The Most Complete Line of
Babbitt Metal
In the Dominion

Write for Illustrated Circular and Price List.

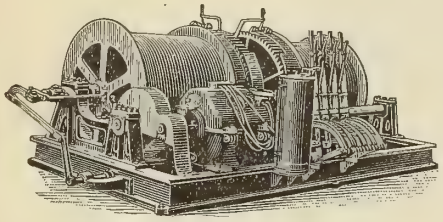
THE CANADA METAL CO., LIMITED, - TORONTO

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

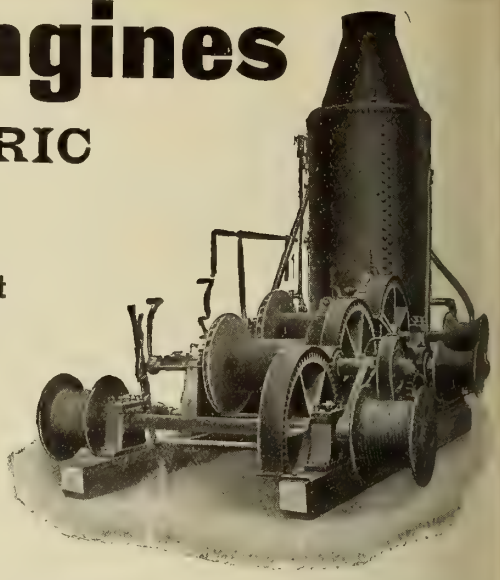
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
I. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 a.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

TROUT FISHING

CANADIAN PACIFIC RAILWAY

Season opens May 1st.

NOW IS THE TIME TO PLAN A SPRING FISHING TRIP

Commence by securing 1910 Copy

"FISHING AND SHOOTING" AND "SPORTSMAN'S MAP"

Also literature descriptive of Canada's Fishing Grounds, best reached by

CANADIAN PACIFIC RAILWAY

WRITE FOR ILLUSTRATED LITERATURE AND ALL INFORMATION TO

R. L. THOMPSON, - - District Passenger Agent, - - TORONTO

Behrend System of Concentration

DRY -:- WET

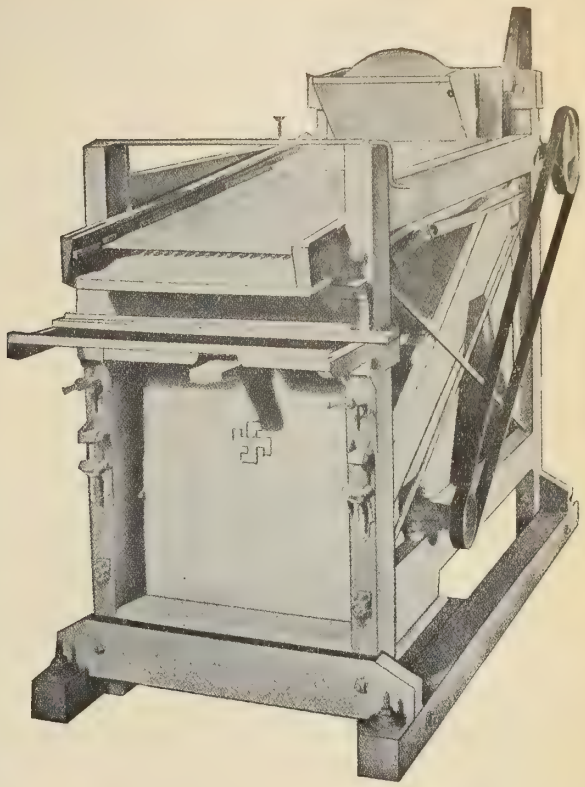
For all ores and minerals.

Highest recovery on slimes.

Send sample of ore for preliminary test to

Behrend Concentrators, Limited

48 Inspector Street, Montreal





Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scrantan, Pa. - -	314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - -	710 Torrey Bldg.
Denver, Col. - -	225 E. Maple St.

When wanting goods write nearest office.

The Davis Handbook

OF THE

Cobalt Silver District

By H. P DAVIS.

ILLUSTRATED WITH PHOTOGRAPHS

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 PAPER COVER $2.00 STIFF COVER

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

A New, Complete and Authoritative Treatise.

Cyanide Handbook

By J. E CLENNELL.

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid.

Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

CONTENTS

Part I. General.

Introduction.—I. Early History of the Cyanide Process. II. Outline of Operations in the Cyanide Process.

Part II. Chemistry.

I. Cyanogen and its Compounds with Non-metals. II. Simple Metallic Cyanides. III. Metallic Compounds of Complex Cyanogen Radicals. IV. Chemistry of the Dissolving Process. V. Chemistry of the Precipitation and Smelting Processes. VI. Manufacture of Cyanide.

Part III. Preparatory Treatment of Ore for Cyaniding.

I. Crushing Machinery. II. Grinding Machinery. III. Mechanical Handling of Material for Cyanide Treatment. IV. Hydraulic Classification, Separation and Settlement of Slimes. V. Amalgamation and Concentration.

Part IV. The Dissolving Process.

I. Percolation. II. Agitation. III. Filtration by Pressure and Suction. IV. Handling of Solutions.

Part V. The Precipitation and Smelting Process.

I. Zinc-Box Construction and Practice. II. Clean up of Zinc-Boxes. III. Acid Treatment and Roasting of Precipitate. IV. Fluxing, Smelting and Refining of the Precipitate.

Part VI. Special Modification of the Cyanide Process.

I. Direct Treatment after Dry or Wet Crushing. II. Crushing with Cyanide Solution. III. Roasting before Cyanide Treatment. IV. Use of Auxiliary Dissolving Agents. V. Electrolytic Precipitation Process. VI. Other Precipitation Processes. VII. Treatment of Cupriferous Ores.

Part VII. Assaying.

I. Sampling. II. Assay of a Typical Siliceous Ore. III. Roasting III. Special Methods of Assay for Particular Ores and Products. IV. Assay of Gold and Silver Bullion.

Part VIII. Analytical Operations.

I. Analysis of Ores and Similar Siliceous Material. II. Analysis of Bullion and other Mainly Metallic Products. III. Analysis of Cyanide Solutions after Use in Ore Treatment. IV. Analysis of Commercial Cyanide. V. Analysis of Sundry Materials.

Part IX. Metallurgical Tests.

I. Density Determinations. II. Alkali Consumption Tests. III. Screening and Hydraulic Separation. IV. Concentration and Amalgamation Tests. V. Cyanide Extraction and Consumption Tests. VI. Useful Formulae.

BOOK DEPARTMEMT

Canadian Mining Journal

Confederation Life Bldg., Toronto.

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Safest and Best Quality.

BALANCES

CRUCIBLES

CRUSHERS

FURNACES

SCORIFIERS

BONE ASH

BORAX

LITHARGE

C. P. ACIDS

CHEMICALS &c.

Laboratory Apparatus of every description.

LYMANS, LIMITED.

ST. PAUL STREET, MONTREAL.

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

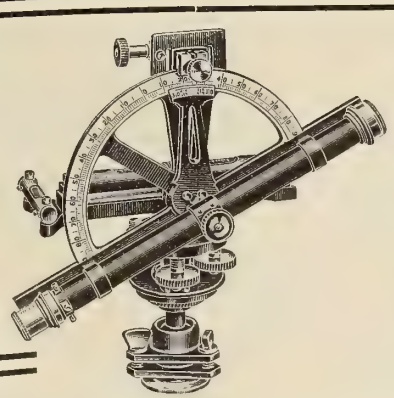
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Hayes' Mining Level

Specially designed for accurate levelling and for taking angles of inclination in mines. Equipped with a ball and socket motion for rapid levelling—can be levelled anywhere in 15 seconds. A great time-saver and invariably accurate. With telescope attachment or sights.

A well-built and minutely accurate instrument with advantages too numerous to explain herein.

Catalogue F sent free.

Joseph Casartelli & Son

Scientific Instrument Makers

43 MARKET STREET

MANCHESTER, ENG.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co., Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS. MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

T. H. CRABTREE

Member of Canadian Mining Institute

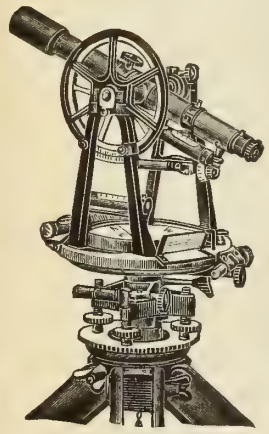
DEALER IN ASBESTOS

Inspector of Shipments for Foreign or Home buyers.

Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager. Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.

BLACK LAKE

Cable address "Crabtree" Black Lake
A. B. C. code 4th edition



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

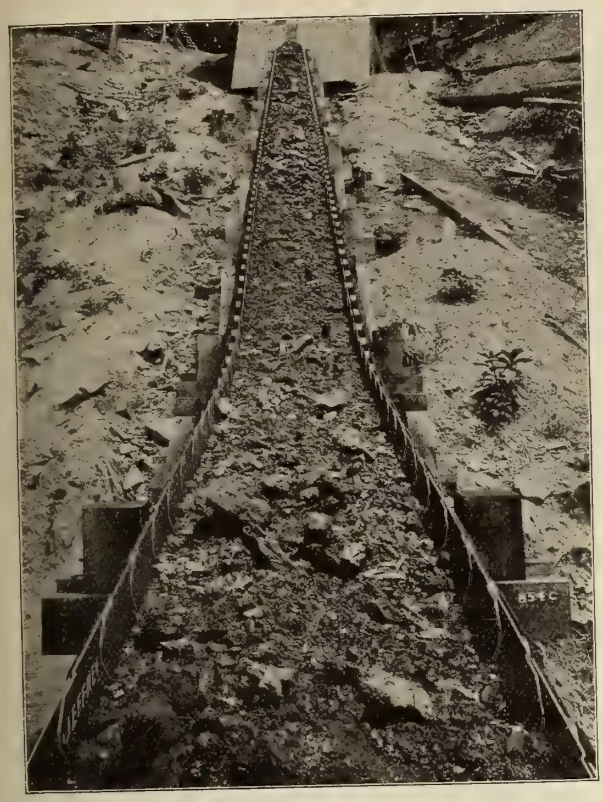
Address P.O. Box 196

Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.



JEFFREY
Retarding Conveyers

are the best means of delivering coal from upper to lower tipple without breakage. We have Conveyers of this type in operation handling from 50 to 500 tons, distances as great as 1150 ft.

Descriptive Catalogue 67

WE BUILD

Complete Coal Mine and Tipple Equipments

including

Electric Locomotives, Coal Cutters, Drills, Car Hauls, Coal Washeries, Screens, Crushers, Fans, Cages, Pumps, Hoists, Elevators, etc.

General Catalogue 81

THE JEFFREY MFG. COMPANY

COLUMBUS, OHIO, U.S.A.

Canadian Office and Works, Cote and Lagauchetiere Sts., Montreal
Toronto Office, Room 6, Dineen Bldg. Temperance Street

THE

Bennett Fuse

Crown  Brand

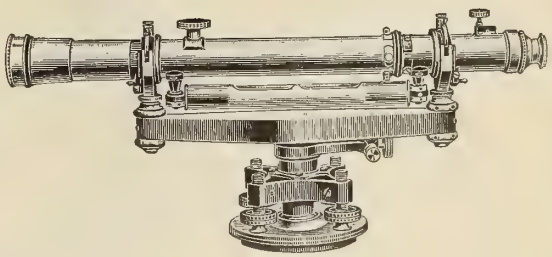
MANUFACTURED BY

William Bennett, Sons & Co.
CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.
VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION.



K & E

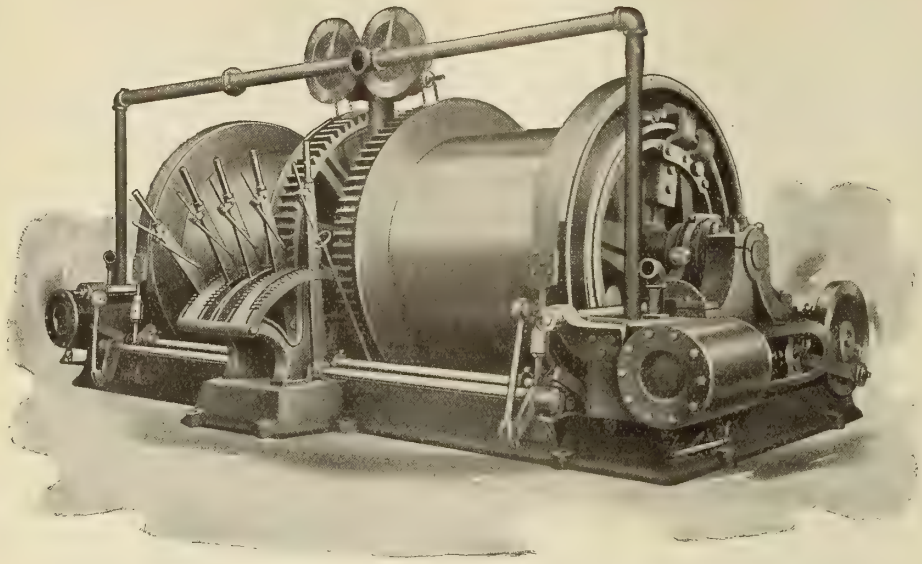
Transits and Levels

Give thorough satisfaction. Discriminating engineers select them on account of their accuracy, convenience and general reliability.

Send for our 550-page Catalogue, listing every requisite of the engineer for field or office.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

When answering Advertisements please mention THE CANADIAN MINING JOURNAL.



When desired we equip our winding Engines in the larger sizes with the Lane Friction.

This device possesses great strength and adapts a Hoist to the heaviest class of work.

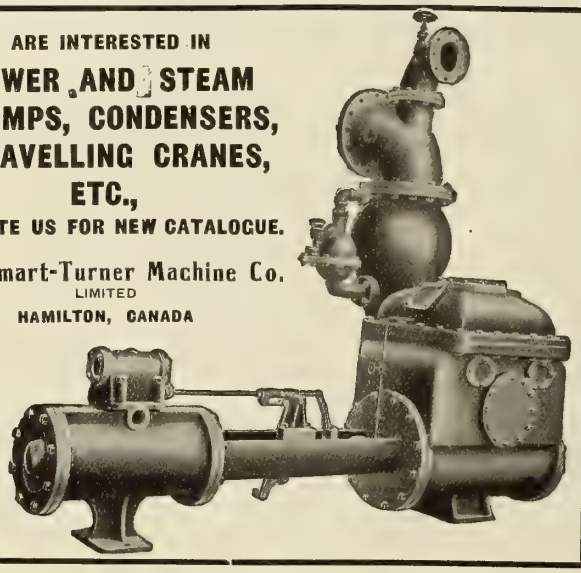
WE STOCK THE SMALL SIZES.

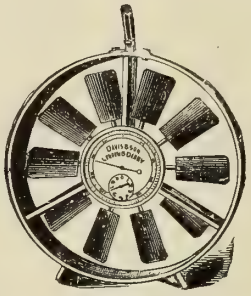
ARE YOU INTERESTED

The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland
Works: Sherbrooke, Que. St. Catharines, Ont.

IF YOU ARE INTERESTED IN
POWER AND STEAM PUMPS, CONDENSERS, TRAVELLING CRANES, ETC.,
WRITE US FOR NEW CATALOGUE.
The Smart-Turner Machine Co.
LIMITED
HAMILTON, CANADA





DAVIS

ANEMOMETERS
WATER GAUGES
HYGROMETERS
(STOCK AT MONTREAL)
SEND FOR CATALOGUES

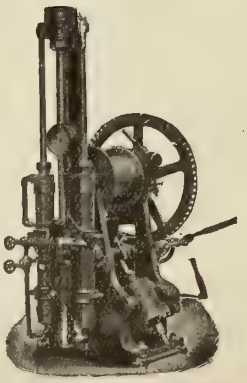
PEACOCK BROTHERS
68 BEAVER HALL HILL
MONTREAL

Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY
9 WEST ST. NEW YORK



LUDWIG NAUEN
HAMBURG & LONDON
IMPORTER AND DISTRIBUTOR OF
ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, May 15, 1910 No. 10

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials	289
(a) The King	289
(b) The McKinley-Darragh-Savage Report	289
(c) Conservation and Common Sense	290
(d) The Timmins Sample Car	291
(e) Editorial Notes	291
Personal and General	291
The McKinley-Darragh-Savage Mines of Cobalt, Limited	292
The Elements of Slime Concentration, by Walter McDermott	299
Our European Letter	303
Koppers' By-Product Coke Ovens at Birmingham, Alabama	305
The Porcupine Gold District, by Hamlin Brooks Hatch	306
Electric Motor Driven Mine Hoists	308
Correspondence	309
The Geological Survey Field Parties	312
Sand Filling of Stopes	312
Special Correspondence	313
General Mining News	316
Mining News of the World	317
Company Notes	318
Statistics and Returns	319

THE KING.

When on the evening of Friday, May 6th, the news reached Canada that King Edward VII. had passed away, incredulity was succeeded by dumb sorrow. The blow was cruelly sudden—so sudden, indeed, as to be dazing.

Now the whole Empire over which Edward the Peacemaker ruled so well is plunged in sincerest grief.

Canadians have special reasons to revere the memory of King Edward. During his peaceful reign Canada has prospered as never before. Our industries have flourished. Our commercial life has expanded most notably. In all respects we are a stronger, more united, and infinitely more confident nation than we were ten years ago.

In large measure King Edward's unfailing tact, clear judgment, and strength of character made possible our progress during the last decade. A less wise monarch might have sanctioned the popular clamour for war. Fortunately for us, the monarch whose death we lament devoted all the prestige of his high office and all his rare personal abilities to the cause of peace.

Canadians will ever remember with unchanging affection the brief reign of King Edward VII. His successor, King George V., may confidently count upon Canada's unswerving loyalty.

THE McKINLEY-DARRAGH-SAVAGE REPORT.

Not altogether illuminating is the usual mine manager's annual report. Not infrequently the manager regards his report as a superfluous duty that can readily be scamped. He writes a page or two of disjointed narrative with a few figures interspersed—and sighs a sigh of relief.

To many competent managers writing is an affliction. To others it is a means of disguising thought. All too rare is the manager who writes fully and appropriately the record of his year's work.

The report under consideration is a model. It is concise, interesting, informing. It is suitably illustrated. No important detail is omitted. The arrangement is logical. In brief, the McKinley-Darragh-Savage report is as nearly as possible just what a report should be. Before glancing at a few of its more striking features we must proffer our congratulations to Mr. P. A. Robbins, the general manager, to whom the credit of authorship is due; and to the company, whose directors are sufficiently enlightened to authorize the relatively large expenditure that such a report implies.

Mr. Robbins opens his report with a general tabular summary of silver produced and silver shipped during the past four years, and a general statement of costs for the year 1909. We notice that a total of 2,722,992.64 ounces of silver has been produced in the period 1906-1909, inclusive. As set forth under "Expenditures for Operations," the total cost per ounce of silver produced is 17 cents—a very creditable figure in view of the limiting conditions that affect the McKinley-Darragh. Under "Operations," Mr. Robbins includes all costs for shaft sinking, timbering, cross-cutting, raising and other development work. If these items were charged to capital expenditure as development, and this is the usual practice, the cost per ounce would be reduced to 14 cents. Mr. Robbins' method is to be commended.

A particularly interesting table is that giving itemized marketing costs. Of the five items—consular fees, insurance, freight, sampling, and smelter charges—the last is by far the heaviest, amounting to 4 cents per ounce. The total marketing cost is 5.3 cents per ounce.

The estimates of ore reserves, 110,300 tons, containing 5,725,000 ounces, are given in round numbers. Here Mr. Robbins avoids the meaningless refinement of arithmetic whereby reserves are estimated down to the odd ounce or even to a fraction of an ounce.

In dealing with the accidents that occurred during the past year, a careful classification as to causes is followed; and the resulting injuries are specified. This is not only sound engineering practice, but it is also good citizenship. Were this policy followed by all Canadian mine managers, there would be fewer accidents.

The extent and distribution of underground work Mr. Robbins sets forth fully. The amount of stoping is reported in cubic yards. The amount, also, of trenching is reported.

Commenting upon the character of the rock, the manager states that a man and helper in one shift of nine hours, using a 3 1-8 inch drill, will drill 25 to 30 feet in conglomerate, 30 to 35 feet in lower Huronian measures, and from 35 to 45 feet in slates, all holes being about five feet deep. The average charge of powder is about 2.1 pounds of 60 per cent. dynamite. The number of holes required for breaking a face, 5 feet 6 inches by 7 feet, varies from 9 to 13, according to the rock, the conglomerates being the toughest.

The mining, milling, and general charges are carefully analyzed. The wage schedule is given. We note that $2.25 per day is the lowest rate obtaining. Drill runners are paid $3.25 per day. The cost of supplies, such as meat, coal, lumber, and dynamite, appears on page 11.

Following this general information, the work done in each vein is stated, and provisional estimates of the reserves on each are furnished.

We could readily continue culling from Mr. Robbins' report, but space will not permit. Many items of interest we must be content to omit. Our readers will find the report reproduced almost in its entirety on other pages of this issue.

The coloured maps, the diagrams, plans, and tables imply an immense amount of labour. The general text gives evidence of a critical choice of words and more than usual facility in condensation. In fact, Mr. Robbins has begun and ended his task with the clear intention of telling his directors and shareholders everything that they have a right to know. And he has succeeded in doing this within most reasonable limits.

We sincerely hope that our readers, especially those readers who happen to be mine managers, will study thoroughly the McKinley-Darragh report. Time thus spent will not be lost.

CONSERVATION AND COMMON SENSE.

On several occasions we have emphasized the fact that our sympathies are strongly with the work of the Conservation Commission. The desirability of educating the nation up to a point where ruthless waste of nature's bounties will be looked upon as a crime is beyond question. But so far as we have been able to observe, the personnel of the Commission leaves much to be desired.

In the first place, the Commission is not composed of men who possess first-hand knowledge of the resources to be conserved, or, rather, to be used economically. Lumbermen, farmers, and miners are, naturally, the persons who respectively possess the most intimate knowledge of the three basic industries. Yet not one of these industries is represented on the Commission. We should like to know the reason for this. Are lumbermen, farmers, and miners not to be trusted? Are they uniformly robbers and plunderers? Or are they ignorant children who, forsooth, must be led by the hand?

In one other respect the Commission must be criticized. The word "conservation" has become a shibboleth. The unthinking take it for granted that the present generation is the only one that has attacked the problem of utilizing properly the country's natural wealth. This, of course, is far from the truth. The fact is that "conservation" is merely a new label. In Canada, for instance, the Geological Survey and other Government bureaus have been engaged in the work of collecting and disseminating information for the last sixty-five years. And much of this information has had to do, either directly or indirectly, with various phases of conservation. The records and reports of the Geological Survey, for instance, constitute an almost exhaustless mine from which the Conservation Commission cannot do better than draw.

As we have remarked above, "conservation" is merely a new label. In all essentials the lumberman, the farmer, and the mining engineer (we mention these classes merely for illustration) have been and are becoming more and more the exponents of practical con-

ervation. Every improvement in lumbering, farming, nd mining implies a definite addition to the wealth of he nation. Every method devised for the utilization f waste products, such as sawdust, mechanical fertiliz-rs, slag, creates new wealth and postpones the final lepletion of our sources of raw material. In other words, our workers, our engineers, are essentially conservers.

We must conclude, therefore, that the Commission must guard against ineffective teaching or preaching; and must recognize that its real end is to supplement the efforts of others by giving timely and proper publicity to facts, figures, and ideas that are not available to the masses. Another important function, one that the Commission is not at present qualified to perform, is the promotion of restrictive legislation. Unless the membership of the Commission be made more representative, any attempt to formulate new laws will be utterly vain.

THE TIMMINS SAMPLE CAR.

It is by no means an easy matter to place in its proper light the meaning of a sample, whether that sample be made up of a few pounds of ore or consists of one or more carloads. Other things being equal, we are apt to accept results obtained from large samples more readily than those obtained from small lots of ore. However, mere bulk is no guarantee of accuracy.

The Porcupine gold fields are much in the public eye at present. Among the pioneers of Porcupine were the Messrs. Timmins and Dunlop. These gentlemen, by the way, signalized their confidence in Porcupine by paying a very large cash price for certain claims. From workings on these claims there was recently taken a sample carload of ore. The entire car of ore was crushed, sampled, and assayed by competent specialists in the United States. The assay value of the ore is reported as being $202.75. This, of course, is most gratifying. But there is distinct danger of overemphasizing this particular assay report.

While we do not doubt in any way the "bona fides" of the men who took the sample, yet there is every likelihood that the carload was, to some extent at least, selected ore. The taking of an absolutely fair sample is neither a simple nor an easy matter. Very few men, indeed, are qualified by experience, or fitted temperamentally, to undertake the sampling of a gold-bearing vein. But, granting that the announced results are probably too high to be really representative, yet there is ample reason for encouragement. The fact that a carload of such rich ore could be secured in restricted workings and with no conscious effort on the part of the samplers to select the rich and reject the lean, is a pleasant surprise.

EDITORIAL NOTES.

The Yukon dredging season has had the earliest opening on record. Dredge No. 1 of the Canadian Klondike Company was put in commission on April 27th. Water is plentiful. Everything points to a prosperous year.

PERSONAL AND GENERAL.

Mr. S. N. Graham is paying a professional visit to Cobalt.

Mr. R. W. Brigstocke has been elected a member of the Institution of Mining and Metallurgy.

Mr. R. G. Drinnan has been engaged to examine and report upon coal lands on Graham Island, Queen Charlotte, B.C.

Mr. Martin Nordegg has returned to Toronto. For the last four months Mr. Nordegg has been travelling through Egypt and Turkey.

The sympathy of our readers will be extended to the veteran editor of the Transactions of the Canadian Institute, Dr. George Kennedy, whose wife died on Friday, May 6th.

Mr. J. B. Tyrrell has been elected president of the Canadian Institute, the oldest scientific society in Canada. The Canadian Institute was organized in 1849. Among the former presidents were Sir William Logan, Sir Henry Lefroy, Sir John Beverly Robinson, Hon. G. W. Allan, and Sir Sandford Fleming.

A special coal dust experiment station is used by the Vienna Committee on Fire-Damp for studying mine explosions. A masonry gallery 964 feet long has an arched roof about 7 feet high, increasing slightly in height toward the outer end, and is covered with earth varying in depth from 6 1-2 feet at the outer end to 70 feet over the explosion chamber. This chamber, forming the inner end of the gallery, is of concrete, 6 feet high, 6 1-2 feet long, and 4 1-2 feet wide. Racks of shelves for coal dust are placed at intervals along the gallery, and apparatus is provided for testing measures for preventing and limiting explosions, such as wet zones, water sprays, and zones of stone dust. The flame produced by an explosion is measured by matches placed along the gallery at intervals of forty inches. Loosely corked bottles, filled with water, are suspended bottom up about 35 feet from the explosion chamber, and strings attached to the nearest shelves draw the corks when the shelves are moved by an explosion. In this way the bottles are emptied of water, samples of gas from the explosion taking its place, ready for chemical and other examination.

The market for Baku petroleum covers Central Russia and the East. Maikop, the newly-discovered oilfield, will probably supply Western and Southern Russia and may export its oil for foreign consumption.

In the Maikop oilfields bluff exposures of oil-bearing strata, sometimes 150 feet vertical measurement, are covered with soft asphalt, the result of oxidation of the exuding petroleum.

There are 9,700 stamps in commission in the Transvaal. The number of gold producers is 68.

THE McKINLEY-DARRAGH-SAVAGE MINES OF COBALT LIMITED.

ABSTRACT OF GENERAL MANAGER P. A. ROBBINS' REPORT FOR THE YEAR 1909.

[Editor's Note.—Mr. Robbins' report has been so carefully compiled and presents so many facts, not only concerning Cobalt, but also of interest from the mining engineer's standpoint, that we have thought it well worth while to reproduce the greater part of it in these columns.]

OUNCES OF SILVER PRODUCED.

	1906	1907	1908	1909	TOTAL TO JAN. 1, 1910
McKinley-Darragh,	42673.07	706543.48	653590.38	1235340.37	2638156.30
Savage,			22654.82	62181.52	84836.34
TOTALS,	42673.07	706543.48	676245.2	1297530.89	2722992.64

OUNCES OF SILVER SHIPPED.

	1906	1907	1908	1909	TOTAL TO JAN. 1, 1910.
McKinley-Darragh,	42673.07	632983.48	701611.2	1265505.37	2642773.12
Savage,			17432.82	59403.52	76836.34
TOTALS,	42673.07	632983.48	719044.02	1324908.89	2719609.46

EXPENDITURES FOR OPERATIONS.*

	INSURANCE, TAXES AND MISCELLANEOUS.	LABOR.	SUPPLIES	TOTALS.	COST PER OUNCE PRODUCED
Administration and Management				$32,657.90	$0.0246
Operations, McKinley-Darragh,	$6777.58	$96,322.10	$48,443.20	151,442.88	0.1143
Operations, Savage,	381.10	28,279.55	13,117.44	41,778.09	0.0322
Prospecting,		2,719.24	337.53	3,056.77	0.0024
TOTALS,	7158.68	$127,320.89	$61,898.17	$228,935.64	$0.1735

Under "operations" are included all costs for shaft sinking, timbering, cross-cutting, raising and other development work. If these items were charged as development and included under the head of "Plant," our operating costs would be reduced to approximately $185,000 and the cost per ounce would be $0.1426.

MARKETING ORE.

Ounces of Silver Shipped, - - - - - - 1,324,908.89

	MARKETING COSTS.	COSTS PER OUNCE
Consular fees,	$101 40	$0 00032
Insurance,	328 25	
Freight,	12177 10	0 00942
Sampling,	4440.50	0.00335
Smelter Charges,	53070 50	0 04005
TOTALS,	$70417 75	$0 05314

Average Value.

No. I Ore	3662.44 ozs. per ton.
Jig Concentrates	2176.04 ozs. per ton.
Sand Concentrates	957.85 ozs. per ton.
Slime Concentrates	294.03 ozs. per ton.
Gross value of silver shipped	$679,813.0
Gross value per ounce	$0.513094
Production cost per ounce	$0.173199
Marketing cost per ounce	0.053149
Total cost	$0.22634
Net profit per ounce	$0.28674

Expenditures for plant extensions have amounted t

	LABOR.	SUPPLIES.	TOTALS
McKinley-Darragh,	$16183.98	$30356.31	$46540.29
Savage,	2553.71	2829 87	5383.58
TOTALS,	$18737.69	$33186.18	$51923.87

Further analyses of costs will be found in the fo lowing pages, included in the reports on the respectiv properties.

Reduction in Costs.

The year 1910 will see our working costs reduced m terially. With a cheap source of power available, larger production of ore from McKinley-Darragh, th Savage emerging from a phase of development to on of steady, profitable production, and a more settle condition of affairs generally, the results are certai to be congratulatory.

Ore Reserves.

Our ore reserves have been increased by the year work, and in the following reports you will find the estimated as at January 1st:

McKinley-Darragh . 100,000 tons carrying 4975000 oz
Savage ..... 10,300 tons carrying 750000 oz
Total ....110,300 tons carrying 5725000 oz

Prospecting.

During the year our prospectors located a numbe of claims at Gow Ganda and Shining Tree. We hav a controlling interest in eleven claims, upon one which showings of native silver have been found, an upon several others smaltite and cobalt bloom.

McKinley-Darragh	Tons	Ounces	Value	Treatment Charges	Arsenic Penalty	o/o not paid for	Freight	Refining	Total Debits	Net Return
Nuggets	·673	13,305·60	6,861·26	339·46			9·00		348·46	6,512·80
#1 Ore	135·172	494,981·59	253,047·90	1089·27	1,037·46	13,19·432	1,619·94	247·490	19,415·89	233,632·01
Jig conc	178·124	386,149·13	198,561·81	1,424·99	1,677·20	9,928·09	2,232·63	1,930·74	17,193·65	181,368·16
Sand "	276·402	264,476·12	135,961·75	2,245·31	426·58	6,798·09	3,450·55	1,322·38	14,242·91	121,718·84
Slime "	235·025	70,212·09	36,170·35	1880·24	2·06	1,808·52	3,015·35	351·06	7,057·43	29,112·92
Miscel	122·002	36,380·84	18,552·26	906·18	34·21	1,328·56	1,007·33	101·64	3,377·92	15,174·34
Total	947·348	1,265,505·37	649,155·33	7,885·45	3,177·51	33,057·58	11,335·00	6,180·72	61,636·26	587,519·07
Savage										
#1 Ore	23·658	51,840·91	26,822·03	189·26	228·71	1341·10	269·51	254·45	2288·03	24534·00
Screenings	65·170	7,512·61	3,835·70	521·37		191·78	872·59	37·56	1,623·30	2,212·40
Total	88·828	59,403·52	30,657·73	710·63	228·71	1,532·88	1,142·10	292·01	3911·33	26,746·40
Grand Total	1,036,226	1,324,908·89	674,813·06	8,596·08	3,406·22	34,590·46	12,477·10	6,477·73	65,547·59	614,265·47

Accidents.

Two fires occurred during the year, i e., No. 3 Shaft ouse at the Savage, and the Hungarian quarters at IcKinley-Darragh.

No serious accidents occurred to machinery or plant.

It is with regret that I report three fatalities which ave marred the year's work, all on McKinley-Darragh.

Besides these fatalities there have been a number of inor accidents, which have been catalogued—first, according to causes; second, according to resulting inuries.

Summary of Injuries.

njuries to head and face—16 cases (including 4 cases of eye injuries).
njuries to hands—15 cases (3 cases entailing loss of digits.)
njuries to feet and ankles—5 cases.
njuries to body—4 cases.
njuries to limbs—3 cases.

Typhoid.

Although Cobalt and the camp in general suffered reatly during the autumn from a severe epidemic of yphoid, we were extremely fortunate in not having a ingle case develop upon either the McKinley-Darragh r Savage claims.

Smallpox.

One case of small pox occurred on McKinley-Darragh, having been brought in by an arrival from England. An isolation camp was built under the Medical Health Officer, and the spread of the disease prevented. All costs in connection with the matter were met by us, neither the town nor township contributing.

General.

The character of the ground may be somewhat judged from the following notes:

Using a 3⅛-inch drill, a man and helper in one shift of nine hours, when working on company account, drifting or crosscutting, will drill from 25 to 30 feet in conglomerate, 30 to 35 feet in lower Huronian meameasures, and from 35 to 45 feet in slates under the swamp, all holes approximately 5 feet deep.

The average charge of powder is approximately 2.1 pounds of 60 per cent. dynamite per hole.

The number of five-foot holes required for breaking a face, 5 ft. 6 inches by 7 feet varies from 9 to 10 in the Swamp drifts, 10 to 12 in lower Huronian, and 11 to 13 in the tougher conglomerates of the Blind Vein.

With two faces to work in, so that the drill runners do not have to do their own mucking, one drill working 13½ shifts per week, will, in that time, advance from 18 to 20 feet in conglomerate, 22 to 24 feet in lower Huronian, and 25 to 35 feet in slates.

The foregoing figures represent what is considered fairly good work upon the part of our men.

Monthly Production of Shipping Ore and Concentrates for year 1909

Month	Nuggets		#1 Ore		Concentrates Fig		Concentrates Sand		Concentrates Slime		Miscel.		Total	
	Tons	Ozs	Tons	Ozs	Tons	Ozs	Tons	Ozs	Tons	Ozs	Tons	Ozs	Tons	Ozs
January	·002	3753	27·182	80893·24							83·449	20,005·80	110·603	100,926·57
February			1·000	400·00	8·500	1529·05	2400	3,000·00	2000	666·53	4·050	2,400·00	17·950	25,964·58
March	·124	2514·25	3·803	15,100·40	14·089	28627·58	14·658	21,381·85	7·026	2,113·27			39·710	69,737·35
April	·074	1730·88	8·849	30,589·01	14·354	34,034·60	23·656	20,820·29	14·626	5,05·772			61·559	92,252·50
May	·084	2038·19	16·161	37,489·51	19·734	46,114·61	29·545	29,457·53	22·185	6,726·46			87·759	141,855·30
June	·075	1,480·47	13·951	48,441·39	15·652	31,428·95	35·052	26,674·74	43·670	10,669·09			108·400	118,694·64
July	·064	759·44	4·204	15,330·25	17·845	32,492·31	23·579	24,614·11	21·489	7,60769			66·579	81,305·80
August	·058	1000·00	13·600	59,840·00	19·578	47,230·15	29·864	29,158·23	26·697	9,09033	6,050	2,05600	95·848	148,374·71
September	·070	1375·81	7·402	32,657·24	20·404	42,508·00	37·691	33,044·21	25·221	7,858·43	4,100	1,500·00	94·888	118,943·79
October	·028	528·00	11·947	5974	19·456	41,122·63	29·016	28,361·29	33·017	8693·21	4·300	2,128·00	97·764	131,478·86
November	·090	1826·00	8·668	38,155·32	17·700	41,582·10	30·040	28,680·20	31·925	9,300·00	3·253	1600·00	91·676	124,143·62
December	·007	66·03	4·235	22,340·00	13·411	31,010·15	23·415	22,009·67	31·961	8,678·36	2·500	780·004	75·259	85,284·20
Total	·676	13356·60	120·972	455981·59	180·124	391,949·13	278·966	267,202·12	259·825	76,390·09	107·702	36469·84	948·265	1,235,349·37
On hand Jan 1 1909	·003	44·00	15·000	42000·00							15·000	6,100·00	30·003	48,194·00
Total	·679	13450·60	135·972	497981·59	180·124	391,949·13	278·966	267,202·12	259,826	76,390·09	122·702	36,569·84	978·268	1,283,543·37
Shipped	673	13305·60	135·172	494481·59	178·124	386,149·13	276·402	264,476·12	235·028	70,212·09	122·002	36,380·84	947·398	1,265,505·37
On hand Jan 1 1910	006	145·00	·800	3,000·00	2·000	5,800·00	2564	2,726·00	24·800	6178·00	700	189·00	30·870	18,038·00

COSTS OF PRODUCTION AT McKINLEY-DARRAGH.

	TOTAL.	PER TON OF ORE MINED.	PER TON OF ORE MILLED	PER OUNCE OF SILVER PRODUCED.
Insurance, Taxes and General Charges, - -	$28541.48	$1.6965	$1.5260	$0.0231
Mining, - - - - - - - - -	85767.08	5.0979	4.5857	0.0694
Milling, - - - - - - - - -	37134.32	2.2072	1.9854	0.0300
TOTALS, - - - - - -	$151442.88	$9.0016	$8.0972	$0.1226

Ore hoisted from mine during year.....16824 tons.
Ore milled .....18703 tons.
Ounces of silver produced.....$1,235,349.37

During the year approximately 10,000 tons of waste rock have been hoisted from the mine. Including this tonnage with the tonnage of ore, the costs work out:

General charges.....$1.064 per ton of rock
Mining .....3.197 per ton of rock
Assume Milling .....1.30 per ton of rock

This is indicative of what could be expected if we were to stop all exploratory work and limit our operations to the mining and milling of ore. In fact, were

we to pursue such a course, it is probable that the total cost of operations could be reduced to $5.25 per ton, for the costs of surface trenching, and other contributing costs could also be eliminated.

A day's work consists of 9 hours, in the mine; 9½ hours, on the surface; and 12 hours in the mill.

The average number of men employed upon operations at the mine, exclusive of construction work, has been 112.

The standard rates of wages are:

Surface Labourers	$2.25	per day
Drill Runners	3.25	per day
Drill Helpers	2.75	per day
Mine Labourers	2.50	per day
Mill men	2.25 to 3.25	per day
Mechanics	2.75 to 3.25	per day
Mechanic's Helpers	2.25 to 2.75	per day

The men are charged 60 cents per day for bed and board.

Distribution of Labor and Supplies

	Labor	Supplies	Totals
Sundries	1981.76	675.47	2,657.23
Mine Office	3468.88	315.54	3784.42
Superintendance	4629.02		4,629.02
Trenching	2532.11	72.88	2,604.99
Sinking	963.37		
Drifting	8421.86		
Crosscutting	44809.9	12,105.22	33,322.24
Raising	2803.21		
Stoping	4547.59		
Timbering	3859.11	1,247.90	5,107.01
Loading and Tramming	10905.60	199.97	11,105.57
Pipefitting, Pump Repairs	410.32	213.66	623.97
Hoisting, Landing, Dumping	6220.06	114.27	6,334.33
Steam and Air Plant Operation	4920.55	13,685.92	18,606.47
" " " Repairs	406.08	385.01	791.04
Sharpening Drill Steel	4851.55	456.62	5308.17
Repairs to Air Drills	394.35	1,568.94	1,963.29
Sorting and Bagging Ore	1493.44	1,112.89	2606.33
Mill Operations	13724.82	599.12	14323.94
" Repairs	2578.06	1957.26	4535.32
Mill Power plant Operations	5604.54	10900.74	16,405.28
" " " Repairs	286.74	278.44	565.18
Sampling and Assaying	2878.50	434.18	3312.68
Operating Shops	621.77	408.29	1,030.06
" Compand Nobles	2247.65	1,241.24	3488.89
Maintenance of Buildings	527.48	419.11	946.59
Road making and Repairs	662.74	50.54	713.28
Totals	96,322.10	48,443.20	144,765.30
Construction work	16183.98	30,356.31	46,540.29
Operating Boarding House	2564.99	10658.90	13223.89
Prospecting	2719.24	337.53	3056.77
Totals	117790.31	89,795.94	207,586.25

Indicative of the cost of supplies delivered at Cobalt, the following may be taken:

Meats.....8 to 12 cents per lb.
Penn. Bituminous Coal.....$5.40 to $5.80 per ton.
West Virginia Bituminous Coal..$5.80 to $6.00 per ton.
Lumber.....$14.00 to 20.00 per M., B.M
Square Timber.....$18.00 to $22.00 per M., B.M
3-in. to 5-in. Round Lagging.....2 cents per lin. f
12-inch Round Timber.....7 cents per lin. f
50 per cent. Dynamite.....14½ cents per l

MONTH.	TONS MILLED.	TOTAL OUNCES FOR MONTH.	OUNCES PRODUCED PER TON MILLED.
February,	715	25,364	35.47
March,	1,533	69,737	45.42
April,	1,520	92,232	60.68
May,	1,755	141,855	80.83
June,	1,627	118,694	72.95
July,	1,817	81,303	44.74
August,	1,870	148,374	79.30
September,	1,948	118,944	61.06
October,	1,976	131,478	66.54
November,	2,040	121,143	59.38
December,	1,902	85,284	44.84
	18,703	1,134,408	60.65

Mining.

We have continued our policy of doing a relatively large amount of crosscutting, and the results, in locating new ore bodies, have demonstrated the value of this method of prospecting.

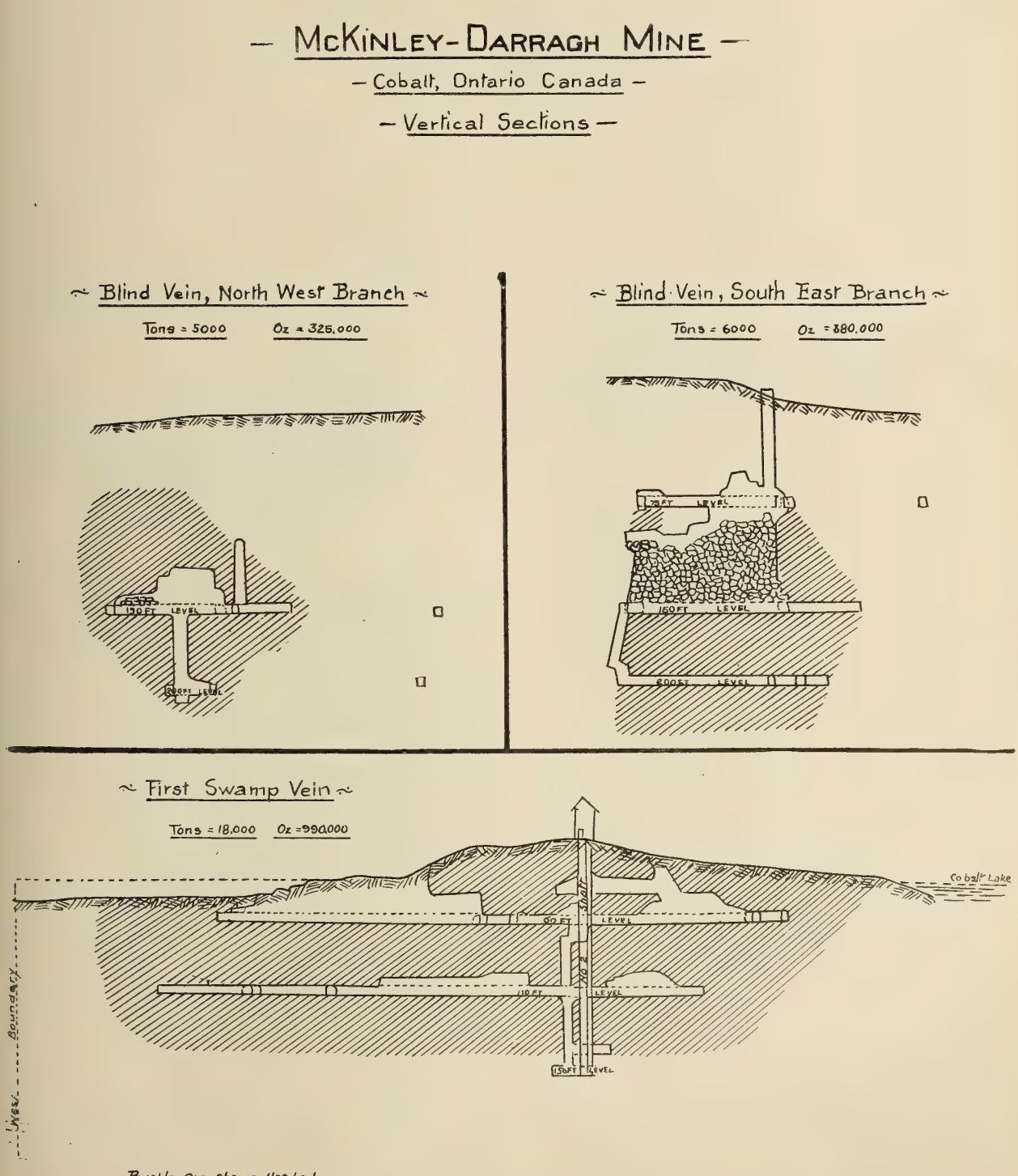
STOPING.—While approximately 3,000 cubic yards of ore have been broken in the stopes during the year, but little over one-half of this has been removed from the mine, the balance being still in the stopes, ready to be drawn off and treated in the mill when required.

At the beginning of the year we had a large amount of ore broken in the mine, awaiting treatment by the mill.

Around our No. 1 Shaft, which is the hoisting shaft, there had accumulated a considerable tonnage of low-grade ore which was also destined for the mill. This broken ore in the mine and on the dumps interfered greatly with our development work, as it had to be removed before good progress could be made.

As you are aware, the No. 1 Shaft is located in a gully, with our discovery vein on the north, power plant on the west, T. & N. O Railway on the south and a hill side on the east, leaving a very constricted area available for waste and ore dumps.

In order to carry on crosscutting it is necessary to have space in which to dump the waste rock, and it



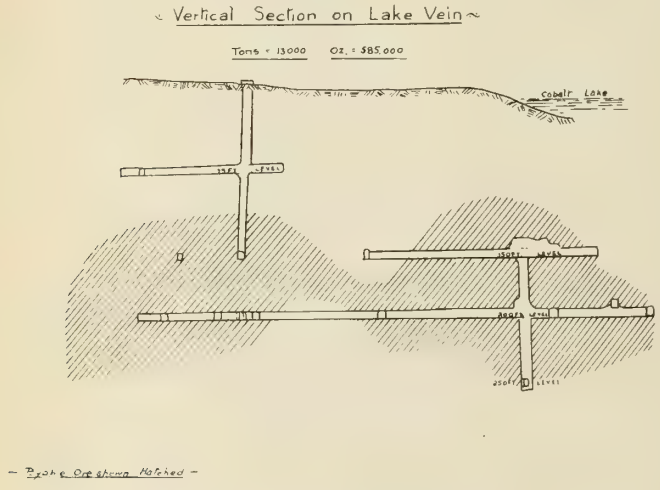
was to provide this space that we milled a quantity of ore which was lying around No. 1 Shaft.

During the year we have overcome these difficulties and provided sufficient waste dump space to carry us through the coming year, so that we shall be able to carry on our mining operations under more favourable conditions.

Accompanying are plans showing the location of veins upon the property, and also sectional elevations showing development, stoping and estimated reserves of the principal ore bodies. Reference to these will guide you in understanding the following remarks:

LAKE VEIN.—Development work consists of 194 feet of drifting on 150-foot level; 480 feet of drifting on 200-foot level; winze from 150 to 250 feet. The vein cut off at 235 feet in the winze, but is almost certain to be picked up again at 250 feet by means of a cross-cut. This vein is in conglomerate and lower Huronian.

Estimated ore reserves and silver contents,
13,000 tons at 45 ozs.=585,000 ozs.



BLIND VEIN.—This vein has been stoped out above the 75-foot level, and considerable stoping has been done between the 150 and 75-foot levels. On the 150-foot level drifting amounts to 545 feet, and on the 200-foot level 320 feet of drifting have been done, and two winzes sunk between 150 and 200 feet. This vein is in conglomerate and lower Huronian.

Estimated ore reserves and silver contents,
22,000 tons at 65 ozs.=1,430,000 ozs.

FIRST SWAMP VEIN.—Drifting 60-foot level, 384 feet; 110-foot level, 445 feet; 135-foot, 28 feet. Raise from 135-foot to 60-foot. Considerable stoping has been done above 60-foot, and a small amount on the 110-foot level. The vein is in conglomerate and slate.

Estimated ore reserves and silver contents,
18,000 tons at 55 ozs.=990,000 ozs.

SECOND SWAMP VEIN.—Drifting 110-foot level, 475 feet; 150-foot level, 390 feet; three raises from 150 to 110-foot, and one raise from 110-foot to surface.

This vein is in conglomerate and slates. A small amount of stoping has been done on the 150 and 110-foot levels.

Estimated ore reserves and silver contents,
20,000 tons at 55 ozs.=1,100,000 ozs.

THIRD SWAMP VEIN.—82 feet of drifting on 110-foot level with 30 feet of raise above this level. Good ore in the floor, backs and west face. This vein is in slate, as far as proven.

Estimated ore reserves and silver contents,
3,000 tons at 50 ozs.=150,000 ozs.

The foregoing constitute the ore bodies upon whic the bulk of development work has been done.

Besides these there are:

No. 7 VEIN—stoped out under ground, but still considerable amount of payable ore in open cut sout of shaft.

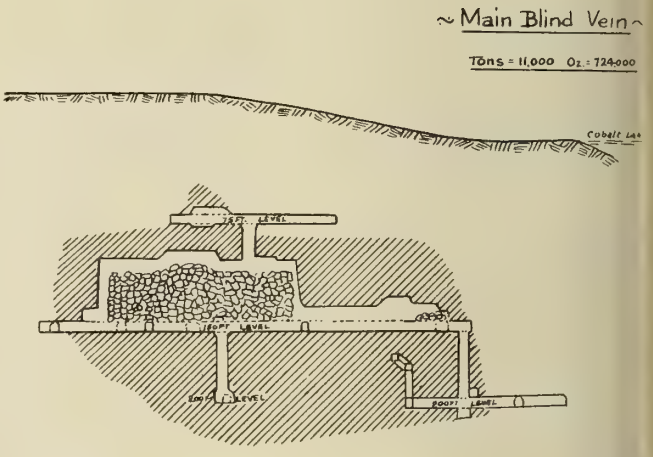
FOURTH SWAMP VEIN—Trenched on surface 100 fee shaft sunk 20 feet, and vein proved at 75 feet, by work ings of Right of Way Mining Company.

Discovery vein at edge of lake, large tonnage of lo grade ore, and some good high-grade ore in cut, a present under water.

— McKINLEY-DARRAGH MINE —

— Cobalt, Ontario, Canada —

— Vertical Sections —



Northwest stringers from blind vein proved for 12 feet by drifts and crosscuts on 150-foot level, veins a three-quarters of an inch in width, and carry 1,00 ounces per ton.

SOUTHWEST VEIN—80 feet of drifting on 150-foo level in good ore.

For purposes of including in this report I estimat that these miscellaneous ore bodies will yield 15,00 tons, having a gross value of 30 ounces per ton, givin a total of 450,000 ounces.

Work upon these veins has not been pushed, for th reason that the output from the rest of the mine ha been all that we could handle.

Last year, ore on dumps was estimated at 10,000 ton During 1909 we have milled 3,178 tons of this. Th estimate of last year was too conservative, and we sti have approximately 9,000 tons of milling ore upon th dumps, which will contain 30 ounces per ton, or a gro value of 270,000 ounces.

Recapitulation of Estimates.

Lake Vein	13000 tons at 45 ozs.	585,000 oz
Blind Vein	22000 tons at 65 ozs.	1430,000 oz
1st Swamp	18000 tons at 55 ozs.	990,000 oz
2nd Swamp	20000 tons at 55 ozs.	1100,000 oz
3rd Swamp	3000 tons at 50 ozs.	150,000 oz
Miscellaneous	15000 tons at 30 ozs.	450,000 oz
Dumps	9000 tons at 30 ozs.	270,000 oz
	100000	4975,000 oz

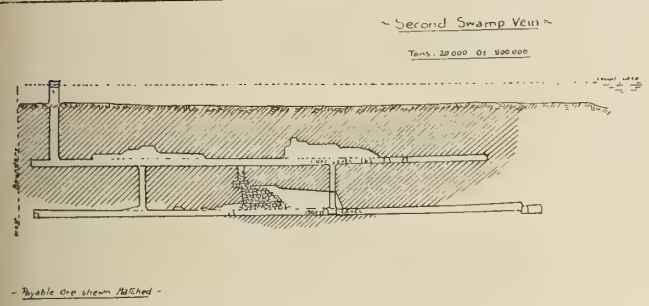
Having made arbitrary allowances for extensions of the ore bodies beyond the limits of our workings as at January 1st, it is obvious that exact figures would be misleading in regard to the accuracy of my estimates, and I have, therefore, used the nearest even thousands, as those figures are more eaily carried in the mind and are sufficiently close to the truth for the purposes of this report.

Referring to the tabulated figures covering ore production for the year, and taking the months since we started milling, the yield per ton has been:—

These results are higher than we can hope to maintain throughout the life of the mine, and in order to place a more definite valuation upon our ore reserves, during the month of December we milled ore which could be taken as more representative of the whole mine, as follows:

1st Swamp Vein, 110-foot level.....	837 tons.
Blind Vein, 150-foot level.....	495 tons.
Southwest Vein, 150-foot level	36 tons.
Lake and Blind Veins, 200-foot level....	534 tons.
	1902 tons.

The recovery for the month was 85,284 ounces, or 44.84 ounces per ton, and the average mill tailings carried 6.26 ounces per ton, making a total value per ton of 51.10 ounces.



It is not possible without any extensive development work, and sampling, to accurately gauge the value of the ore reserves, owing to the great variations in values which occur within a few feet. In one case, the Blind Vein, at 75 feet, is about two inches in width and carries 4,500 to 5,000 ounces per ton. There is little silver in the wall rock, and the stopes have to be carried as narrow as possible. At 150 feet the vein is split into smaller veins which carry from 2,000 to 2,500 ounces per ton, and there is considerable value in the wall rock, permitting stoping widths of over ten feet in places. At 200 feet the stringers are more numerous, smaller, carry from 1,500 to 2,000 ounces per ton and the wall rock is not so heavily mineralized as at 150 feet. Like variations occur in the other veins, and it will, therefore, be understood that figures must be approximate, but I believe that those given above are a conservative estimate of our probable ore reserves, as they are based upon some hundreds of samples, and are checked by actual returns from milling.

To estimate the possible ore, as distinguished from the probable ore, is a still more difficult matter.

On the north, Cobalt Lake Mining Company is working two rich veins which run into our property and which appear to be continuations of our 1st and 2nd Swamp Veins. This being so, we could expect an addition of 300 feet to the known lengths of each of these veins. My policy is to leave the 4½ acres, which we own under the lake, until the rest of the mine is worked out, so as to avoid any possibility of flooding our workings.

Near the northwest corner The Right of Way Mining Company is working a vein which is yielding good ore, and which appears to be an extension of our 4th Swamp Vein, upon which we have as yet done no development work.

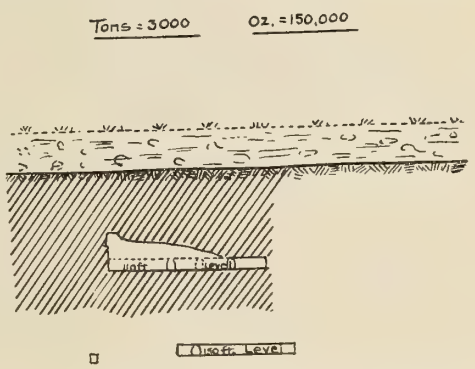
On our west, the Princess has two veins making toward our property. It is possible that one of these is an extension of our 1st Swamp Vein, which fact would add 100 feet to the length of this vein as developed at present.

Our No. 7 Vein, (an extension of the Kendal Vein of the Nipissing), constitutes another factor in possible ore reserves. There is still some ore to be stoped on the surface, and at 120 feet a strong calcite vein in diabase remains to be explored. During the past year only a small amount of work was done upon No. 7. We have in the southeast portion of the claim, several veins of smaltite, which carry small silver values on the surface. Nothing has been done to prove these at depth.

— McKINLEY-DARRAGH MINE —

— Cobalt, Ontario Canada —

~ Verfical Section on Third Swamp Vein ~



In the western portion of the property we have found by means of crosscutting, seven small silver-bearing veins of calcite and smaltite, upon which no work has been done other than locating them by means of crosscuts; there is always a possibility that some of these will develop into good producers upon further development.

In the matter of depth, we have not carried on any exploratory work below 200 feet. One winze has been sunk on the Lake Vein to 250 feet, but nothing further has been done, as the development work on the upper levels has kept our plant going at full capacity. There are indications that the ore shoots of the Blind and Lake Veins dip to the south, which, if true, will give us ore at still lower levels. This, however, is a matter of conjecture at present.

From the foregoing, it will be evident to you, that while in the matter of estimating probable reserves, we are bound within more or less definite limits, the possibilities of the property may be discounted as having much wider limits, and there is every reason to expect that the life of the mine will be materially increased by the development of some of the factors at present

classed as "possibilities," or by the opening up of new ore bodies at present undiscovered.

Milling.

The new mill was started on February 8th, when ten stamps were put into commission, followed on March 11th by the remaining ten.

Record of Ore Milled and Extraction

Month	Ore Treated. Mine	Dump	Total	No. of Stamp days run	Average daily tonnage	Mill Heads	Mill Tails	Ounces of Silver recovered in mill	% of Silver recovered in mill	Oz. Silver per ton in Slimes dry
February	715		715	12·50	57·20			18964·58		
March	1533		1533	26·00	59·73			5436·95		
April	1463	57	1520	25·50	59·61	4·865	7·21	61,642·40	82·36	1350
May	1427	328	1755	28·20	62·82	5·63	7·82	84,365·79	84·42	1800
June	476	1151	1627	26·90	63·80	5·163	7·50	70,253·25	83·63	1550
July	887	930	1817	26·00	69·40	4·481	7·37	63,973·55	81·43	1450
Aug	1816	54	1870	25·67	72·85	5·560	7·20	88,624·71	85·13	1980
Sept	1699	249	1948	25·55	76·24	5·261	7·34	86,286·45	84·19	1900
Oct	1567	409	1976	25·62	77·13	4·779	6·62	80,733·13	85·12	1800
Nov.	2040		2040	25·75	79·27	4·782	6·23	82,488·30	85·07	1850
Dec	1902		1902	24·30	78·27	3·988	6·26	62,544·25	82·45	1400
Total	15523	3178	18703					756924·45		15130

Considerable experimenting was required at first before the mill could be worked up to its full capacity, and it was not until May that satisfactory results could be depended upon. Since then there has been a steady increase in tonnage treated, and a corresponding decrease in costs.

The costs for the month of December were unusually high, due to the shutting down of the mill for two days at Christmas in order to make certain repairs, and also due to the laying in of a surplus stock of coal, the costs of handling which were charged into December operations.

During the first month of 1910, we have treated an average of 83.5 tons daily at a cost of $1.48 per ton; a decided improvement over previous performances.

The mill is operated six days per week, which accounts for the comparatively high milling costs when compared with those of other camps.

Distribution of Milling Costs for 1909

Months	Concentrating Labor	Stores	Total	Cost per ton	Repairs to Mill Labor	Stores	Total	Cost per ton	Power - Light - Heat Labor	Stores	Total	Cost per ton	Assaying Labor	Stores	Total	Cost per ton	Grand Total Labor	Stores	Total	Cost per ton
Feb	773·61	67·90	841·51	1·177					1129·10	947·30	1369·40	1·910					1196·71	1015·20	2211·91	3·092
March	1336·75	60·40	1397·15	·911	187·70	30·26	217·96	·142	506·42	1038·18	1544·60	1·008	100 39	1595	116 34	·075	2131 26	1144 79	3276 05	2·137
April	1238 45	82·73	1321·18	·869	243 47	169·12	562·59	·370	547·38	1024·50	1572·14	1·034	101·67	1446	1160·4	·076	2281·07	1240·38	3571·95	2·349
May	1173·16	86·96	1260·12	·718	251·04	138·35	395·44	·225	622·37	986·01	1608·38	·916	123·85	1467	1288·2	·079	2176·47	1225·04	3402·46	1·938
June	1374·52	72·31	1446·83	·889	341·98	366·05	708·03	·436	506·24	980·13	1486·37	·913	112 49	2425	1367·4	·084	2333·23	1443·74	3777·97	2·321
July	1330·78	27·95	1378·73	·758	244·20	219·36	463·26	·254	530·08	1048·50	1578·58	·869	122·79	2697	1497·6	·082	2246·55	1322·28	3568·83	1·963
Aug	1309·23	81·07	1390·30	·743	210·48	248·95	459·43	·246	518·66	1020·74	1539·39	·823	105·18	2280	1279·8	·068	2143·54	1373·52	3517·10	1·886
Sept	1336·58	30·90	1367·48	·702	291·40	197·28	488·82	·251	552·72	1089·21	1691·93	·817	107·29	2539	1327·68	·068	2288·33	1292·88	3581·21	1·838
Oct	1368·67	24·71	1393·38	·705	223·87	168·68	392·55	·198	474·27	1005·13	1479·40	·748	97·50	1287	1164·37	·056	2164·31	1211·20	3375·51	1·707
Nov	1252·88	31·40	1284·28	·629	205·25	158·45	363·70	·179	506·93	1024·27	1530·60	·750	104·22	3546	1396·8	·068	2068·68	1249·58	3318·26	1·626
Dec	1209·89	32·79	1242·68	·653	223·88	260·66	484·54	·254	604·52	1065·16	1669·67	·877	104·22	3227	1336·4	·072	2142·51	1390·82	3533·38	1·857
—	13724·82	599·12	14323·94	·705	2578·00	1907·26	4485·32	·248	5791·38	11,179·18	16970·44	·907	1079·50	2258	13046·0	·071	23173·66	13664·66	37134·32	1·915

All coarse crushing and jigging are done in one shift, but the balance of the mill, from the stamps on, is operated 24 hours per day.

Mill Extension.

During the year it became evident that the mine was opening out to such an extent that an increase in milling capacity was desirable, and an extension has been built consisting of ten 1,250-pound stamps, one 8-foot Hardinge pebble mill, twelve shaking tables and a set of canvas tables.

The following tabulation shows more concisely the relation between the original mill and the new extension:

Apparatus.	Number in Original Mill.	Number in Extension.	% Increase in Capacity.	Total Number in Extended Mill.
Jigs	6	..	..	6
Stamps	20	10	50%	30
Sand Tables	4	6	100%	10
Tube Mills	1	1	100%	2
Vanners	4	..	..	4
Slime Tables	8	5 Slime; 1 Sand.	90%	14
Canvas Tables	..	10	..	10

It will be noticed that our stamping capacity has been increased but 50 per cent., while the tables and fine grinding tube mills have been increased 100 per cent. This gives us a better balanced mill, as in the past we have had insufficient tables to treat efficiently all of the product obtainable from the stamps.

The extended mill can treat 140 tons per day, but it is expected that only from 110 to 120 tons daily will be milled. The extension is almost completed and some of the tables are already operating.

Attached "flow sheet," plan and elevation of the mill illustrate the process of concentration in its various details. A photograph of the extended mill is also attached hereto.

So far, it has not been demonstrated that any other process of extraction possesses commercial advantages over straight concentration as practised by us, but there is every hope that the cyanide process will be developed to a point which will insure increased profits from milling.

Within a few weeks we expect to be driving the mill by electricity, developed from water power, a change which will net considerable saving in the cost of power. This saving in power costs, taken with the increased tonnage to be treated, will enable us to reduce milling costs to approximately $1.30 per ton.

A further economy will also be achieved through the installation of canvas tables, making possible a higher extraction of the values, and it is hoped that the values in our tailings will be cut down to between four and five ounces per ton.

(To be Continued.)

THE ELEMENTS OF SLIME CONCENTRATION.

By Walter McDermott.

(Paper read before the Institution of Mining and Metallurgy.)

Introduction.

In considering the progress of concentration methods for the last thirty years, it appears possible to draw certain conclusions, which may be considered as elements governing the probable developments in the future. To those who have been in touch with this branch of ore treatment, it is very evident that there has been nothing revolutionary in the best practice for the period mentioned.

There have been hundreds of inventions; there have been some dozens of commercial introductions of new machines, which were expected to be revolutionary, but which have had only a short period of favour, followed by disappearance from use; and there have been a very few new types which have survived the struggle for existence. The most striking fact has been the very wide and increasing use of two types of machines, the shaking belt and the jerking table.

Inventors, of course, will invent, and they will hope; but very often they will not investigate what has been already done; and those persons who have been in the position to hear of and examine many new inventions, must be continually struck with the fact of the recurrence of exploded ideas, and the existence of certain limitations which must be considered in a successful slime saver.

It is easy enough to save the coarser particles of any mineral with a specific gravity admitting it into the concentration class, so that invention is more prolific in the means of saving the finest particles. Experience all over the world, on all kinds of ore, has certainly demonstrated a number of facts which enable one to decide pretty accurately the chances of success for any new invention by a mere examination of the principle on which it works, and of its details of construction, without any actual trial on a given ore. Many think that every new invention must be tried before it is judged.

Even on actual new inventions this is only partially true; because life is too short and capital too limited for trial always to precede judgment; but in the vast majority of inventions the novelty is only a novelty to the inventor: the machine itself is an immaterial modification of something already tried and condemned, or it is opposed in principle to established conditions of success.

The following notes are an attempt to put down certain elements which to the writer seem established by practice; and to draw certain conclusions which may be of service as indicating the most promising direction for improvements in the arrangement of old machines, or in the designing of new ones.

Definitions.

Although the chief subject matter of these notes is the discovery of slime mineral, some of the processes to be discussed cover a wider range of sizes than what are usually understood by the term "slime," and a number of machines are in present use which deal at one operation with this wider range. To restrict the field of discussion it is proposed to confine this paper to the treatment of material which has passed a screen equivalent to 40-mesh I.M.M. standard, that is, apertures of .0125 inch.

As the functions and efficiencies of a number of well-known machines are to be referred to, it is desirable to point out that to-day there are practically no master patents in existence on the best known types of machines; that these types are all (with varying details) manufactured by a number of firms; and, therefore, it is possible to refer broadly to types of machines without being misunderstood as referring to makes of machines. The following classification is herein adopted as covering all the machines necessary to refer to for the purposes of this paper:—

1. Fixed inclined tables (including slowly travelling tables).
2. Jerking tables (including bumping tables).
3. Shaking travelling belts.
4. Jerking or bumping travelling belts.
5. Shaking side-inclined belts or tables.

Class I.—"Fixed Tables" are illustrated by various forms of frames, with wood, canvas, blanket or other surface; by the old Cornish buddle; and by various forms of revolving buddles and side-inclined non-shaking belts. The slow revolution of a buddle or belt, and the intermittent automatic discharge of a Frame, do not affect the actual operation of concentration on the surface, so all are included in the class of fixed tables for the sake of simplicity and brevity.

In this class, all the machines depend for results simply on the greater resistance of the specifically heavy minerals to the wash of water down an inclined surface, as compared with the resistance of the lighter waste. The more perfect of these machines do not make a simple division between "Concentrate" and "Tailing," but they have to make an intermediate or "middle" product in order to yield a clean concentrate.

Class II.—"Jerking Tables."—This class depends for results on a combination of greater movement across a table, and greater resistance to wash of water down the table, of the specifically heavy particles, as compared with the motion and resistance of the lighter waste particles. For high efficiency this class, like Class I., must produce a middle product; because, in most cases, a hard line of division between Concentrate and Tailing is not possible.

Class III.—"Shaking Belts."—The operation of this class depends on a greater variety of conditions than need be considered in the preceding two classes; and a misunderstanding of these conditions has led frequently to hasty generalizations as to the requirements for most useful efficiency.

The shaking or vanning motion not only settles the heavy mineral on to the travelling surface of the belt, but it prevents the larger particles from clinging to the surface. The upward travel of the belt is in opposition to the flow of water; it tends to keep a bed of the coarser particles on the belt, and this bed checks the too-rapid flow of slime material down the incline. The shaking motion, by keeping the bed from packing on the belt, allows of much less inclination on this than on a Fixed Table, therefore of less rapid current of water. This class makes no middle product, which fact is a limitation on some ores, but a great advantage on others, where only one class of Concentrate is required.

Class IV.—"Jerking Belts."—The actual concentrating process on this is the same as in Class II., but it is carried out on a side-inclined travelling belt, going in the direction of the "throw" of the concentrate, and so the discharge is assisted and does not depend entirely on the "throw." This class makes a middle product also. In some modifications, owing to the nature and frequency of the jerking or bumping motion, a complication is introduced in the relative conditions as the settling motion approaches one of the conditions in Class III. machines and has less of the jerking action so important in Class II. machines. Such modification merges then into Class V.

Class V.—"Shaking side-inclined Belts or Tables."—This type of machine is not much employed at present, though it has been re-invented a number of times in different forms. A slowly revolving buddle with a shaking or bumping motion works in effect the same way as a side-inclined belt. The shaking motion yields some of the advantages of Class III. by assisting the settling of the slime material, diminishing the inclination of bed and lessening the water required on fixed surface machines; but a middle product is produced; and the longer settling surface and thickening effect of the upward travel of the belt in Class III. is not obtained.

Conditions Affecting Efficiency.

To understand the conditions necessary for a close saving of fine mineral, it is advisable to begin by examining the action of the simplest (and at the same time the most perfect) appliance in use; and this is the vanning shovel, or some equivalent tool, in the hands of an experienced man. The quantity of material operated on is small; time is of no object; and the action of the tool can be varied to meet the requirements of the moment; so that all the conditions are in favour of the most perfect work.

For proper work, the shovel surface must be smooth; and it must be of a very slightly curved section in all directions. There are two distinct systems used with the shovel: the one for throwing up mineral which is not exceedingly fine, and the other system for separating the finest sizes of mineral from the waste. The first employs a motion which is in effect the action of the jerking machines of Classes II. and IV. The second movement (used for the slime mineral) is the washing back of the waste by a succession of waves of water from the fine mineral—previously settled on to the shovel surface, by a shaking motion. This second separation is in effect, but in varying degrees, the action of Classes I., III., and V. machines.

Passing by the question of the saving of the coarser particles of mineral, as being unimportant for the purposes of this paper, the second motion of the shovel may be further explained. To take it in its most refined work, it can be assumed that a sample of tailing, from a concentrator working only on slime, is under examination in order to see how much fine mineral is escaping. The shovel, having its charge of sample (as flowing from the concentrator) is nearly full of water, with fine waste and fine mineral in suspension. No separation of waste and mineral can be at once made; but the first operation is to settle all the solid matter possible on to the surface of the shovel. This settling is assisted by a circular steady shake of the shovel, which shake at the same time works down the heavier material, however fine, into actual contact with the surface, and below the lighter waste. A rapid shake assists in concentrating the settled mineral at one spot. When the elements of settling time, and settling motion have sufficiently operated, a series of slower and wider sweeps of the shovel introduces the separating effect of gentle waves of the water, which gradually move the lighter waste along the shovel, and leave exposed the "head" of fine heavy mineral. In this final separating movement there is a combination of the shaking with the washing action, as facilitating the movement of the lighter waste over the surface of the shovel.

The perfect work of the vanning shovel is shown by the fact that it will always give, from the most perfect commercial concentrator, a definite head of the fine mineral which is going to waste. This perfection of work of the shovel being established, its conditions of working may be taken safely as a guide to the conditions necessary for close slime concentration in practice; and conversely, it can be accepted that machines which ignore the conditions essential to good work by hand vanning give only very imperfect results in the saving of slime mineral.

The conditions which are essential to good work, irrespective of the skill of the operator, can be stated as follows:—

(A) Sufficient time for settling.
(B) A smooth surface for final separation.
(C) A gentle movement of the washing water.
(D) A motion to assist in differential settling and in separation.

These elements deserve detailed examination as to their application to the construction and operation of concentrators of various kinds.

(A) Time.—It is quite evident, if a very small sample on a shovel must be given a relatively long time to settle before any separation can be effected, that no machine will do close work on slime mineral unless the fine particles are given adequate time to settle from the water in which they are suspended.

As all commercial machines are continuous in operation, this function of settling time becomes in effect the ratio of quantity fed to surface and rate of flow. It follows conclusively, that if a new machine is produced for which a large capacity is claimed, while the settling surface is relatively small, no arguments based on motion or principles of construction will meet the immediate criticism that an essential element of success has been ignored by the inventor.

It is true that there is a point of difference between a continuous flow of pulp over the surface of a commercial machine, and the settlement of solid particles from a nearly stationary charge on a shovel. This difference lies in the fact, that a thin layer of pulp slowly flowing down an inclined machine surface will, by mere frictional contact of some of the particles with the surface, deposit such particles. This fact, however, does not affect the general truth of the proposition that feed must be adjusted to settling surface and speed of flow, so as to secure the element of settling time.

(B) Smooth Surface.—What is well-known to be an essential for satisfactory hand vanning—that is a smooth surface—has been proved by general experience in the use of concentrators for slime mineral to be also best in commercial work.

It is true that canvas tables and blankets are used under certain circumstances; but such surfaces cannot be considered in the list of perfected concentrators; they are either used for special purpose (as in the case of blankets for the saving of fine gold) or as supplementary catchers of a little valuable mineral from the tailings of more perfect machines. It is a constantly

recurring fallacy that a rough surface must be good for saving slime mineral. The fact that it is also good —and in fact relatively better—for saving fine waste, quite annuls the supposed benefit of its retaining power on the mineral. If a clean concentrate is required the current of washing water must be so great, to prevent the waste clinging, as to involve loss of fine mineral; and if clean concentrates are not required, the machine is not a concentrator: it is only a contrivance, like a settling pit.

The history of past practice and an inspection of the most successful working of the present day, show that the advantage of a smooth surface is generally recognized. Tables, buddles and belts have been made of wood, glass, slate, marble, cement, rubber, etc., all with a view to getting the necessary degree of smoothness.

The extraordinary clinging power of very finely-divided mineral, when once settled on to a smooth surface, is seen in the action of any of the machines of Classes I., III. and V., when an excess of wash water is turned on; for the lighter waste and the larger particles of mineral are driven off long before the finest mineral can be moved from the surface it has adhered to. To free a smooth vanning shovel from fine mineral after a test, it has to be immersed again and again in water, or put under a strong stream. The possibilities of rough surfaces, varying all the way from coarse riffles in a launder to a smooth close canvas, have been exhausted long ago; and therefore a new concentrator, for which some form of rough surface is claimed as the chief advantage, can be safely left for time to dispose of.

The action of stratification within definite cavities by a shaking motion, is quite different from the mere arresting effect of a rough surface above referred to.

(C) SPEED OF WATER.—The bad effect of an excessive rate of flow of water over a concentrator surface is two-fold. A rapid current is, of course, in the first place, unfavourable to the settling of fine mineral; and, in the second place, it is apt to re-float and carry off some of the particles which by rolling contact with the surface of the concentrator have succeeded in settling.

It is elementary that a too great inclination of a concentrator and an excess of water are both unfavourable to close work. It is unnecessary, therefore, to illustrate the effects of these conditions, combined under the head of "speed of water;" but the importance of the point is sometimes overlooked in the comparison of certain types of machines for certain work, and in the designing of new machines for obtaining large capacity.

(D) SETTLING AND SEPARATING MOTION.—It is difficult to explain to those unused to hand vanning, how important is the shaking motion imparted, and in how many varying ways it can be used, guided by the eye according to how the mineral and waste are settling and distributing over the surface of the shovel. The whole success of the operation, and the clear exhibition of the "head" of fine mineral separate from the body of the lighter waste, depend on the way the settling is accomplished, and on the way gentle washing waves of the water are made to travel. A proper motion keeps the lighter waste in semi-suspension in the water, free to move over the clinging, sluggish mineral particles; whereas if both waste and mineral are allowed once to settle fully on the shovel (to pack) the waste cannot be moved except by such a strong wave of motion as is certain to pick up and move much of the fine mineral also.

In considering the effect of the shaking motion in actual concentrators in practice, it will suffice to take a machine of the shaking belt class, and note the effect of stopping the shake. The machine becomes at once of the Class I. type; it is a self-discharging Frame. Its inclination must be increased, or water supply made much larger; its loss of fine mineral will be much greater, and its concentrates will be less clean than when running in its normal way on the same feed of material.

Another very important effect of the shaking motion is that unclassified material can be treated in a way not otherwise possible, both on the shovel and on shaking belt machines; and this will be referred to more fully below in treating of classification.

Direction of Probable Improvements.

If the above evidence and conclusions are accepted, it is perfectly justifiable to judge any proposed new concentrator by its agreement with, or departure from, certain principles. The design will doubtless fall within one or other of the five classes described above; unless it falls into one or other group of certain well-travelled and exhausted lines, such as rate of settling in water; resistance to upward flow of water; centrifugal separation; separation by air; separation in a denser medium than water; and flotation processes.

Putting aside the last-named group (flotation processes) as not really in the nature of concentration by specific gravity, and so not within the limits of this paper, it is worth while pointing out one of the great obstacles to the perfection of a machine for saving fine mineral by any of the other principles just mentioned.

No system of practical classification has yet been invented which does not in the end leave a great difference in the sizes of particles contained in the final class, the class in which the great loss occurs in concentration. As a consequence, separation by rate of settling, by upward flow of water, by a denser medium than water, all become imperfect and are usually quite impracticable.

It is well known that air separation—already tried in dozens of different ways—is most satisfactory on dust, and it is usually inapplicable for commercial reasons.

Many have been the attempts to employ centrifugal force, which on first thought seems eminently adapted to the saving of fine particles by its power of intensifying the function of specific gravity, but in practice its application becomes impracticable. With such fine and unequally-sized particles as are under discussion, a separation by mere form of trajectory is not possible; and, as a consequence, the action of a centrifugal concentrator must be almost necessarily one of packing the material against the sides of the revolving machine. This action of packing, or building up on the walls, is in its very nature absolutely opposed to any continued separation of particles of differing specific gravities when once fairly started; and hundreds of failures witness to the apparently insuperable difficulties of making a continuous discharge to this class of machine. Attempts which have been made to combine a washing separation by water (requiring a freedom of motion between particles) with the packing action of centrifugal force, seem to point to an inherent antagonism between the two forces which would require a delicacy of adjustment impracticable in practice.

From the above, it seems probable that new concentrators which require serious consideration will be modifications of established types; and to meet the expectation of doing work comparable with that of exist-

ing machines, they can pretty safely be judged by the extent to which they meet the conditions which have been referred to. Of course, all new machines are said to do wonderful work; but history shows how exceedingly difficult it is to get at comparable facts, and how very unreliable as a guide are the testimonials and figures of millmen in the matter of concentration. The great variety of practice all over the world, even on similar ores, in both the use and distribution of different types of machines, shows at once how difficult it is in this branch of milling to get rid of the personal element, and the limiting effect of special experience; and again, the influence of mere fashion is often apparent in the arrangement of mills.

It may be mentioned here that on ores from which a single concentrate is required (not, for instance, concentrates separate of galena and zinc blende from waste) it is not advisable to make a middle product. A middle product may be needed when the coarsest particles carry attached mineral and need regrinding; but on material finer than 40-mesh this is not often the case. Many concentrators do make middle products; and it is certain that losses are incurred, and are often obscured, by the fact that the middle product must be re-dressed; for a secondary loss is thus involved, and must be added to the loss in the Tailing of the first operation.

There are often good reasons in practice for using a middle product-making machine; but it should not be overlooked that, in principle, and for the conditions assumed, there is a definite objection to the system; and, therefore, in designing improvements over existing machines, it is a point which will count in actual commercial results in the end. Questions of capacity, cost, and expediency often influence the choice of the details of arrangement of mills; but the question under discussion is one of individual efficiency of work, which should be well weighed in the first instance. It is known that in modern concentration mill losses are often high; it is, therefore, no heresy to refer in detail to certain probable causes of loss in existing practice.

To sum up the conditions which seem from the above to be most favourable to the evolution of any new concentrator which may reasonably be expected to prove an advance over existing machines, it can be said that there must be a large and smooth surface; a regular settling motion which does not jar the finest particles from their contact with the surface when settled; and a delivery of clean mineral without the production of a middle class. The provision of a proper settling motion insures the other necessary conditions of slight inclination of surface, and the minimum quantity of water in pulp and for washing purposes. For example: a revolving buddle, which as ordinarily used, will require an inclination on its surface of 1½ inches to the foot, can, with a proper shaking motion, work to better advantage with ½-inch fall, and will need less water.

Classification.

The necessity for classification before concentration is so marked in some cases and with some machines, that it is accepted by some people as a comprehensive dogma with full scientific warrant; but actual experience has shown very clearly, that in certain cases it is distinctly undesirable, and in other cases it is so imperfectly applied as to largely neutralize its advantages.

Bearing in mind the limitation in this paper to the consideration of material finer than 40-mesh, it is a clearly-demonstrated fact that machines of Class III. (shaking travelling belts) give better results both industrially and theoretically without classification. At intervals of some few years new teachers arise to point out that the treatment of an unclassified pulp is in contravention of elementary laws of scientific concentration on any machine. It will be worth while here to push this argument to a conclusion: to see what, if anything, science has determined, and what practice has demonstrated.

In what scientific formula has it ever been attempted to lay down the relative values of the functions of specific gravity, inertia, surface resistance, speed of settling, friction of grains, rate of water flow, and adhesion to machine surface, in the case of a mixture of particles from 40-mesh aperture to impalpable slime, on a machine of Class III. type?

Such a formula might amuse a mathematician; it would be beyond the comprehension of the writer and of most people; and it would carry no conviction whatever in a practical sense. It is only necessary to fall back on certain results and details of actual operation, to show that some of the functions above named are so different relatively on different types of machines, as to make conclusions draw from one machine inapplicable to the results to be expected from another machine. An illustration will help to make this clear. If a silver or copper coin be put on a machine of either I., II. or IV. Class it will be delivered with the concentrate. If the coin be put on a machine of Class III. it will not be delivered with the concentrate. Any scientific formula which correctly accounted for these opposed results could never be construed into a dogma sification has led to some curious results. A very un- on classification in general, since the effect of the function of inertia is quite different in the two cases.

It is known that classification is not necessary for a sample treated on the vanning shovel; and as this treatment is taken above as a standard of work, and as a guide to investigation, it would seem to indicate in advance that classification is not a fixed law of perfection in concentration.

Furthermore, the experience of thirty years, on all kinds of ores, in many different mining fields, has established most definitely the fact that there is a distinct advantage in treating unclassified pulp on machines of Class III. The coarser particles form a bed on the belt owing to its upward travel; and the fine slime instead of flowing down in unchecked waves over the belt surface (as it would do if treated alone) flows more slowly, by a filtering process in part, and so has better chances for settlement of the fine mineral.

In practice, the blind adherence to the belief in classatisfactory method of classification is usually adopted, that of simple pointed boxes. By this system the coarser or bottom discharge is of necessity accompanied by a stream of the finest slime; and this last goes to a class of machine not adopted to its treatment. In some modern mills, arranged specially with a view of keeping coarse and fine apart for separate treatment, the first step, that of classification, is thus most imperfect. A step in advance is made in some cases by the introduction of upward flow classifiers, with a disadvantage from the continued dilution of the stream of pulp for the final treatment. The experience obtained in some of these mills has led to the supposed discovery that machines of Class III. are not proper machines for slime treatment, and they are, therefore, given an intermediate product of the classification system.

This conclusion is quite opposed to general experi-

ence; because machines of Class III. were originally developed for, and are continuously used for, the direct treatment of ores crushed fine in batteries, and containing small quantities of finely-divided and brittle minerals, which are valuable enough to demand very close saving. Such ores, crushed under such conditions, must need close saving of slimes, and must make much slime value, and it would be a remarkable thing if a class of machine which is so successfully used for such work should be now discovered to be not adapted to slime saving. The explanation of this erroneous conclusion is simple, namely, that by attempting classification ,and then experimenting with the very diluted slime alone, the machines of Class III. are not working under the best conditions; and they have, furthermore, very little capacity when so improperly limited as to size of pulp, and when so overcharged with water.

In most of the large modern mills of the United States and Mexico, machines of Class III. are used for the finest sizes, and the slime losses due to imperfect classification already referred to, are sometimes diminished by a re-treatment of the Tailings of Class II. machines on machines of Class III. In some of these mills the finest overflows of classifiers or thickening boxes are run into settling pits, and treated as a concentrate for addition to richer products for the smelter; but such treatment is not available when clean products are essential to subsequent treatment, for example, with ores. Of late there has been a tendency to the use of fine screens in place of some of the water classifiers in a mill, to this extent avoiding the slime discharge of the ordinary classifier with the coarser particles, while making a separation by size alone, instead of by equal falling particles.

It is a very usual thing in mills to treat the tailing of one slime machine by another machine of the same or different construction; for example: buddles are often made double; or a convex surface may be followed by a concave one; and frames or canvas tables may be used in a long succession, each saving a little. This double treatment can be used with great effect on machines of Class III. treating unclassified pulp, but is very seldom attempted. The loss in the tailing of the first machine is in part saved by the second, and in some cases (for instance, with tin ores) where the pulp from the stamps is fine enough to go direct and unclassified to the first machine, the double treatment will be most effective as compared with a classification and treatment on several types of middle product machines. To get the best results from the second machine, it is advisable to use a large pointed box between, to get rid of some excess of water introduced by the first machine; and an increase in belt surface on the second row will add to the efficiency. By this system the slime mineral has a double chance of being saved; there is no excessive dilution of the slime; clean concentrates can be produced; the losses due to rehandling of middle products are avoided; and the whole plant is the most simple and automatic in character. If the tailing of the second row of Class III. machines contains enough fine mineral to be worth additional treatment, a properly-arranged classifier will deliver this mineral in the fine overflow and in a condition suitable for treatment on revolving buddles or frames, or other wide surface appliances suitable for poor material.

When a screen is used in the battery too coarse for effective work by machines of Class III., an additional finer screen can be used to take out one or more sizes of particles for machines of Class II., or even for jigs.

Note.—The use of the vanning shovel is not very general, outside Cornwall, and most enquirers will find it easier to use a circular placque of white enamelled iron, or of china. Such a placque has the additional advantage of retaining a good, clean, smooth surface, and of showing up more clearly the "head" of most minerals, than a shovel.

OUR EUROPEAN LETTER.

LONDON'S MINING MARKET OVERSHADOWED BY THE RUBBER AND OIL BOOM. A FEW FACTS ABOUT THE RISING OIL MANIA. THE RUSH OF NEW MAIKOP COMPANIES. TWO WARNINGS. GERMAN INTEREST IN THE RAND. GOLD MINING IN FRANCE. THE SURFACE CONDENSER IN MINING POWER PLANT. RESCUE APPARATUS. PEACE IN THE BRITISH COAL-FIELDS.

Exclusive correspondence of Canadian Mining Journal

London, April 20th, 1910.

The rise of the rubber boom with the temporary extinction, to all intents and purposes therefore, of interest in other sections of the Stock Exchange (the mining ones included) looks like being followed by an oil boom. Of course, no one expects this to be nearly so big an affair as the rubber mania has become, but tremendous profits are being made by speculators already.

The speculation largely centres in shares of companies in the Maikop district, on the Black Sea, concerning the potentialities of which shares many favourable reports are being received. Most of the companies have been formed since the great "spout" occurred last September and ground is not now cheap to acquire in the oil district.

Russian oil, hitherto, has been drawn almost wholly from the Baku district. At one time in the history of the older field the bulk of the oil was consumed as fuel, its distillation for lighter oils being disregarded. There can be little doubt that it was due to English enterprise that Russian burning oils have been so largely imported into this country and a new department of the industry built up.

The new Maikop fields are looked to for the revival of the waning glories of the past. Should surface indications be justified, Maikop will have a brilliant future undoubtedly, not only from the point of view of actual production, but in its effects on the oil fuel question and the world's demand for additional supplies of illuminating oil. Russia has been, with the United States, the world's principal oil provider, but recently its condition had been giving rise to considerable disquiet and a second Baku has come along in good time. About twenty new oil companies have already been formed this year, and every week now two or three newcomers located in Maikop are being put before the British in-

vestor. As I write, nine new oil companies are announced for issue to-morrow.

As far away and as unknown to the ordinary Englishman as Maikop is, it has apparently already been found necessary to issue a warning as to titles and their validity. It is urged that care should be taken that on conducting agreements for purchases of claims in Maikop, original certificates issued by the Ekaterinodar District Department must be produced, certified copies being useless. Cases are reported from the oil field where people have sold their claims twice over, and having taken so well, no doubt some people will be quite prepared to sell them, on alleged certified copies, another half-a-dozen times each. It has been discovered that a number of Maikop claims now being offered in the London market, do not belong to Cossacks at all, but to so-called settlers. Such claims are declared by Verbitscheff, a leading Ekaterinodar legal authority, to be valueless.

Another thing to be remembered by the British investor in oil shares is that in spite of many romantic ideas to the contrary, oil is not a get-rich business. Immense sums of capital have to be expended on the preliminary borings and the ultimate workings, and a patient historical retrospect shows that hundreds of millions of dollars have been spent on the industry at various times without producing anything like a satisfactory return.

Perhaps the actual incident more than any other which started off the active price of oil shares of all kinds in the market here, was the publication of oil contracts given out by the Admiralty in the middle of February, a circumstance which is taken to mark the beginning of the adoption of oil as fuel in the Navy on a large scale. Efforts have been made for years past to impress the Admiralty with the utility of oil for the generation of steam power, and at last the Admiralty moved.

In the market for South African mining shares, despite competing influences, there has been fair business passing, and a curious side of this is the participation of German investors in this revival. A quick rise recently was followed by a halt, and wisely enough there was no disposition shown to rush in to buy upon the temporary reaction. This cautious attitude must contribute to solidify the basis of what is undoubtedly a carefully-planned "bull" campaign.

The view that the Rand industry is on the eve of a further period of steady progress is, however, rapidly gaining ground. Disinterested cablegrams from Johannesburg reflect also the confidence of those on the spot, and the optimistic feeling which is thus created facilitates the arrangement of "deals" between the leading finance houses and Stock Exchange circles.

According to views expressed by some of the most prominent bankers in London, Germany is displaying a keener interest in Rand affairs than at any time during the present movement. The various large amalgamation schemes which are now formulated, especially the advantages of working on a large scale with centralized management, appeal particularly to the German mind. A large turnover at a moderate, but satisfactory, margin of profit spread over a long period of years, removes mining propositions on the Rand from the speculative side to that of steady industrial working. Patience and well-regulated energy are required, but these essentials played also a prominent part in the growth of Germany's well-ordered home industries. The parallel is sufficiently close to explain German investment buying of Rand shares, and the determinatio of these buyers to wait and back their opinions unin fluenced either by moderate market fluctuations o minor changes in the industrial position.

For a long time people were incredulous with regar to gold mining in France, but now it appears that ther are five mines in active operation and a large amoun of prospecting is going on to find new mines. For th development and equipment of these money will b forthcoming on a liberal scale, and makers of minin machinery should not overlook this. The titles of th five gold mines at present working, are as follows:— Mine de la Lucette, Mayenne; Mine de la Bellière Maine-et-Loire; Mines du Châtelet, Creuse; Mines d Salsigne, Aude; Mines de Villaniere, Aude. The firs mine produces antimonial ore. La Lucette, La Bellièr and La Châtelet are the most advanced in develop ments. La Bellière employs 70 stamps, crushing som 300 tons of ore daily for a yield of 9 hundredweight of gold per ton at a profit of $400,000 in 1909, the pro duction now being over 4,000 ounces monthly. Over 9 per cent. of the gold is extracted.

Several tube mills have recently been ordered, whic are expected to be at work by the end of the curren year. One shaft is down over 300 feet in depth. The Mines du Châtelet treat arsenical ore by Merton fur naces, tube mills and filter presses. At Bonnae the de posits increase in value in depth. Wolfram has beer found in this ore. The mining districts are situated in Central France.

Speaking before the Institution of Mining and Metal lurgy, W. A. MacLeod dealt with the question of the Surface Condenser in Mining Power Plant. During the last two years, he said, he had searched such engineering literature as was available to him with the object of obtaining information on the subject of intermittent condensation. The result had been somewhat disappointing, though he gathered, more by the way of inference than from direct statement, that condensation had been applied to winding engines in some places, but that the consensus of opinion seemed to be against the practice . He had had the opportunity of conducting tests on an intermittent plant of considerable capacity under ordinary running conditions, and had collected a considerable amount of information; and he thought that this, with a study of some aspects of the problem of particular interest to mining engineers, might stimulate a free exchange of views to the general benefit of the mining industry.

Though much of his work was, he realized, incomplete and demanded further and more accurate experimental investigation, yet the results he had obtained did not confirm the somewhat vague adverse stand that appeared to be taken by some engineers against the practice of intermittent condensation. On that account therefore, he thought that a full consideration of the problem might lead to a clear understanding of its merits or defects from an economic point of view. In the rest of his paper, which was of an elaborate character, he discussed first the principles of design, as applied to the similar problem of what might be called "constant" condensation. Having defined the various factors of this problem and their relations to one another, he examined the variations introduced by the "intermittent" conditions, and then considered the altered relations of the various factors under the new conditions, which in ordinary mining practice were "constant" plus "intermittent;" that was, certain machines, such as the air compressors, were running con-

tinuously with an approximately constant consumption of steam, whilst others, as, for instance, the winding engine, ran intermittently, the intermittent periods being brief and frequent, causing sudden demands on the steam, and at the same time on the condenser.

An exhibition of mining rescue apparatus was recently held in the Mining Department of the Birmingham University, Bournbrook. The inventions shown included the "Meco Shamrock" apparatus, which was exhibited by the Mining Engineering Company, of Sheffield; the Draeger apparatus; the "Aerolith," in which liquid air is used; and the Fleuss, Davis, and Hill patents, shown by Messrs. Siebe, Gorman and Company. Most of the firms also exhibited pure air supply tubes and pumps which can be used by men engaged in extinguishing local or "gob" fires in mines, or entering places where the atmosphere is foul. Some of these arrangements were combined with a speaking tube and telephone. Oxygen reviving appliances for restoring persons suffering from the inhalation of poisonous gases were also shown, as well as stretchers and litters, and other first-aid requisites. The exhibition was held under the auspices of the coal-owners' associations of the Midlands. The members of the Rescue Stations Committee inspected the various appliances and witnessed demonstrations of their value.

The exhibition may be regarded as the first step towards organizing rescue stations and brigades to serve the South Midland coalfields. The matter was first brought to the attention of Midland coal-owners by the recommendations of the Royal Commission on Accidents in Mines, and the result was the formation of a general committee representative of the South Midland coal-owners. An Experiment Committee, which they appointed, is requested to examine various forms of apparatus with a view to the recommendation of one or more for use, and further, to embody in a report to the General Committee such suggestions as may enable that committee to formulate a scheme for the establishment of a station or stations for the storage of apparatus and for the training of men in its use.

After having been on the verge of a Titanic struggle the coal miners of South Wales have arrived at an agreement with their employers, although there is still strong resentment against the three-shift system. The matters at variance will now be dealt with by the new conciliation board to be formed under the new agreement, the old one having expired. This dispute has been continuous ever since the Mines Eight Hours Act came into force at the beginning of July last year.

On the Durham and Northumberland coalfields the Eight Hours Act was not introduced until the 1st of January this year, and at once provoked trouble. The miners' union officials, however, arrived at an agreement with the colliery owners and, although a section of the coal miners at first kicked against the official arrangements and several local strikes broke out, peace has now been restored. It is very clear, however, that taking the whole of the coal-mining districts there is a vast amount of discontent simmering beneath the surface, and if the men are not tightly held down by penalty clauses, there may be an outbreak at any time. This will be disastrous to the industries of the whole country.

Inspection of mines in this country at last looks like being put upon a sound footing and both the coal and metal mines are to come under the control of the reorganized government inspection staff. The recommendations of the Royal Commission on Mines are to be adopted. In addition to the existing inspectors and assistant inspectors of mines a superior grade is to be instituted to have charge of each new district, the old territorial classification having been abolished. These officials will be styled divisional inspectors. The general scheme foreshadowed is good, although many people hold that our inspection system, especially as regards safety in coal mines, is already good, despite the fact that some of the lines of progress foreshadowed earlier have not been followed.

KOPPERS' BY-PRODUCT COKE OVENS AT BIRMINGHAM, ALABAMA.

Two hundred and eighty Koppers' By-Product Coke Ovens have been contracted for by the Tennessee Coal, Iron & Railroad Company for its Birmingham, Alabama plant. These ovens will be 37 feet long between doors, 9 feet 10 3-8 inches high, and will have an average width of 19 3-4 inches. Each oven will produce 11.25 tons of coke every 24 hours. With a coal containing 30 per cent. of volatile matter, the daily output of the plant will be 3,145 tons of coke besides 22,000,000 cubic feet of 500 B.T.U. gas, 35,000 gallons of tar and 44 tons of sulphate of ammonia. The ammonia will be recovered from the gas by the Koppers' direct process.

With this plant of 280 ovens, the United States Steel Corporation will have a total of 1,120 Koppers' By-Product Coke Ovens. The first ovens of this type erected in America, were built in 1907 by the Illinois Steel Company at Joliet, Illinois. They have been in operation for nineteen months to date, and they are giving results superior to any previously obtained anywhere in the world, in the by-product coke oven industry.

This is the same type of by-product coke ovens that is being erected by H. Koppers for the Lake Superior Iron & Steel Company, at Sault Ste. Marie, Ontario.

J. H. Haynes, in the April number of the Western Chemist and Metallurgist, gives the cost statements of a concrete battery foundation, built for the Tanguay M. & M. Company, at Idaho Springs, Colo. The foundation base is 16 feet by 5 feet; height, 8 feet; top, 12 feet by 2 feet 4 inches. It contains 12.5 per cent. of rock. It supports ten 1,000-pound stamps dropping five inches, 108 drops per minute. A piece of ⅛-inch rubber packing is inserted between the mortar and the foundation. The cost was as follows:

Labour, excavating	$32.30
Labour, foundation	68.30
Bolts and castings	50.00
Cement	33.70
Lumber	10.00
Gravel	30.00
Rock	7.25

Estimates published by the Western Canada Loan Company, Limited, (an English incorporation), place the initial cost of equipping the collieries of the Pembina Coal Company at $250,000. This latter company is subsidiary to the Canada Land Company. A purchase price of $500,000 was paid for the coal lands. The output counted upon is 1,000 tons per day. Messrs. Bambridge, Seymour & Company, of London, Eng., reported upon the Pembina fields.

THE PORCUPINE GOLD DISTRICT.

HAMLIN BROOKS HATCH,

The Porcupine gold area comprises about 216 square miles, surrounding Porcupine Lake, in New Ontario. The lake is forty miles due west of the 222-mile post of the Temiskaming & Northern Ontario Railway, which connects the Town of North Bay with the new Trans-Continental. Part of the area is surveyed and consists of the Townships of Tisdale, Whitney, Shaw, and Godfrey. The remainder lies in the Temagami Forest Reserve.

History.

The gold-bearing quartz bodies of the district first attracted attention in the late fall of 1909. The announcement of the discovery of auriferous quartz bodies was followed by an unprecedented rush of prospectors to the new field. This rush continued for perhaps two months into the winter, and during this time. all the available ground was staked for miles in every direction. The means of transport were canoes and packsacks until the freeze-up, when roads were cut and sleighs and toboggans came into use.

Topography.

The Porcupine area is probably a portion of the great post-Laurentian and pre-Huronian peneplain. It is undoubtedly proven that the deposits of the Huronian and Cretaceous periods were followed by a period of erosion, which developed the peneplain. The area under consideration was concerned in all these changes and the continued erosion has so thoroughly worn away the hills that the present surface has all the aspects of a characteristic peneplain.

The present surface is traversed by low-lying quartz-bearing schist ridges, the highest elevation attained being in the neighbourhood of seventy feet. The surface is even, and the overlying drift in most cases is extremely light. In parts of the district there are sand and boulder moraines, which are of both the terminal and lateral kind. It may be said that the whole gold-bearing area has been so eroded that the only formation which has exerted any resistant influence, whatever, upon the topography, has been that of the quartz bodies themselves, which, on account of their extreme hardness, did not lend themselves readily to the agents of erosion.

Geology.

Owing to the recent discovery of the district and to the fact that until very recently the country was snow-covered, only a very general idea of the geology of the district has been obtained. The only formation so far met with in the gold-bearing area are of igneous origin and may be classified as follows:

1. Schist—green in colour, and showing marked schistosity.
2. Igneous eruptives—diorite, diabase and porphyry.

It may be said that the geological history of the district began with the plutonic formation of a basic igneous rock, which later by metamorphism took on its present schist form. The gold-bearing quartz bodies, so far, have only been found in the schist formation, which covers the greater part of the whole prospected area. This schist is undoubtedly of igneous origin and presents all the characteristics of being an altered plutonic diorite. It is green in colour and the schistosity runs parallel to the general strike of the whole formation, which is northeast. In the vicinity of the quartz bodies it is heavily pyritic, and in all specimens examined by the writer, pyrite was present. In mineralogical composition it is closely allied to the eruptive diorite, the only difference, as nearly as can be determined by the naked eye, being one of structure. In places the writer has noticed the gradation of the schist formation to that of almost typical diorite, the transition being so gradual that the line of contact was not discernible. Further investigations and further development of properties may, perhaps, alter this hypothesis, but at present all indications are that it is correct. The extent of this schist is practically over the whole gold-bearing area, it being approximately 18 miles east and west, and 12 miles north and south. Dykes of some of the basic eruptives cut it occasionally, two of these dykes having been noted in Shaw Township cutting across the strke of the formation. In Whitney Township diorite dykes have also been seen. In contrast to the diabase dykes, these appear to cut the formation parallel to the schistosity. Also in Shaw Township there has been reported to the writer a quartz porphyry intrusion, but as yet this has not been verified.

Ore Deposits.

The auriferous bodies of the district so far discovered may be divided into three classes:

1. Segregated veins.
2. Fissure veins.
3. Fahlbands.

The segregated veins are a series of overlapping quartz lenses, which vary greatly in size. In some cases the lenses form extended deposits, although each of itself is of no great extent. They appear to be formed along certain well-defined lines of weakness, which are lines of local faulting. In many instances they are auriferous and carry pyrite in greater or less quantity. The general strike of the veins of this type appear to be northeast and follow the schistosity.

Fissure Veins.

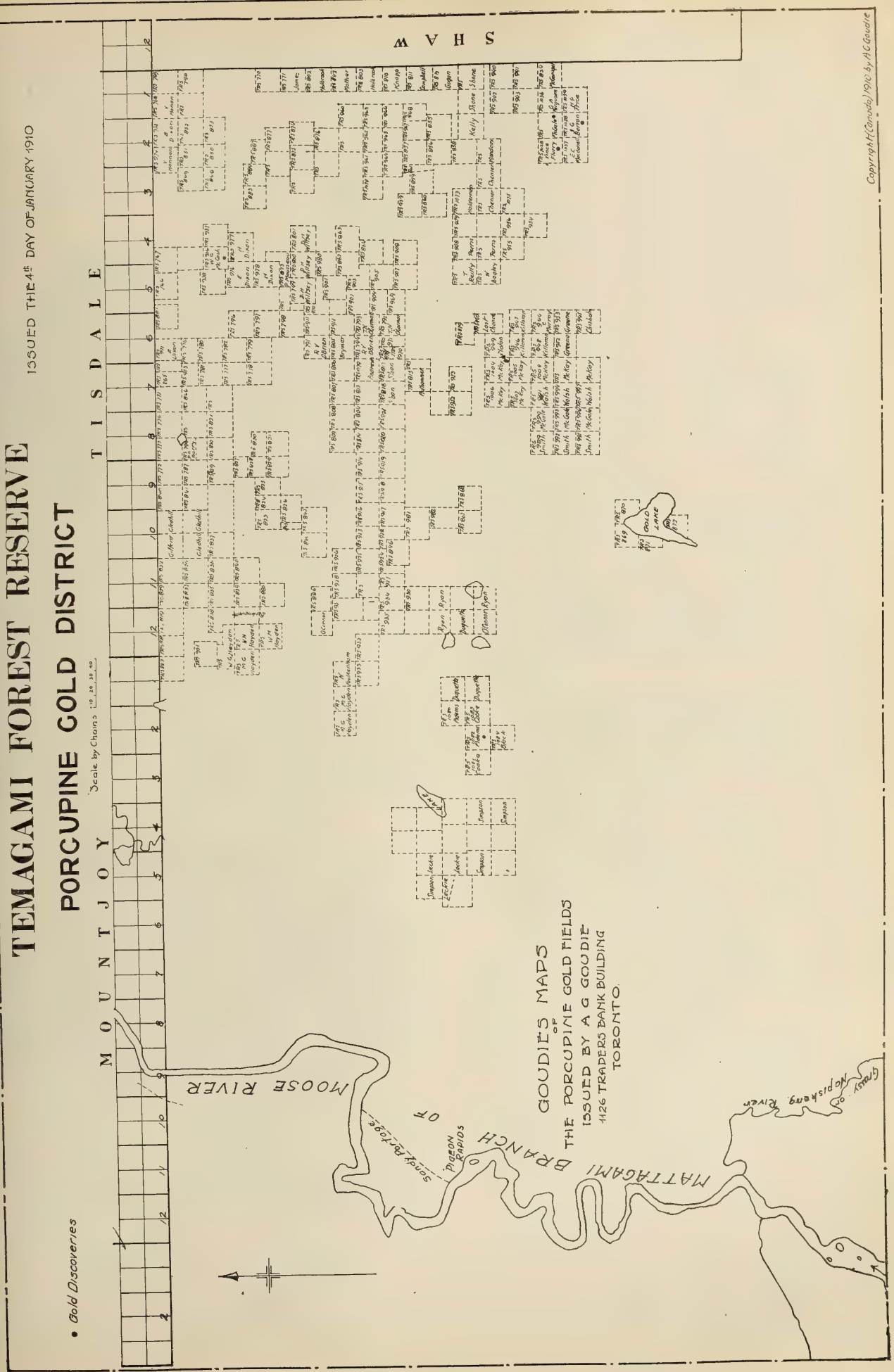
These are quartz veins, which cut the formation in all directions and vary greatly in size. The writer has observed them from one inch up to well-defined veins of fifteen feet. Some show native gold, and practically all give assays. Their longitudinal extent is not known at the present time as this type of deposit is almost invariably covered with drift and has only been exposed in places where assessment work has been done.

Fahlbands.

These deposits are beds of foliated schist, impregnated with sulphides. Copper sulphides and iron sulphides are common. As a rule they are from 100 to 200 feet in lateral extent, and in certain instances have been followed longitudinally for 500 feet. Shaw and Whitney Townships, and the Temagami Reserve—just south of Tisdale—furnish the best examples of this type. In some cases free gold has been found in minute quantities on the surface of these deposits, and in several instances assays of the sulphides have also yielded values.

Economic Possibilities of the Porcupine Area.

At the present stage of development of the district it is, of course, impossible to determine definitely whether Porcupine will or will not become a paying gold camp. There are several fine looking properties


TEMAGAMI FOREST RESERVE
PORCUPINE GOLD DISTRICT
ISSUED THE 4th DAY OF JANUARY 1910
Scale by Chains
MOUNTJOY
TISDALE
MVHS
Gold Discoveries
MOOSE RIVER
Sandy Portage
PIGEON RAPIDS
MATTAGAMI BRANCH
Nopisaring River
GOLD LANE
GOUDIE'S MAPS OF THE PORCUPINE GOLD FIELDS
ISSUED BY A G GOUDIE
426 TRADERS BANK BUILDING
TORONTO.
Copyright (Canada) 1910 by A G Goudie

in the district, notably the Wilson Dome, and the Timmins option, which undoubtedly have all the aspects of becoming paying mines. Both of these properties have on the surface enormous quartz bodies carrying spectacular free gold in quantity. In so far as development has proceeded on them, the ore bodies have shown no lessening of values. The Timmins people are at present down in the neighbourhood of 100 feet, on their ore body and have sacked ore and have sent a car-load to the States for a mill run.* The returns from this mill-run will go far to prove or disprove the worth of the district. On several other properties where development work has been done it is encouraging. It would be of benefit to the different claim holders and the investing public at large, if the results of the work now being done would be frankly stated. The writer knows that results so far are encouraging and that the chances of the district becoming economic are more favourable each day. It must be understood that there is very little ultimate chance of the district being other than low grade. It may be added that the question of power is one of moment and will probably be solved eventually by the utilization of two water powers, which are within easy striking distance of the district.

In conclusion the writer wishes to say that the encouraging results so far obtained on those properties on which development has gone ahead, makes him of the opinion that this newest Ontario gold field will eventually become a paying producer.

*Editor's Note.—This carload is reported to have averaged $200 per ton. As to the value of this shipment sample from an engineering point of view, the reader is referred to the editorial on another page.

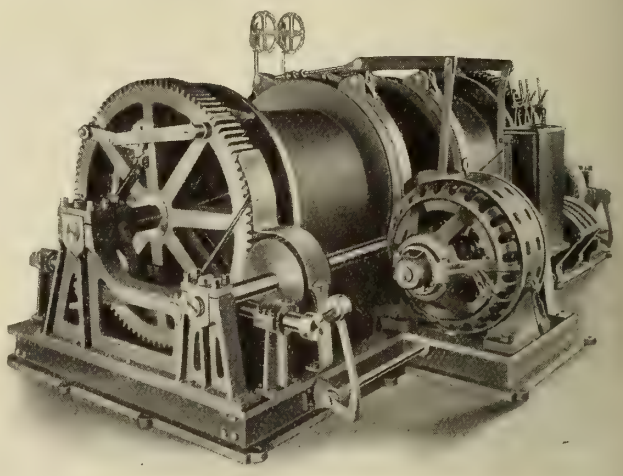
ELECTRIC MOTOR DRIVEN MINE HOISTS.

Since the cycle of operation in any hoisting proposition is of an intermittent character, the power is at a maximum only a part of the time, even though the hoist be operated practically continuously. In many cases the hoist is in operation only a very small part of the day. These conditions offer special advantages from an economical point of view for the use of electric motor-driven hoists. The electric hoist is always ready, and uses power only in proportion to the load handled when it is in actual operation.

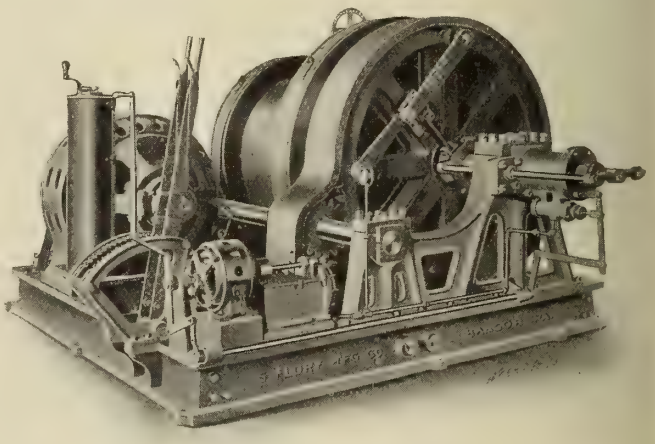
The bearings are self-oiling and the motors seldom require any other attention than an occasional inspection and cleaning. There are no complicated parts to get out of order or to require continual oiling, packing, etc. The electric hoist may be operated by almost any one, as no previous experience or mechanical knowledge is required and an engineer's license is unnecessary.

The single and double drum motor-driven mine hoists of the S. Flory Manufacturing Company, Bangor, Pa., are well shown by the accompanying pictures. These hoists which are especially designed for mines, quarries, planes, shafts, etc., are equipped with the I. O. Werner patent band friction and are driven by Westinghouse motors.

The patent band friction is of special design and possesses many features of superior merit. It is actuated through different members: the gear, drum, rocker shafts and strap bands. The strap bands tighten on a cast rim on the drums and are actuated by shafts which have double stub ends and are connected to the ends by jaw ends and turnbuckles. The lever arms are keyed to the rocker shafts on opposite ends and are actuated by the levers which move around fixed points on the gear. Slides are secured on the gear supporting the lever arms. The slides are actuated through a sleeve on the main drum shaft, and two radial arms which are secured to the slides. The frictions are thrown in and out of contact by means of hand levers in a battery, as shown by the cut of the double drum hoist, or by an air cylinder using an equipment similar



to street railway car compressors, as shown by the picture of the single drum hoist. By moving the sleeve to the gear the slides are actuated in a radial direction that operates the stub levers and rocker shaft; this causes the band to grip or tighten on the brake flanges of the drums. The reverse motion of the sleeve releases the fricton. A strong claim is made for the gripping device. After the frictions are thrown into contact, they will positively remain in this position until released. The drum and gear form a unit and can be operated as a reverse motion hoist without producing



any end strain on the bearings; the value of which is obvious. When the frictions are thrown out of contact, the drums are loose on the shaft and will revolve free at high speed when lowering or paying out the rope.

The single-drum hoist is shown with a Westinghouse electric railway air compressor and air reservoir mounted on the base of the hoist. The reservoir is connected to the air cylinder at the end of the drum shaft. The air valves are actuated by a lever shown

close to the battery of two levers and controller. Very little exertion is required by the motorman to throw the friction in and out of contact as it is of the toggle type. After the air compressor is put on the contact continues until the friction is reversed by the reverse motion.

The drums are turned off smooth or machine spirally grooved for any size wire rope, and mounted on a self-contained cast iron base arranged to receive the motor and controller. The drums for long planes or heavy lowering are equipped with asbestos brakes made out of long fibre material. The blocks are formed in sectors with iron flanges, securely bolted under high pressure, and treated with oil. They are secured between cast iron flanges and surrounded with steel bands of the differential type. The brake bands are operated with hand levers in notched quadrants fitted with thumb latches, and are thereby securely held in any position. The advantage of asbestos brakes for long planes or shafts is decided.

The single drum hoist shown by the photograph was installed at the Bliss Colliery of the D. L. & W. Company. The drum is 60 inches in diameter; 48 inches long between the flanges, and is designed for an 8,000-pound rope strain at a speed of 500 feet per minute. The hoist is operated by a Westinghouse type "HF" 150 horse power alternating current motor. This type of induction motor is especially suited for application where a strong starting effort is needed. It is well adapted for use on circuits carrying lighting loads, as the starting of it does not appreciably affect the voltage regulation. These motors are controlled by standard Westinghouse single handle, reversing, drum type controllers which insert resistance in the secondary at starting, and gradually cut it out as the hoist speeds up; the controller has a large number of points that gives smooth acceleration. When the controller is in the off-position, the motor is entirely disconnected from the line.

The double-drum hoist shown was installed for the Bessemer Coal, Iron & Land Company, Messins, Ala. It is connected to a Westinghouse 125 horse power motor of the same type.

CORRESPONDENCE.

*DR. HAANEL'S LETTER TO THE TEMISCAMING MINE MANAGERS' ASSOCIATION.

Ottawa, April 7th, 1910.

DEAR SIR:—

I am in receipt of a letter dated March 31st, 1910, entitled "Statement by Temiskaming Mine Managers' Association," from which I learn that the Association in question has thought it advisable to criticize me personally for certain statements which were included in an address delivered by myself, at the request of the Honourable Clifford Sifton, before the Canadian Conservation Commission. In making this statement, the Cobalt Mine Managers' Association has acted without a full knowledge of the facts. Considering the statements seriatim:—

1. That the statements "and in the Cobalt Region . . . . the mortality was simply astounding, the death rate per 1,000 men employed being 24.8," is absolutely without foundation or fact.

The figure given above was supplied to me by a trained mining engineer who had been especially engaged to make statistical investigations of this nature. That he misinterpreted the data published in the 18th Annual Report of the Bureau of Mines for Ontario is no fault of mine. Officially, I am responsible for his work; personally, I have no responsibility as I cannot be expected to personally check all data supplied to me by my subordinates. Had his figures been correct, my remarks would have been truly justified. As it happens, this officer is not alone in having made this error, for the same data have also been misunderstood by a number of other parties. Precisely the same figures were given independently by Honourable Clifford Sifton in his opening address before the Conservation Commission, and data for Mr. Sifton's address were not supplied from my office.

2. "That knowledge of its incorrectness was known by those responsible for it, two months previous to its publication in the above periodical."

This statement is without foundation in fact, as the following correspondence will show:

*See page 241, C. M. J., April 15th.

26 Wellington Street, Ottawa,
December 8th, 1909.

T. E. Corkill, Esq.,
Inspector of Mines, Toronto.

DEAR SIR,—I am looking up statistics on mine accidents and have read with much interest your remarks on this subject in the Annual Report of Bureau of Mines, 1908.

In your report I do not see any information given as to the number of persons employed underground, and above-ground, or total employed.

In Part IV. Colonial and Foreign Statistics for 1907 the total number of men employed is given for Ontario, as also the number of deaths, and death rate per 1,000.

I would appreciate your kindness very much, if you could supply me with the following information, form of which I enclose.

Yours truly,
(Signed) J. G. S. HUDSON.

DEPARTMENT OF LANDS, FOREST AND MINES.

OFFICE OF THE BUREAU OF MINES.
Cobalt, December 13th, 1909.

Jos. G. S. Hudson, Esq.,
Department of Mines,
26 Wellington Street, Ottawa, Can.

DEAR SIR,—I am in receipt of your letter of the 8th instant, asking for information regarding the mine accidents in Ontario for 1908. I will look into this matter as soon as I go to Toronto and give you the data asked for.

I must say, however, that the number of men employed underground in the Cobalt Camp in 1908 was more than 1,089. You have received this number from Mr. Gibson's statistics which is quite correct for the producing mines. I would draw your attention to the fact that there are only some thirty or thirty-five producing mines in the Cobalt Camp, which would not be half of the number of mines that are in operation.

Your truly,
(Signed) E. T. CORKILL.

You will note that Mr. Corkill writes: "I will look into this matter as soon as I go to Toronto and give you the data asked for." Mr. Gibson stated, both publicly and privately, in Toronto, that he personally had had no correspondence on this matter from this Department. I, also, can state that I had no correspondence on the matter, and can add that I had no personal knowledge of the correspondence noted above. I was surprised to learn from Dr. Wilson, on his return from Toronto, that there had been any correspondence. You will note that the two letters which have been exchanged are entirely unofficial. You will also note that Mr. Corkill promises to send the information for which Mr. Hudson asked. These letters were referred to both publicly and privately by both Mr. Corkill and Mr. Gibson in Toronto, during the meeting, but the information asked for in Mr. Hudson's letter and promised in Mr. Corkill's letter of December 13th, 1909, has not yet been received at this office.

Further, Mr. Corkill's letter is dated December 13th, 1909, the address was delivered on January 19th, 1910, and the same day the manuscript was handed to the representative of "Industrial Canada," at his own request. Proof was never submitted to me, and at the time of its publication I was not even aware that an error had been made.

3. "That notice of their error has still more recently been brought to their attention, both publicly and by the Ontario Government."

My attention was drawn to the error by an officer of this Department, and, subsequently, under my direction, this same officer, acting officially, made personal inquiries in Toronto with respect to this matter. The Ontario Government has not otherwise held any official communication with me on the matter, and has not sent a written statement officially drawing my attention to the error. Such information as we now possess has been obtained as the result of our own initiative and by personal inquiry.

4. "That in issuing no formal correction, those responsible for the statement are to be condemned for their silence and defensive attitude."

Dr. Alfred W. G. Wilson, who made the inquiries for me in Toronto, made a written report to me on March 7th, the date of his return from Toronto. The same morning the substance of this report, correcting the error, and giving the rate of 11.94 fatalities per thousand for the "Silver-Producing Mines" of Cobalt, was transmitted to the Honourable William Templeton, Minister of Mines. A report by another officer, dealing with mine accidents and which was in the printer's hands, was recalled and the necessary corrections were made. That these reports have not yet been published is not due to the inaction of this department. It did not appear to me that any further action was immediately necessary. Public attention had been called to the matter officially by an officer of the Ontario Government. No sensible person would think for a moment that such a mis-statement was made by me or by any one else in this department intentionally. Why should a special public statement be issued by me withdrawing the figure in my personal address on the authority of another party, and substituting therefor one equally startling, Equally startling because, if we accept, as you have done, Mr. Gibson's statement that there were thirteen fatalities in the "Silver-Producing Mines" of Cobalt, then there were fourteen fatalities in the non-producing mines of the same locality, and obviously there were fewer men working underground in these non-producing mines, although we have no published data as to this number. To strike any ratio for these non-producing mines would be a mistake under the circumstances, but what advantage would there be in correcting the former error and leaving the matter open to still greater error? Moreover, we already had in press, in the form of a report, a document in which there is a correct statement based on Mr. Gibson's own figures. Why then recall the former figure when the correct figure is given in an official report to be issued by this department?

The purpose of the statement in the original address was not to draw attention to the precise fatality rate of Cobalt. That is an abstract matter and incidentally of little importance. The statement was made purposely to show that the death rate was abnormally high and to draw attention to the matter, that it might be remedied. In such a connection, the precise rate per thousand is a matter of little moment. It would seem that the original purpose of that portion of the address which referred to mine accidents has been abundantly fulfilled.

5. This statement gives what purports to be the official figures on fatalities.

As already stated in section 2 above, Mr. Corkill promised, unofficially, in his letter of December 13th, 1909, to give us data asked for. These data have never been received either from Mr. Corkill or from Mr. Gibson. This table in your statement of the ratios is the first that has been seen either by myself or by any officer of this department. The figures are not given in any official publications of the Ontario Bureau of Mines that have been received at this office. That officers of my department, officers of another department not connected with the Mines Branch, and certain independent citizens of Ottawa, Halifax and elsewhere, have failed to clearly understand the data published in the reports of the Ontario Bureau of Mines is due either to their stupidity or to the manner in which the information in these reports is worded. Which is to blame is a matter of opinion. You will note, on referring to a statistical table subjoined herewith, that Mr. F. L. Hoffman, Statistician of the Prudential Insurance Company, of New Jersey, strikes a ratio of 9.94 fatalities per 1,000 employees for the silver and cobalt mines of Ontario in 1908. Evidently, authorities can honestly differ even when working with the same data.

6. Nothing in this statement was intended to reflect in any way on the excellent work which is being done in Canada at the smelters referred to. You will find, however, from the reports of the Ontario Bureau of Mines and from the reports of the Temiskaming and Northern Ontario Railway Commission, that these smelters export a large percentage of ore for further treatment. On page 12 of the 18th Annual Report, it is stated: "Through these works there were passed an aggregate of 6,958 tons of ore, containing 11,658,008 ounces of fine silver ,of which 8,972,938 fine ounces were recovered, the remainder. 2,685,050 ounces, being contained in the speiss product, reserved or exported for further treatment."

On analysis, this shows that 23.03 per cent. of the silver in the ores received by these smelters is recovered elsewhere. The same report is my authority for the statement that a large tonnage of low grade ores is exported, and that at present the elements other than silver are of comparatively little value, at any rate to the miners of the ore.

7. With regard to the statement of this section, it is only necessary to remark that no officer of my department should be blamed for obscure statements publish-

ed in the reports of the Bureau of Mines. Other persons entirely outside of this department and independent of it have misunderstood these reports in precisely the same way.

Here follows an illustration of Dr. Haanel's point, taken from a contemporary.

We recognize the excellent work of the Province of Ontario and her inspectors as regards the mining and inspection laws. The high mortality figures, as compared with foreign countries, and especially with Germany and England, show that there is still room for further improvement, and Ontario is not the only province in which this improvement is required.

8. This statement requires no comment.

In conclusion I would ask your association to consider the circumstances under which the address, afterwards published in "Industrial Canada," was delivered The purpose of the meeting was to consider Conservation in all its aspects. Is it not desirable that throughout our mining districts there should be greater care of human life and property? Are not the fatality rates in our mines, particularly underground, unnecessarily high? Can this rate not be reduced? And in regard to the treatment of the Cobalt ores, are not methods of treatment which will enable us to recover the whole of the silver values in Canada desirable? Would it not be of direct benefit to the miner and to the country at large, if the Cobalt content of these ores could be recovered and economically used in Canada? As it is, practically all the cobalt, except the very small percentage saved as a pigment, is lost to Canada. Are not these fit subjects for discussion before such a convention as the Conservation Commission, and are they not worthy objects in investigation? The mere fact that a slight error was made in quoting a mortality figure, an error entirely unintentional and due to causes beyond the control of the speaker, should not be allowed to detract from the force of the argument there set forth, nor should it call for more than passing comment.

I hope that you will see fit either to give this letter the same publicity accorded the statement which has caused it to be written, or that you will reconsider the statement in the light of the facts here set forth.

Yours very truly,

EUGENE HAANEL,
Director of Mines.

PRESIDENT PARK'S REPLY.

Dr. Eugene Haanel,
Director, Mines Branch, Ottawa, Ont.

DEAR SIR,—In reply to your letter of April 7th, regarding statement made by this Association.

While appreciating the detail of your reply, we cannot see that it alters or rectifies any of the statements taken exception to. We see no necessity of our replying at length and becoming involved in controversy. We cannot pass over, however, the fact that the copies you give of correspondence between J. G. S. Hudson and E. T. Corkill, are not complete, on the part of Hudson. He especially mentioned 24.8 as the result of his calculations, and it was to this letter and result that the reply of Corkill, which you give, was intended.

We recognize that improvement is always possible in metallurgical treatments. We believe that Thorold and Deloro are recovering practically all values of all marketable constituents, even to the point of exceeding the demand. That such is not done in Canada, at Copper Cliff, we believe, is entirely a matter of industrial conditions, and which is also governed largely as to the location of their markets. The fatality percentages are those as given by Mr. Corkill, who after all, is the only person competent to determine them.

We believe you lay too much stress on what is official and what is unofficial. Although you acknowledge an error on the part of one of your assistants, we see no reason why, in a public matter receiving a public protest, you prefer to place the correction in the hands of a printer of an official document, to appear at an indefinite date.

According to your request for equal publicity, we are sending copy of your letter to the CANADIAN MINING JOURNAL.

Yours truly,

H. PARK,
President.
J. G. SHEWAN,
Secretary.

Cobalt, April 26th, 1910.

The Editor, CANADIAN MINING JOURNAL,
Toronto, Ont.

SIR:—Mr. S. G. Forst, of Toronto, a director of the Peterson Lake Silver Cobalt Mining Company, has recently issued a circular letter to the shareholders, in which he casts insinuating reflections upon the character of his co-directors and also against the secretary-treasurer and solicitor of the company. Many of your readers have probably seen the letter, and it is probably too long to be printed in its full text.

In this letter Mr. Forst states that I rendered an account of $4,800 to the Peterson Lake Company for the work done in connection with the Nova Scotia investigation last year, and that I am still the holder of a lease on Peterson Lake granted to me in 1908. Both these statements are absolutely false. He also intimates that Mr. R. F Segsworth in his capacity as secretary-treasurer, was instrumental in having me appointed and in paying me a large fee for work done, and was using his influence to have the leases extended on account of his relation to me.

I do not need any defence with those who have known me during my fourteen years' mining experience, but to those who are not acquainted with Mr. Forst and his methods, or with myself, the following plain statement of facts is due.

After some pressure I was induced to undertake (at the personal solicitation of the president), the investigation, and was appointed on the 8th day of June, 1909, on the motion of Mr. Forst, and my fee for the work arranged. I returned to Toronto and made a partial report to the directors, and on the 30th day of June, on the motion of Mr. Forst, was instructed to return to Cobalt and make a more extended investigation. On the completion of the work, Mr. Forst moved the acceptance of the report, and it was also adopted by the shareholders at a general meeting held on October 6th, 1909. I did considerable work during the fall and winter in connection with the litigation and my account was not presented until March. 1910, when Mr. Forst attempted to repudiate the whole transaction and began the personal attack above referred to, apparently to gain full control of the company for himself.

I obtained a lease from the Peterson Lake Mining Company in April, 1908, and in the same year sold it to the Kerry Mining Company, and from that time have had absolutely no connection with the management or financing of that company. My brother is not a direc-

tor of the Peterson Lake Company, and has no vote on the board, and accepted the position of secretary-treasurer at the personal solicitation of Mr. MacLaren and Mr. Scott, and was appointed on the motion of Mr. Forst some time after my own appointment.

Mr. Forst says in his letter, "One of the leading engineers of Cobalt has informed Mr. Forst that he would have done the required work for $1,200." It is unusual for prominent engineers to state the cost of this class of work before its execution, and it is more unusual for them to comment upon the cost of extensive examinations made by others unless they take pains to inform themselves of all the work done. In this case I am sure that the engineer's so-called prominence exists in Mr. Forst's imagination, or that he was misquoted.

A slight consideration of the above facts will show that Mr. Forst must have some ulterior motive for repudiating his own actions just five weeks before the annual meeting. He holds to be unjust and iniquitous acts in which he was the prime mover, and the results of which he moved to accept, and then states that they were wholly the acts of others. His position is so false and unjust that further comment is unnecessary.

Yours truly,

Walter E. Segsworth.

Toronto, May 4th, 1910.

THE GEOLOGICAL SURVEY FIELD PARTIES SO FAR ARRANGED FOR ARE AS FOLLOWS.

Mr. D. D. Cairnes will examine the ore deposits of the Atlin district. Since the early days of placer mining a number of mineral veins have been discovered.

Mr. R. G. McConnell, assisted by G. O. Malloch, will study the country at the head of the Portland Canal. This district has recently come into prominence, and a mining boom is now setting in.

Mr. W. W. Leach will continue his explorations in the Hazelton district, on the Grand Trunk Pacific Railway, up the Skeena River.

Mr. C. H. Clapp will continue his geological investigation on the southeast end of Vancouver Island.

Mr. R. H. Chapman will continue topographical work on Vancouver Island.

Mr. Chas. Cassell will complete the geological mapping of the Tulameen district.

Mr. L. Reinecke will continue the mapping of the Beaverdell district, West Fork Kettle River.

Mr. O. E. LeRoy will complete his study of the geology and ore deposits of the Slocan district and investigate Deadwood Camp, Boundary Creek district.

Mr. W. H. Boyd will be engaged in topographically mapping these districts.

Mr. R. Schofield will continue work in East Kootenay.

Mr. J. Allan and Mr. Shimer will make a geological study of the Ice River district.

Mr. D. B. Dowling will continue his investigations of the coal areas of Alberta, near the Grand Trunk Pacific Railway.

Mr. W. McInnes will explore in the country north of Prince Albert.

Mr. H. Ries and J. Keele will be engaged in a study of the clay deposits of the Northwest Provinces.

Mr. J. D. Trueman will map the geological formation about Gunflint Lake.

Mr. W. H. Collins will be engaged in a geological study of the country west of Gow Ganda.

Mr. W. A. Johnston will complete his mapping of the Lake Simcoe district.

Mr. C. R. Stauffer will make a detailed study of the rocks of the southeastern peninsula of Ontario, which are important on account of oil, gas and salt.

Mr. M. E. Wilson will explore the country near the Transcontinental Railway east of Lake Abitibi.

Mr. J. Dresser will continue his investigations in the Eastern Townships.

Mr. E. R. Faribault will spend part of the season in the Chibougami district as a member of a geological commission sent out by the Quebec Government.

Mr. J. W. Goldthwait will study the Pleistocene geology of the St. Lawrence valley.

Mr. G. A. Young will geologically survey the Tobique district.

Mr. M. Y. Williams will be engaged in a geological investigation in the Arisaig district.

Mr. E. R. Faribault will have a party continuing the investigation of the gold-bearing rocks of Lunenburg County.

In addition, it is hoped that a number of competent geologists will be secured to undertake pressing work in the Northwest, in Ontario and in Nova Scotia for the new Museum.

SAND FILLING OF STOPES.

At the Robinson gold mine on the Rand the hydraulic sand filling of stopes was undertaken last year on a small scale, and the consulting engineer now reports that arrangements are being made for the application of the scheme on more extensive and practical lines. "This system," he says, "provides security in the old workings. It will enable us to win nearly all the rich pillars left on the main reef leader and south reef, and will assist in the economic working of the main reef." Other Rand mines are also about to employ the sand filling process to a much greater extent than hitherto. Mr. Schumacher, at the Rand Mines meeting last month, suggested that in the course of the next five years the unsightly sand dumps of the Central Rand will have partially disappeared. The plants now in course of construction or already complete will, at an early date, be dealing with sand at the rate of about 4,000,000 tons per annum. As soon as these are in proper working order steps will be taken to increase the capacity of the sand-lowering equipment until the dump heaps of the Central Witwatersrand will be depleted at the rate of 30,000 tons per day, or, approximately, 9,000,000 tons per annum, an amount which is more than double the total tonnage mined by the Rand Mines, Limited, last year. The plan required for carrying out these operations is very simple indeed, and consists of a sand-bin at the top of the shaft, into which dry sands are filled from the nearest dump. A pipe is led from this bin down the shaft and along the drives, etc., to the point at which it is desired to pack. Down this pipe the sands are flushed with water, under a free flow. The water is drained off at the top of the beds of sand packing and is re-pumped to surface for use again. This water is kept wholly apart from the mine water. The preceding remarks apply, of course, to accumulated products only. For the time being it is deemed inadvisable to employ current sands for the packing work, as they naturally carry a considerable amount of free cyanide, and are, moreover, not sufficient in themselves to provide all the material required. Experiments are, however, being carried out with a view to neutralizing the contained cyanide in current or recently dumped products.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, May 3rd, 1910.—The Close of the U. M. W. Strike. In our letters which appeared in the Journal of the 15th of March and 1st of April we referred to the desire which was being shown by the management of the Dominion Coal Company to afford their striking employees an honourable way out from the mistaken position which, under the tutelage of the U. M. W. A., these men have taken up. We referred to the efforts of the clergymen of the Glace Bay district in this direction, and to the circumstances under which the company saw fit to withdraw a written statement from the general manager of the terms on which they were willing to re-employ the strikers, and we remarked: "Whoever counselled the men on strike to refuse the very liberal and honourable offer which was made by the management of the company in their desire to end a situation, disastrous to all alike, assumed a grave responsibility. The strike was always unnecessary, and those who called it were guilty of crime, but its continuance under present conditions is merely foolishness. The individual strikers are beginning to realize this, and the increasing outputs tell their own unmistakable tale." The reasonableness of the company's position was admitted on all hands, and the illegality of the proceedings of the U. M. W. A. was clearly laid down by Judge Lawrence's decision and the restraining order which he issued against the American union. The efforts which had been made two months previously to end the strike, to which the company had responded in a very conciliatory manner, were still continued by the clergymen, and the sentiment against further futile prolongation of the strike became almost unanimous, and too pronounced to be resisted. The United Mine Workers are face to face with a large strike expenditure in their own proper domicile, and they are also having trouble in the Canadian West. One of the most prominent of the U. M. W. leaders made the statement that the strike had been mismanaged and was commenced under a misapprehension of the true state of affairs, and in face of the action, which the Coal Company has entered against the U. M. W. for damages and conspiracy, and the large importations of men which the company was arranging for, the leaders of the U. M. W. appear to have concluded that the present time was not opportune for further prosecution of the strike, which on their own representations has absorbed the entire amount at the credit of their reserve fund in July of last year. The offers which the company has made from time to time to take back its striking employees and give them absolutely fair treatment have always been open to the men, and acting upon the advice of their leaders the strikers decided to return to work, relying on the good faith of the company to deal fairly with all its employees. The end of this ill-starred trouble, like its commencement came with remarkable suddenness and took people generally by surprise. The past ten months has been probably the most unpleasant period that Glace Bay ever experienced, and there can be no doubt about the sincerity of the general hope that the trouble is over, and that its memory will be as evanescent as that of a hideous nightmare. The strike was an ill-considered and ill-advised proceeding, taken with a blind disregard of the probabilities. Its utter failure was apparent the first week of the trouble, and it is a great pity that the fighting abilities of those who took part in the strike were not utilized to better advantage than to serve the aims of an ambitious labour leader and to destroy the livelihood of the fighters themselves.

A New Work on Nova Scotia Mining Industries.—Mr. C. Ochiltree MacDonald has enriched the mining literature of Canada by what is undoubtedly the most complete survey of mining in Nova Scotia which has appeared since Mr. Richard Brown published the "History of Coal Mining in Cape Breton." Mr. T. J. Brown, in his presidential address before the Mining Society of Nova Scotia, recently deplored the fact that Mr. Richard Brown had apparently no successor in his literary labours in this connection, but it would appear as if the mantle of this worthy of former days had descended on Mr. MacDonald, who we believe is also from the "Old Country." A casual reading of Mr. MacDonald's book impresses one with the fact that he views the coal mining industry of Nova Scotia with a breadth of view and with a sanity proceeding from a complete apprehension of the facts and the history of the industry, and the work will repay perusal by anyone whose business touches coal-mining in this province.

Referring to the Dominion Coal Company, the author remarks: "The organization of the Dominion Coal Company has obviously very greatly benefitted Nova Scotia; and all Eastern Canada has similarly felt the beneficial effects of this timely amalgamation of the collieries south of Sydney Harbour." Mr. MacDonald states that had the Dominion Coal Company not been formed a shortage of coal must have come about "which would have abnormally increased the price of fuel to the Canadian consumer."

In connection with submarine coal-mining, Mr. MacDonald speaks from personal knowledge of the subject obtained at the Morien collieries. He refers to the great submarine coalfield lying off the shores around Sydney Harbour, which, "lying on the edge of the water routes to the most populous markets in the globe, is practically inexhaustible; and the Sydney coalfield may consequently be regarded as one of the world's greatest coalfields." It is a matter for surprise that many people do not realize the value of the Sydney coalfield. When it is considered that it is the only coalfield on the Atlantic seaboard of the American continent—the other Nova Scotian fields alone excepted—that the coal measures of Europe and the United States are becoming very sensibly depleted, and that the world's future coal supply lies mainly in Siberia and the Far East, there are, it would seem, very sufficient reasons to anticipate a marked appreciation in the value of the Cape Breton coalfields. Mr. MacDonald also refers to the wastefulness which would be occasioned by adherence to the regulations governing submarine mining which until lately were law in Nova Scotia. It was always understood, however, that these regulations were merely tentative, and would be modified as experience was gained in working submarine coal areas. Mr. MacDonald remarks very truly that submarine areas "can be more advantageously wrought by specific regulations applied to each as experience in the winnings accumulated, rather than by hard and fast rules equally applicable to all." Most people will agree with this point of view.

The book deals very sympathetically with the history and aims of trades unionism in the province, and traces the history of the Provincial Workmen's Association from its commencement under the direction of Mr. Robert Drummond. Mr. MacDonald refers to the changing conditions brought about by the recent industrial expansion in Cape Breton. He remarks that the mine workers of Nova Scotia have in the past" by their moderation, patience, and good judgment promoted the development of the Nova Scotia coal trade; and by the exercise of similar good judgment they can further promote this great industry." These remarks are peculiarly opposite to the condition now existing at the Glace Bay Mines, where the hitherto harmonious relations existing between the mine-workers and the operators have been disturbed by the intrusion of influences alien to the province. It is to be hoped that the present situation will be helped by what Mr. MacDonald terms "the pacific influences likely to be exerted by the hereditary intelligence of

the Nova Scotian mining classes, and the fair treatment the mine-workers enjoy from the operators. Mr. MacDonald is evidently among the prophets.

The book makes reference to the suitability of many of the fireclays associated with the coal seams in Nova Scotia for use as fire-bricks, etc. Considering the importance of the steel industry to Nova Scotia and the many uses to which such bricks could be applied it would seem as if there was reason to pay more attention to this matter. The use of bricks and stone generally will, of course, increase as the timber resources of the province become depleted.

A chapter is devoted to a history of the agitation against the Truck System in Cape Breton, in the abolition of which the author states he was largely instrumental. Another chapter deals with the co-operative movement among the miners. This movement has had several severe setbacks in Cape Breton, but several successful societies are now doing business in the mining districts, and there seems really no adequate reason why the principles of co-operation should not consort as well with the genius of the Cape Breton miner as they have with that of the miner in other countries, notably in England. The secret of the failure of many of the co-operative societies in the past in Nova Scotia appears to have been that they did not do business on a strictly cash basis.

There are several interesting chapters in the work on the iron industries of the province, but your correspondent's knowledge of this matter is too limited to enable comment thereon.

ONTARIO.

Cobalt.—Navigation has now been open on the Montreal River for some little time, and boats are running between Latchford and Elk Lake. The two navigation companies that were operating on this route last year have been merged into one company. At the beginning of the season a good deal of trouble was experienced at first on account of several of the boats being put out of commission on the initial trips, but they have now been put into service again. For the present only one trip a day is being made, but when the traffic warrants it two trips each way will be made daily.

The Kerr Lake people are optimistic regarding the Wettlaufer property in South Lorrain, which they have acquired. The development work being carried out is giving excellent results, so much so that the management will considerably extend the scope of their operations. When the new twelve-drill compressor is running, the cost of mining will be greatly reduced. It is expected that this mine will shortly become a regular shipper. The Keeley now has its plant running, and will carry on the work of opening up its property as rapidly as possible. At the Maidens property the shaft on the No. 2 vein is down about sixty feet, but the vein was dipped from working. Sinking will be continued for some distance farther before a crosscut is run to cut the ore body. The vein in the shaft carried good values in native silver. The Mines Power Company contemplates installing a compressor of about fifteen drills capacity, somewhere in this district, in order to help out some of the smaller properties until they are in a position to install machines of their own. Five silver bricks, valued at between four and five hundred dollars, were found a short time ago on the Princess property. The silver had evidently been stolen, and had been hidden for some time. So far no owner for them has appeared.

Since the last statement of shipments from the Gow Ganda camp was given out, the Millerett, formerly known as the Blackburn, has shipped another car of high-grade ore. This makes a total output from the district for the year of about 325 tons, and from the Montreal River district as a whole, 345 tons. All of this output was high-grade ore, none of which ran less than 1,000 ounces of silver to the ton. On the Rawhide property, near Shanty Lake, a discovery is stated to have been made in a winze about 35 feet from the tunnel entrance. The Temiscaming and Hudson Bay Company, in the same vicinity, are working the McAlpine claims and good results are reported. A small steam plant was installed just before the break-up. A shaft is now down about twenty feet, and there is about two inches of high-grade vein matter. The country rock is also plentifully shot through with leaf silver.

The Cobalt Lake Mine seems to be coming into its own at last, and never in the history of the property have the physical conditions been so satisfactory. In sinking the winze to the 280-foot level, another rich vein has been encountered. This makes the third high-grade vein that has been discovered in the past few months. The new ore body is several feet wide and running through it are several stringers of high-grade ore. The rock between these stringers also carries leaf silver and argentite. Shipments are now being made more or less regularly and it is probable that they will be considerably increased in the near future.

The German American Company, in South Lorrain, has decided to put in a steam plant during the summer to open up a big calcite vein on the property. A shaft has already been sunk 50 feet by hand, and this will be continued another 50 feet. The vein is calcite with some smaltite and low assays in silver. On the Harris Lorrain, which adjoins the Frontier property, a force of 30 men has been started prospecting. A small plant will be installed. Another plant is to be put in on the adjoining property known as the Wendie, where twenty men are already trenching the surface. The opening of navigation has been responsible for the renewed activity of this district, which is growing in importance every day. During the summer, considerable road building, which is very badly needed, will be done. The government has made a small grant to assist in this work.

The O'Brien has made another shipment of silver bullion to the Bank of England. The bars contained 18,250 ounces of fine silver, valued at $9,675.

The Silver Cliff mill is now being operated with electricity supplied by the Mines Power Company, and the returns have been very satisfactory. It is, however, only being run to about half its capacity at the present time, as some of the motors installed were found to be too light for the duty required. As soon as the new motors are in the production will be much increased.

It is stated that the Cobalt Central is to issue between $300,000 and $400,000 worth of bonds. This will clear off their present indebtedness, and provide working capital for the future. The property is evidently suffering from too much New York mismanagement. The mine is in good shape, and there is several months' run of mill rock broken in the stopes. For the present all the miners have been laid off and only enough men are employed underground to supply the broken ore for the mill. The Bailey property adjoining has contracted for a mill run of 500 tons, and a small tonnage of the concentrating dump of the Crown Reserve is also to be treated at the Cobalt Central.

Blackburn and Jones, the men who were responsible for the fake rush into the Caribou Lake district, have fallen into the hands of the police. They have already come up for preliminary hearing ,and have been committed to North Bay to stand trial.

One of the most interesting annual reports issued this year is that from the Nipissing Mining Company. This is the most favourable report yet issued, and shows an excellent state of affairs on the property. During the last year the net earnings were increased by $775,000; the dividend payments were increased $660,000; and the surplus increase was over $100,000.

The value of cash on hand and ore on hand, in transit, and at the smelters increased $400,000. The cost of producing silver was decreased from 20.7 cents to 16.39 cents per ounce. A total of $1,500,000 was paid out in dividends. The ore reserves are now estimated at 6,538,000 ounces, valued at $3,269,000. The reserves are, it is altogether likely, much greater than this, for when a vein is opened up by a drift without any raises or winzes, only ten feet of ore is allowed above and below the drift. At the beginning of the year the reserves were estimated at 2,156,000 ounces, and after producing 4,646,876 ounces, they were estimated at the end of the year at 6,538,000 ounces. The total production up to date has been 12,747,467 ounces. The gross profit on production for the year was $1,687,228. During that time 33 miles of trenches were dug at a cost of $806 per mile, the average depth being 3.4 feet. The report states that this is the most economical and satisfactory method of prospecting, but goes on to say that the management cannot hope to discover all the veins, unless all the overburden is removed. Plans are under way for carrying this out. A new vein was recently discovered, running parallel to No. 101 in the crosscut between the Meyer and Fourth of July shafts, at a depth of 75 feet.

The mine owners of Gow Ganda have petitioned the provincial government to construct a road that will connect that district with some outside point that has railroad transportation. They also urge the construction of a branch line from the T. & N. O. Railway. There is no possibility of such a line being built for some time to come, but the government has appropriated the sum of $30,000 to construct a wagon road from Charlton to Elk Lake. This will connect with the present road from the latter to Gow Ganda, and will aid materially in providing transportation facilities to the district. The lack of this has been the greatest drawback with which the new camp has had to contend and operators in that section feel that some action should have been taken long ago. The shipments from the district, which aggregated about 325 tons of high-grade ore, were greater than was expected, and the mining men point to these as a reason for government aid.

The shaft of the Agaunico property is being sunk from the 250 to the 300-foot level. It is stated that Huronian slates were encountered at a depth of 250 feet, and as these slates have been found to be very productive in this camp, the management will continue sinking in the hopes of opening up an ore body. Work was originally started on one of the largest cobalt veins in the district, but although they have the cobalt at depth, the silver contents are, as they always have been, very low.

A vein has been cut in the Tretheway Mine about 140 feet from the No. 2 shaft. The vein was opened up on the 65-foot level, and shows several inches of high-grade ore. The new concentrator is about completed, and will it is expected, start running in a few days. The new shaft near the Hudson Bay boundary line is all timbered, and in a short time the company will proceed to open up the veins discovered in that section.

A decided improvement has lately taken place in the La Rose properties, good ore bodies having been opened up on the Lawson, Princess and main La Rose workings. At the Lawson, a drift was run from the 88-foot level on the "Keewatin" vein. There is now between three and four inches of high-grade ore showing in the drift. This is practically the first important ore shoot opened up at any depth . The greatest development has, however, taken place in the main La Rose workings, where several veins have been proved to greater depths. There are now three veins on the Princess that are producing good ore, and in the near future some of the outlying claims are to be opened up. At the recent annual meeting of the Nipissing, Mr. D. Lorne McGibbon, the president of the La Rose, was elected a director of the former company. This would seem to point still more plainly to the amalgamation of these two properties. Mr. McGibbon has for some time, been entirely favourable to such a scheme, although there are, however, many difficulties to be overcome before its culmination can be expected.

The Hargraves Mining Company has been notified that its petition to have the royalty reduced from twenty-five per cent. of the gross proceeds to twenty-five per cent. of the net profits, has been granted by the government. It was not generally known that this company had been trying for the royalty reduction, and with the exception of the Chambers-Ferland, it is the only one to get it direct from the Government. All the other companies that got the reduction, paid to the T. & N. O. Railway Commission. The policy of the government seems to be to collect the heavy royalties as long as the companies can manage to stagger along and still pay them, but where the company can no longer do that, then there is a chance of getting them reduced.

The Crown Reserve is having a hundred tons of the dump run through the Cobalt Central mill, in order to get an idea of its value. If the returns are favourable, it is possible that it may build a concentrator for itself. Its concentrating dump is estimated to contain approximately 25,000 tons and it is adding to it at the rate of about fifty tons a day.

At the Provincial Mine, which was bought from the government at the last sale of Gillies Limit lots, a good vein was encountered while sinking the shaft near the boundary of the Savage property. The vein was cut at a depth of 80 feet and shows about four inches of high-grade ore. It dipped from the shaft a few feet lower down, however, and a crosscut will be run from the 100-foot level to intercept it.

Several companies have lately commenced operations in the Gillies Limit, but so far the main operations are confined to trenching. At the Wyandoh, good ore is being found in the drifts at the 110-foot level. This is on the same vein that is being worked on the Waldman property adjoining.

The new machine shop of the Tretheway has been burned down. This will in all probability, somewhat delay operations in the concentrator, as a good many of the machine parts were being made on the property.

Porcupine.—The government has given notice that upon all claims staked in the Porcupine district, between the first of January and March fifteenth, the time for doing the assessment work, will be extended to June the fifteenth. This concession was made on account of the petitions asking for it, that gave as the reason the exceptionally early break-up, which practically disorganized operations in that section. Gasoline launches are now running and are proving to be a material aid in the transportation problem. A good summer road is, however, badly needed, and although several starts have been made, nothing of any importance has as yet been accomplished. Government aid is much needed in this undertaking, and the district as a whole will naturally suffer until it has been built. Although no official statement has as yet been given out, it is commonly reported that the returns from the car of ore shipped from the Timmins' property assayed in the neighbourhood of $200 per ton. It is, however, too much to expect that this will represent an average of the vein, and the owners will doubtless be well pleased if they get an average of one-tenth of that amount. That they are well satisfied with their original investment is, however, evidenced by the large holdings they have acquired, as it is stated that they have purchased and have under option about forty claims.

GENERAL MINING NEWS.

NOVA SCOTIA.

Springhill Mines, May 5th.—Vice-President E. S. McCollough, of the U. M. W., who has been expected here since the settlement of the Glace Bay strike, arrived to-night, and was accorded a grand welcome. He addressed a public meeting held in the Drill Hall. Mr. McCollough referred to the satisfactory settlement of the difficulties in Glace Bay, but further said that the settlement in Cape Breton did not mean a conclusion of the labour disputes here. The strike here was called independent of Glace Bay and could only come to a conclusion when the matters in dispute were satisfactorily settled to all concerned.

He praised the miners of Nova Scotia for the splendid way they had conducted themselves during the strike, and told the men of Springhill that they would now receive more attention. The U. M. W. had spent over a million dollars in Nova Scotia since the strike commenced, and they were prepared to spend more, and that the Union would stand by the miners of Springhill until the whole affair was settled right.

New Glasgow.—A rich strike of gold has been made on one of the veins of the Egerton property, Fifteen Mile stream, Halifax County. Reports affirm that four feet of mill stuff has been exposed for eighty feet, carrying high values.

ONTARIO.

Port Arthur.—The Atikokan Iron Company's blast furnace will be put in commission in a few days. Coal for the coke ovens has already arrived.

Cobalt.—The blacksmith and machine shops of the Tretheway mine were destroyed by fire on May 4th.

Gowganda.—The following petition has been sent to the Hon. Frank Cochrane, Minister of Mines, by the mine operators of Gow Ganda:

"The petition of the undersigned mine-owners in the vicinity of the Gow Ganda townsite, humbly sheweth:

"1. That the amount and value of the ore already shipped, together with the amount in sight, additional mining machinery now being installed, and other actual development work, fully establishes the fact that this is a genuine and established mining camp of large extent and rich values.

"2. That owing to the lack of roads and other transportation facilities the growth and development of the camp is greatly handicapped and investment discouraged.

"3. That your petitioners feel that these facts will warrant your department taking into serious consideration the further extension of roads and transportation facilities.

"4. That particularly your department may see fit to take steps to shorten the road from Miller Lake by way of the present working mines, and to continue a government road westward across the east branch of the Montreal River to connect with or continue the Bisco road to the Wapoose River or other convenient point on the west branch of the Montreal River, thus giving highway facilities at all seasons of the year to the working mines and mine-owners on the west side of Gow Ganda Lake and across to the townsite.

"5. Your petitioners would further urge the early and immediate construction of a railroad, either by the government or by the granting of a charter to some company willing to undertake construction."

Dryden.—At the Detola mine the foundation for the stamp mill is just about finished and trips will shortly be made to the Glass Reef property for balance of the mill machinery which was unable to be brought on the ice owing to the early breakup.

BRITISH COLUMBIA.

Portland Canal.—The Big Casino group of claims in the camp has been sold to a Vancouver syndicate. The transaction was put through by the Mercantile Trust Company.

Stewart, May 3rd.—One of the largest companies so far incorporated to operate in the Portland Canal is that of the Roosevelt Mining Company, Limited, with headquarters in Vancouver. This undertaking has been formed to acquire the interests of D. J. Rainey and Graham Chambers in the Roosevelt group of five claims located on Bitter Creek, for which surveys have been made and applications for crown grant are now pending. The provisional board of directors has the names of Joseph Chew, lumber manufacturer of Vancouver; A. R. Davis, of the same city, and D. J. Rainey, of Stewart. Other names will be added after the preliminary meeting of the directors.

The Roosevelt group is among the oldest located in the camp and has a considerable amount of development work in tunnels and surface cuts.

Nelson.—News of much activity comes in from the Slocan, where with the opening up of spring, mining operations are general. At the Standard mine at Four Mile Creek, near Silverton, a silver-lead proposition, some fine leads have been struck, and it is estimated there is enough ore in sight to keep a crew of twenty men stoping it out for five years. The Standard, which is owned principally in Spokane, has been working for the past five years, but the present strike has been made in recent weeks. G. H. Aylard, New Denver, is manager.

The Van Roi mine at Silverton, one of the biggest silver mines in West Kootenay, has a force of 100 men at work getting out ore, besides a crew of five men on a diamond drill. Some very fine cores have come from the diamond drill, which indicates an abundance of ore in the leads now being worked, as well as in several parts of the area surrounding the workings. The Van Roi mine, owned by a company in the Old Country, promises to be one of the largest silver producers in the province. The manager is Douglas Lay.

Nelson.—Confirmation of the recently-reported strike on the Rossland War Eagle, of an entirely new ore body of high-grade ore ,has been made. The importance of the discovery has been rather under than over-estimated. The shipments are said to average $40 per ton in gold and about five per cent. copper, a much higher average for similar tonnage shipped in one bonanza production this year. The Le Roi hopes to attain similar results and is pushing its diamond drill work as fast as possible.

At the annual meeting here of the Nugget Gold Mines, Limited, operating at Sheep Creek, the old directors were elected and the report presented was decidedly satisfactory, showing solid financial management and excellent indications of a successful year at the mine. Last year 5,000 tons were milled, producing $78,860. The concentrates averaged $5,200 at the smelter. There are no developments of the strike among the British Columbia Copper Company at Mermon. The company has given the men until to-day to return to work.

Vancouver.—On the McLennan property, Moresby Island, a stamp-mill is being erected. The machinery was shipped early in April.

YUKON.

Dawson, April 28th.—The Canadian Klondike Company's dredge No. 1 started operations yesterday for the season, the earliest in the history of the camp. The company expects to operate 200 days before cold weather compels a shutdown.

The season here is more backward than was expected three weeks ago. A spurt of warm weather then laid the trails bare. It has since been very cold at nights, with the temperature moderating slowly. The real thaw has now begun and water is running freely. Ten inches of snow fell several days ago, which

means great benefit to the miners for hydraulic sluicing purposes.

Dawson, April 30th.—The striking of quartz claims continues one of the popular enterprises. Everywhere throughout the camp men are showing their faith by the planting of stakes, and not a few in the undertaking of actual development work.

Some of the most extensive staking of late has been done on Sulphur, Gold Bottom and Meadow Creeks by A. A. Knorr and associates. The staking on Sulphur is on both limits of the creek and extending on the right limit well over toward Parker Creek, a tributary of Indian River.

Forty-one grants for quartz claims were issued at the gold office to-day.

One group of five claims was staked recently on the right limit of Bonanza, opposite Victoria gulch, by Paul Guite and others.

MINING NEWS OF THE WORLD.

EUROPE.

Hungary.

A system of wholesale theft has been brought to light at the Twelve Apostles gold mine at Brad, near Arad, in Hungary. The mine is the property of Count d'Harcourt de Gotha, and it is now known that the thefts of ingots and gold dust have been carried on for years, their extent being estimated at many million kronen. The thieves, it is alleged, formed a perfectly-organized band, recruited from among the workmen and officials, and under the direction of the local priest. The stolen gold was removed in various ways, often in emptied dynamite cartridge cases, and the amount of the plunder may be gained from the fact brought to light during the investigations that one of the workmen had recently been able to make a purchase to the extent of 70,000 kronen, while a gendarme had 80,000 kronen in a savings bank.

SOUTH AFRICA.

Johannesburg, April 16th.—The aggregate ore reserves at present developed by the mines of the Rand are valued by the latest estimate at £100,000,000, showing a profit on the basis of the present working costs of at least £40,000,000.

Profits on operations on the East Rand Proprietary Company's mines during March of this year are reported at £107,046. For March, 1909, the profits were £106,113.

MEXICO.

City of Mexico, April 29th.—The Real del Monte and Pachuca Company is reported to be confronted with the necessity of developing extensive ore reserves in the Real del Monte mines at Pachuca, due to the fact that up to this time the development work has been kept but little ahead of the mill requirements. The available ore supplies are diminishing, and the company's cyanide plants have ceased to operate at full capacity. Officers of the United States Smelting, Refining and Mining Company, which controls the Real del Monte enterprise, recently visited the mines, and the question of extensive development was gone into thoroughly with the general manager, C. W. Van Law. The Real del Monte controls more than seventy mines and at the present time only a few are being operated.

Chihuahua, May 4th.—M. F. Crosette, manager of the Promontorio silver mine for the Cusi Mining Company, of Chicago, states that when he gets the smelter returns for ore shipments made last month, his company will have received the purchase price of the mine, all development work, cost of machinery and every other expense. The mine was purchased in July, 1909.

UNITED STATES.

Washington, D.C., May 3rd.—The senate yesterday amended and passed a bill which already had passed the house to create a bureau of mines in the interior department. In addition to carrying on a part of the mining work heretofore done by the Geological Survey, the bureau will investigate the causes of mine explosions.

Mr. Root opposed the bill on the ground that the measure was a step "toward the usurpation by the national government of duties which belonged to the states."

"I believe we have enough to do," he added, "in performing the functions conferred on the national government, and should not take upon ourselves duties not incumbent upon us."

Mr. Guggenheim predicted that from $50,000,000 to $100,000,000 would be saved annually by the legislation and said the people of the United States had much to learn regarding metallurgy.

To show the importance of the mining industry, Mr. Nixon said that the mines supplied over 60 per cent. of the freight carried by the transportation companies of the country.

The bill places the bureau in the hands of a director, with a salary of $6,000 a year.

A portion of the work of the Geological Survey is to be transferred to the new bureau.

Goldfield, Nev., May 2nd.—Checks for dividend No. 7, payable to stockholders of the Consolidated Mines Company on April 30th, have been mailed from the company's office in Goldfield, and are accompanied by a statement setting forth the financial status of the company and showing that it is in a prosperous condition. The dividend is for 50 cents a share, being the company's regular dividend of 30 cents a share, together with an extra dividend of 20 cents a share, declared at the last quarterly meeting of directors. This payment involves the distribution of approximately $1,780,000 and brings the total of profits divided among shareholders to the sum of $7,468,348.

Birmingham, Ala., May 5th.—A report was received here late this afternoon that 150 miners had been entombed by a mine explosion in a coal mine near Palos, Ala.

The chief State Inspector and First Aid to Injured Society members are flocking to the place. A special train is now leaving Birmingham for the scene.

Palos is a hamlet in Jefferson County, 30 miles from here, and there is no direct communication.

COMPANY NOTES.

PETERSON LAKE SILVER COBALT MINING COMPANY—PRESIDENT'S REPORT.

To the Shareholders of the Peterson Lake Silver Cobalt Mining Company, Limited:

Gentlemen,—In presenting herewith the fourth annual report of your company for your consideration, I must congratulate you upon the improved condition of the company, both from a financial and physical standpoint as shown by the reports of the treasurer and consulting engineer, and also upon the successful issue of your action against the former management which resulted in the payment into the treasury of the company of $53,000 cash and 160,000 shares of stock.

The consulting engineer's report shows that 111.32 tons of ore was shipped, netting $11,312.92 in royalty.

The Bank balance is $47,237.42, as against $6,818.35 at the end of the last fiscal year.

The issued capital has been decreased by 160,000 shares and now stands at 2,401,820 shares, and the stock in the treasury has been increased by a like amount.

The physical condition of the Little Nipissing lease has been much improved during the past year and one other of the leasing companies has made a discovery of value which seems likely to lead to shipping ore.

Two complete power plants have been added to those already on your property.

The company has for some time been developing a vein on unleased land, which appears to be a continuation of the producing vein on the Little Nipissing and your management look forward with confidence to developing shipping ore on their own ground within a short time.

Power is now being supplied to the various lessees by the public power companies and with the advent of this cheap power it seems certain that the profits this coming year will be much greater than the past and that many new discoveries will be made on your property.

(Sgd.) A. F. McLAREN.

SECRETARY-TREASURER'S REPORT.

Issued capital, 2,401,820; treasury, 598.180 shares; authorized, 3,000,000.

Balance Sheet.

April 30th, 1910.

Assets.		
Bank of Hamilton Current Account		$ 2,237.42
Bank of Hamilton Savings Account		45,000.00
Accounts Receivable		3,585.67
Plant, Machinery and Buildings		2,917.31
Mining Properties		2,510,216.25
Road Allowance Patent		49.75
Commission on Stock Sold		5,532.00
Discount on Shares		30,910.00
Development Account, including		
Estimated value of ore on hand, April 30th, 1909.	$38,717.19	
Add Consulting Engineering, Interest, Travelling, Mine and Management Expenses, including Island development for year ending April 30th, 1910	8,800.10	
	$47,517.29	
Deduct Ore Royalties	12,203.95	
		35,313.34
		$2,634,761.74

Liabilities.		
To Public—		
Notes and Accounts Payable (including Accrued Interest on Notes)		$ 31,998.71
To Shareholders—		
Recoveries, Suit, Peterson Lake vs. J. A. Jacobs, Edward and D. M. Steindler, Cash	$ 52,999.99	
Stock	160,000.00	
	$212,999.99	
Deduct Expenses	12,056.96	
		200,943.03
Capital Stock (authorized $3,000,000)		2,401,820.00
		$2,634,761.74

To the Shareholders, the Peterson Lake Silver Cobalt Mining Company, Limited:

Gentlemen,—We have audited the books and accounts of your company for the year ending April 30th, 1010. In our opinion the above Balance Sheet is properly drawn up so as to exhibit a true and correct view of the corporation's affairs, as shown by the books on the closing date.

All our requirements as auditors have been complied with.

(Sgd.) J. L. Thorne Audit & System Company, Auditors.

CONSULTING ENGINEERS REPORT.

Toronto, May 1st, 1910.

The President and Directors, Peterson Lake Silver Cobalt Mining Company, Limited:

Gentlemen,—I herewith submit report of operations upon your property from May 1st, 1909, to April 1st, 1910. The figures for ore shipment cover the last twelve months.

Shipments for year.	Tons.	Oz. paid for.	Value Rec'd.	Royalty
Nova Scotia	67.157	56782.22	$29,052.68	$7,263.16
Little Nipissing	44.160	30883.40	17,045.63	4,011.41
Total, Silver	111.32	87665.62	$46,098.31	$11,274.57
Cobalt				38.35
Total Royalties				$11,312.92

Development.

During the past year the leases, with one exception, have confined their work principally to underground development, the Cobalt Leasors having done a considerable amount of trenching and diamond drilling.

The underground work accomplished by the different leases during the past eleven months was, approximately, as follows:

	Sinking and Raising.	Drifting and Crosscutting.
Gould Consolidated	28	53
Kerry Mining Co.	96	1171
Little Nipissing Mining Co.	70	868
Nova Scotia Mining Co.	110	278
St. Anthony Mining Co.	111	50
Union Pacific Mining Co.	35	...
Susquehanna Mining Co.	120	858
	570	3278

Cobalt Leasors Co., 530, diamond drilling; 1015, trenching.

The following table gives approximately the total amount of work done by each lessee up to April 1st, 1910:

Name of Company.	Acreage.	Diamond Drilling.	Trenching.	Raising and Sinking	Drifting and Cross-cutting,
Susquehanna Mg. Co.....	12	375	550	200	858
Kerry Mining Co.....	42	691	12200	472	1510
Little Nipissing Mg. Co...	15	...	500	345	1900
Nova Scotia Mg. Co.....	30	...	...	185	1208
St. Anthony Mg. Co.....	14	280	640	200	50
Union Pacific Mg. Co.....	10	...	450	148	15
Gould Consolidated Co....	23	...	1630	200	230
Cobalt Leasors Mg. Co....9.8		1113	3350	10	...

In addition to the development work done as above, the Susquehanna and Kerry Mining Companies have complete new power plants, and the Little Nipissing, St. Anthony and Union Pacific Companies have each expended a considerable amount of money in buildings and in additions to machinery and plant.

You will notice that the lessees that have done the most work are the Nova Scotia Company, the Kerry Mining Company, the Little Nipissing Company and the Susquehanna Mining Company, and of these the first three have got silver values. On the disputed ground adjoining the Nova Scotia lease, as also on the leased ground, there is a considerable quantity of rich silver ore blocked out ready for extraction. The Little Nipissing Company has joined the list of shippers of high-grade ore and promises well for the future, and the Kerry Mining Company, after a good many disappointments, has found good silver ore on the 200-foot level, which, when further developed, will possibly produce shipping ore in quantities.

In March a contract was let for sinking a shaft 150 feet from an island in the lake, and it is already down 35 feet, and has a strong 4-inch vein of calcite in the bottom. As this vein is about in line between, and on the line of strike of the Little Nipissing vein and the Nova Scotia vein, there is good reason to hope that valuable ore will be found in it.

Altogether the prospects for the future of Peterson Lake are much brighter than in the past. Owing to the much-delayed installation of electric power and air power the development work has been postponed from month to month, but now that power is available more vigorous development is promised.

I am,

Yours faithfully,

(Sgd.) J. W. ASTLEY.

COMPANY NOTES.

The directors of Bell's Asbestos Company, Limited, recommend a balance dividend of 1s. 6d. per share, making a total distribution of 12½ per cent. for the fiscal year. The amount to be carried forward is £14,168 9s. 4d. The usual bonus of 2½ per cent. has been dropped. This is attributed to the slack condition of the building trades.

STATISTICS AND RETURNS

RHODESIAN GOLD OUTPUT.

The total output of gold from Rhodesia for the month of March is cabled at 54,277 ounces, valued at £228,385, as against 48,443 ounces, valued at £203,888, in the previous month. This is an increase on the month of £24,497. There were 188 gold producers last month. The output of other minerals for last month was:Silver, 18,267 ounces; lead, 56 tons; coal, 12,272 tons; copper, 8 tons; chrome ore, 1,714 tons.

According to a Treasury return, issued April 20th, the total quantity of coal exported from the ports of the United Kingdom in 1909 amounted to 63,076,799 tons. The details show that the prices were as follows: Not exceeding 5s. per ton, 964,553 tons; exceeding 5s. to not exceeding 6s., 1,726,844; exceeding 6s. to not exceeding 7s., 2,162,768; exceeding 7s. to not exceeding 8s., 2,440,857; exceeding 8s. to not exceeding 9s., 9,500,552; exceeding 9s. to not exceeding 10s., 11,800,963; exceeding 10s. to not exceeding 11s., 8,041,973; exceeding 11s. to not exceeding 12s., 4,352,212; exceeding 12s. to not exceeding 13s., 4,258,478; exceeding 13s. to not exceeding 14s., 6,987,120; exceeding 14s. to not exceeding 15s., 5,226,273; exceeding 15s. to not exceeding 16s., 2,061.889; exceeding 16s. per ton, 3,553,317 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending April 22nd, and those from January 1st, 1910, to date:

	April 22. Ore in lbs.	Since Jan. 1. Ore in lbs.
Buffalo	58,900	644,078
Chambers-Ferland	41,950	164,250
Coniagas	78,000	512,096
Crown Reserve	200,700	1,792,070
Kerr Lake	240,000	2,397,523
La Rose	151,900	3,965,970
Nipissing	332,745	3,494,380
O'Brien	66,040	519,046
Right-of-Way	47,000	556,717
Tretheway	64,800	319,450

Ore shipments for week ending April 22nd were 1,282,035 pounds, or 641 tons.

Total shipments from January 1st to April 22nd were 17,619,415 pounds, or 8809 tons.

B. C. ORE SHIPMENTS.

	Week ending April 23.	Year to date.
Boundary.		
Granby	23,408	401,669
Mother Lode	6,300	140,155
Oro Denoro	375	4,855
Snowshoe	376	60,643
Other Mines	163	.....
Total, week	33,813	607,407
Rossland.		
Centre Star	437	61,947
Le Roi	493	972
Le Roi, No. 2 (milled)	300	4,800
Le Roi	367	47
I. X. L.	8	27
Other Mines	12	.....
Total, week	55,225	628,837
Slocan-Kootenay.		
St. Eugene (milled)	2,775	44,400
Whitewater (milled)	600	9,600
Vanroi (milled)	800	12,800
Kootenay Bell (milled)	70	1,120
Granite Poorman milled)	250	4,000
Queen (milled)	420	6,720
Nugget (milled)	110	1,760
St. Eugene	405	5,977
Richmond Eureka	34	1,477
Yankee Girl	40	2,138

Nugget	14	127
Granite Poorman	28	207
Sullivan	203	3,111
Monte Cristo	4	4
Vanroi	31	357
Other Mines	.....	21,844
Total	5,784	115,642

The total for the week is 45,122 tons, and for the year to date, 804,303 tons.

SMELTER RECEIPTS.

	Week	Year.
Granby, Grand Forks	23,408	401,789
Consolidated Co., Trail	10,017	161,125
B. C. Cop. Co., Greenwood	6,675	144,960
Total tons	40,100	707,874

TORONTO MARKETS.

Metals.

May 10.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 34.50 cents per lb.
Copper, casting, 14.00 cents per lb.
Electrolytic, 14.00 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

May 10.—Pig Iron—(Quotations from Drummond McCall Co.)
Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee No. 2, $23.00 (f.o.b. Toronto).
Midland, No. 1, (Off the market).
Coal, Anthracite, $5.50 to $6.75.
Bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

May 6.—Connellsville Coke, (f.o.b. ovens).
Furnace coke, prompt, $1.75 to $1.85 per ton.
Foundry coke, prompt, $2.25 to $2.35 per ton.

May 6.—Tin (Straits), 33.05 cents.
Copper, Prime Lake, 12.80 to 13.00 cents.
Electrolytic copper, 12.40 to 12.50 cents.
Copper wire, 14.25 cents.
Lead, 4.37½ cents to 4.42½ cents.
Spelter, 5.07½ to 5.10 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.37½ cents.
Aluminium, 23.50 to 24.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, ordinary, $29.00 to $29.50 per oz.
Platinum, hard, $34.50 per oz.
Bismuth, $1.75 per lb.
Quicksilver, $48.00 per 75-lb. flask.

SILVER PRICES.

	New York Cents.	London Pence.
April 21	53⅜	24 9/16
" 22	53¾	24¾
" 23	53¾	24¾
" 25	53⅝	24 11/16
" 26	53¾	24¾
" 27	54⅛	24⅞
" 28	54¼	24 15-16
" 29	54	24 13/16
" 30	54¼	24 15-16
May 2	54¼	24 15-16
" 3	54⅛	24⅞
" 4	54⅛	24⅞
" 5	54	24⅞
" 6	53⅞	24 13/16

SHARE MARKET.

Courtesy of Warren, Gzowski & Co.)

May 10, 1910.

Miscellaneous.	Bid.	Ask.
Amalgamated Asbestos	20	22
Dominion Coal Company	66	67
Dominion Steel Company	65¾	67
Nova Scotia Steel	78	80
Granby	42	45
Consolidated Smelting	75	81
Crows' Nest Pass	85	88

COBALT STOCKS.

Amalgamated	.03	.05
Beaver Consolidated	.34	.34½
Buffalo	2.50	2.75
Chambers Ferland	.28½	.29½
City of Cobalt	.30	.31
Cobalt Central	.09½	.11½
Cobalt Lake	.27¾	.27⅞
Coniagas	5.00	5.60
Crown Reserve	3.00	3.05
Gifford	.09¾	.10⅛
Foster	.18	.22
Green Meehan	.03¼	.03¾
Great Northern	.08⅝	.08¾
Hudson Bay	102.00	108.00
Hargraves	.26	.29½
Kerr Lake	8.70	8.75
La Rose	4.05	4.10
Little Nipissing	.22¾	.23⅛
McKinley-Darragh-Savage	.92	.96
Nancy Helen	.04⅞	.05½
Nipissing	9.87	10.00
Nova Scotia	.35½	.36
Otisse	.05⅞	.06¼
Peterson Lake	.24	.24¼
Right of Way	...	...
Rochester	.21¼	.21½
Silver Leaf	.07½	.08
Silver Bar	.06½	.07
Silver Queen	.10	.12
Temiskaming	.69½	.70
Trethewey	1.26	1.28
Watts	.09½	.13
Ophir	.43	.50
Wettlaufer	.80	.85

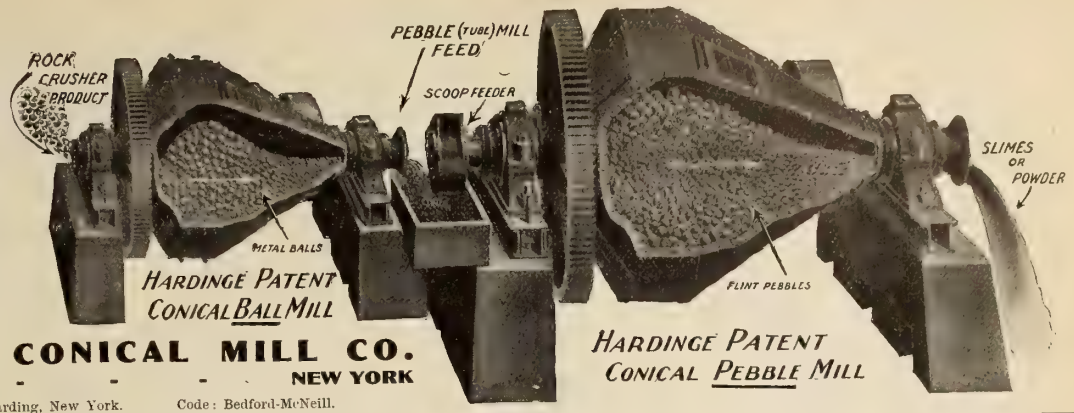
NEW YORK CURB.

Boston Copper	17½	..
British Columbia Copper	5⅝	5⅞
Butte Coalition	20	20½
Canadian Mines	6⅞	7
Chino Copper	13¼	13½
Davis-Daly Copper	1⅝	1⅞
Ely Consolidated	½	⅝
Gila Copper	6¼	6⅝
Giroux Mining	7¾	8
Goldfield Consolidated	8⅛	8¼
Greene-Canadian	8⅞	9
Inspiration Copper	7 5/16	7⅜
Miami Copper	22½	22⅝
New Baltic Copper	6	8
Nevada Con. Copper	19½	19⅝
Ohio Copper	2 5/16	2⅜
Rawhide Coalition	27½	28½
Ray Central	2 13/16	2⅞
Ray Consolidated	18⅞	19⅛
Union Mines	1½	1⅝
Yukon Gold	4 7/16	4½

STEP REDUCTION

Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of."



HARDINGE CONICAL MILL CO.

37 Wall Street, - - - - NEW YORK

Cable Address: Halharding, New York. Code: Bedford-McNeill.

NOTICE

STUDENTS EMPLOYMENT REGISTER,

The CANADIAN MINING JOURNAL has opened an employment register for students taking mining or metallurgical courses at Canadian Universities or Technical Colleges. Mine operators who wish to employ students during the summer months are requested to communicate with the Business Manager.

Students are requested to send in their names, along with brief records of experience. These will be filed and no effort will be spared on our part to place applicants in immediate communication with possible employers.

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

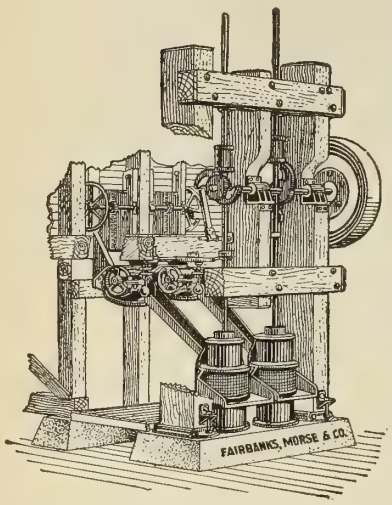
For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, General Passenger Agent, Board of Trade, MONTREAL

Save 50% of the Power

by using NISSEN STAMPS

Descriptive Pamphlets on request



Owing to the great crushing efficiency secured the power required to operate Nissen Stamp Mills is about half that of other mills of the same capacity output.

One user writes :—

THE CANADIAN FAIRBANKS CO., TORONTO, ONT.

Dear Sirs,

In answer to your inquiry regarding the Nissen Stamps supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one inch hole.

The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening .018. With a coarser screen the tonnage would of course be larger.

The shoes and dies wear even, and the splash is well distributed over the screen.

The arrangements for keeping up the weight of the stamps are very good.

I can recommend the Stamps. Yours truly.

(Sgd.) F. J. Bourne, Superintendent.

NORTHERN CUSTOMS CONCENTRATORS, Limited

COBALT, ONT., December 31st, 1910.

The Canadian Fairbanks Co., Limited

MONTREAL

Branches: Toronto, St. John, Winnipeg, Calgary, Vancouver.

Removal Notice

Constant-Herzig Co.

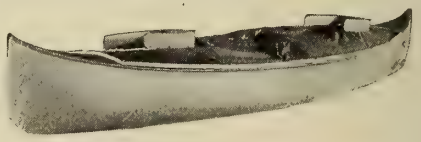
Successor to

C. L. Constant Company

Has moved to 42 New Street

Laboratories and Offices are now in the same building.

PETERBORO' CANOES



STAUNCH AND RELIABLE

We build all sizes, suitable for PROSPECTING or PLEASURE.

Send for Catalogue.

THE PETERBOROUGH CANOE COMPANY, LIMITED.

PETERBOROUGH, ONTARIO.

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,

Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C
McGee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada.
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. SC.
MINING ENGINEER
24 Adelaide St., West, Toronto, Can.
Cable Abmott Phone Main 5063

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers aad Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

S. F. KAVANAGH C. D. BOOTH, C. E.
Assayer
Mining Broker
Kavanagh & Booth
Mining Agents. Civil Engineers.
Contractors. Assayers.
Mining Properties bought and sold.
Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont.
Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
BOX 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

DOBBS & YOUNG
PROPERTIES LISTED and INVESTMENTS DIRECTED
MINING BROKERS and CLAIMS AGENTS
Wire or write us for particulars to
Box 541, COBALT, ONT.
WATCH THIS SPACE

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, ROOM 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc., and any work connected with the mining profession.

THE PETERSON LAKE SILVER COBALT MINING CO., LTD.
Notice is hereby given that the annual meeting of the Stockholders of the above Company for the election of Directors and Auditor, and for the transaction of such other business as may be brought before the meeting, which will be held at the head office of the Company in the City of Toronto, Ontario, on the 30th, day of May, 1910, at the hour of 11 o'clock a.m. The Transfer books of the Company will be closed after office hours on the 19th day of May, up to and inclusive of the 30th day of May, until the annual meeting is over.
R. F. SEGSWORTH,
Secretary-Treasurer.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office. Works.
TORONTO, ONT. COBALT, ONT.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

EXPLOSIVES

Of Every Description

BEST QUALITY ONLY

Blasting Powder, Compressed Pellets, Dynamite, Gelignite, Gelatine Dynamite and Blasting Gelatine.
Cheddite will not freeze or etude.

Permitted Explosives for Gaseous Mines

Bobbinite has the largest sale of any Permitted Explosive.
Excellite, Kolax, Curtisite, Rippite, Etc., Etc.

Only makers of the Celebrated "Diamond ◆ Grain" Black "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders

Manufactured by

Curtis's & Harvey, Limited

Head Office: 3, Gracechurch St., London, E.C.

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners

Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:

32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES

43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MIMERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1 00.**

DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **1.50** paper cover, **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of those books in their library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ackroyd & Best, Ltd xii
Allan, Whyte & Co. v
Asbestos Mfg. Co., Ltd.....outside B.C.
Astley, J. W. xix
American Diamond Rock Drill Co.xvi

B

Bateman & Brown.....xix
Beatty, M., & Sons, Ltd. ix
Bazzanger, Jacques & Co.....xi
Belliss & Morcom, Ltd i
Berger, C. L., & Sons xiv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... xv
B. C. Assay and Chemical Supply..... xxvii
Behrend Concentrators Ltd.....xi
Brown A. H.....xx
Bruce Peebles.....viii
Brown Mach. Co., Ltd.....vii

C

Canada Metal Co..... ix
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co.xiv
Campbell & Deyell .....xix & xx
Curtis & Harvey, Ltd.....xxiii
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xxiii
Canadian Fairbanks Co. Ltd xviii
Crabtree..... xiv
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks....xxiv
C. L. Constant Co.....xviii
Cobalt Electric Equipment Co., Ltd.....xiv

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus.....iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables.....iv
Davis, John & Son..... xvi
Dessau's, S. Sons.....vii
Deloro Mining & Reduction Co...xxiv
Eugene Dietzgen Co., Ltd.....viii

E

Evans, J. W.....xix

F

Fleck, Alex., Ltd. xii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.....v

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii
Hardinge Conical Mill Co.....xvii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C. xx
Laurie & Lamb i
Lymans Ltd.....xii
Link Belt Co. xi
Leckie, J. Edwards xx
Ledoux & Co. xx
The Lancashire Dynamo and Motor Co., Ltd..... xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Mussens, Limited.....Front Cover
McGee, Boyd xx

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxvii
Nova Scotia, Province of.....xxvi
Nissen Stamps.....xviii
Northern Canada Supply Co. Ltd..xiv

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros.....vi, vii, xvi
Patterson Mfg. Co. iii
Peterborough Canoe Co., Ltd....xviii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co..... xii
Stanley, W. F., & Co., Ltd.....ii
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....xxiii
Smith, Thos. & Wm. Ltd xxix

T

Tyrrell, J. B. xx
Toronto University xxvii
Turner, J. J. & Sons.....xviii

U

United Typewriter Co,. Ltd xi

V

Vandeleur & Nichols..... viii

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Separating Co..... xiv

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-ON-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST. JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch. If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings (Diamond —
Montreal Steel Works, Limited
Peacock Bros.

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
C. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

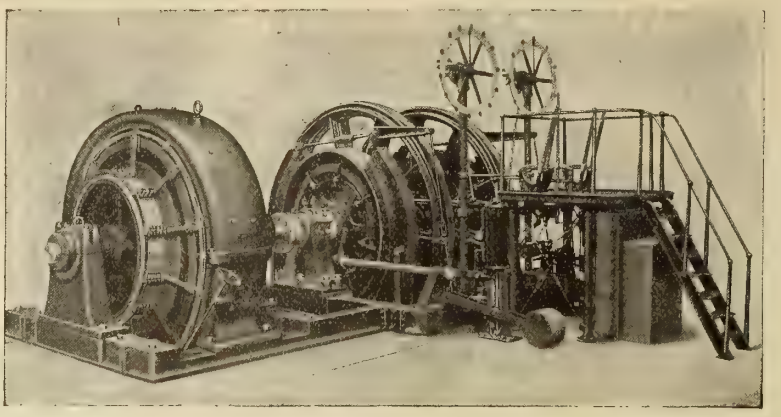
"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.



We illustrate the Hecla Mining Company's Hoisting Plant at Burke, Idaho, one of the largest of its kind and a good example of

The Westinghouse Equalizer Hoisting System

Some particulars of the installation follow:

The hoist motor is a Westinghouse 450 h. p., 600 Volt, 60 R.P.M. Direct-Current Motor, which obtains its power through a Westinghouse Fly-Wheel Motor—Generator Set, consisting of a 450 h.p., 2300 Volt, Type H. F. Induction Motor, a 30,000 lb. Fly Wheel and a 450 K. W., 600 Volt, Direct Current Generator. The normal duty of the hoist is 6,000 lbs. unbalanced load; maximum speed 2,000 R.P.M. ultimate depth of shaft 2400 feet.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
252 St. James Street, MONTREAL.
92 Hollis Street, HALIFAX.

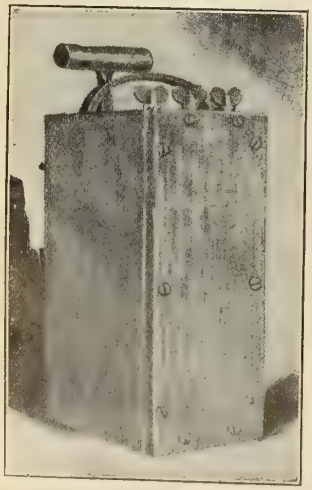
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 40° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

The Greatest Tent Value Ever Offered in Canada!

$9.90



$9.90.

This is a photographic illustration of our

SPECIAL CAMPER'S TENT.

which is made of 8-ounce duck with double sewn seams and re-inforced strain points.

Notice the outside lacing of the Ridge.

This means a top that is both storm and insect-proof, and it is the most satisfactory arrangement for attaching the tent to a ridge rope (stretched between trees) when the utmost portability is desired, using no poles.

Dimensions	Height	7 feet
	Length	12 "
	Width	10 "
Height of	Walls	3 "

Complete with guy-ropes

$9.90

(If poles and pegs are desired, they will be supplied for 95c. extra.)

THE ROBERT SIMPSON COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

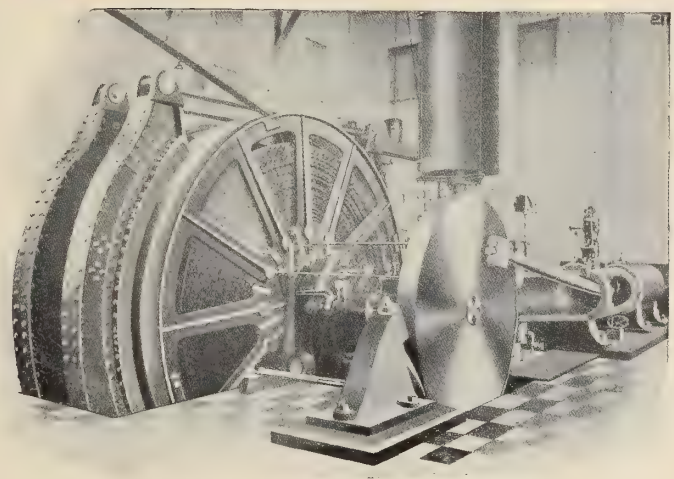
ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

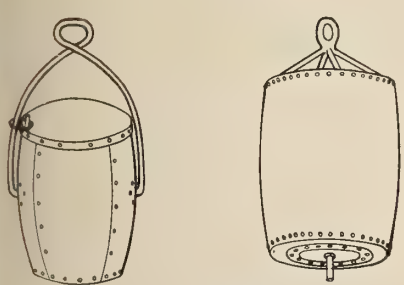
VOL. 31 TORONTO No. 1



Fraser & Chalmers, Ltd.

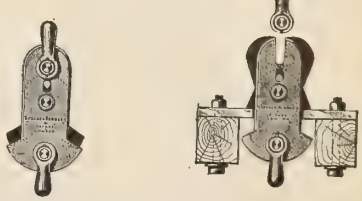
Winding Engines

Made to suit any conditions of service.



Mine Buckets.

Let us
send
you
Catalogues.



Stephen Humble's Patent
Safety Detaching Hooks.

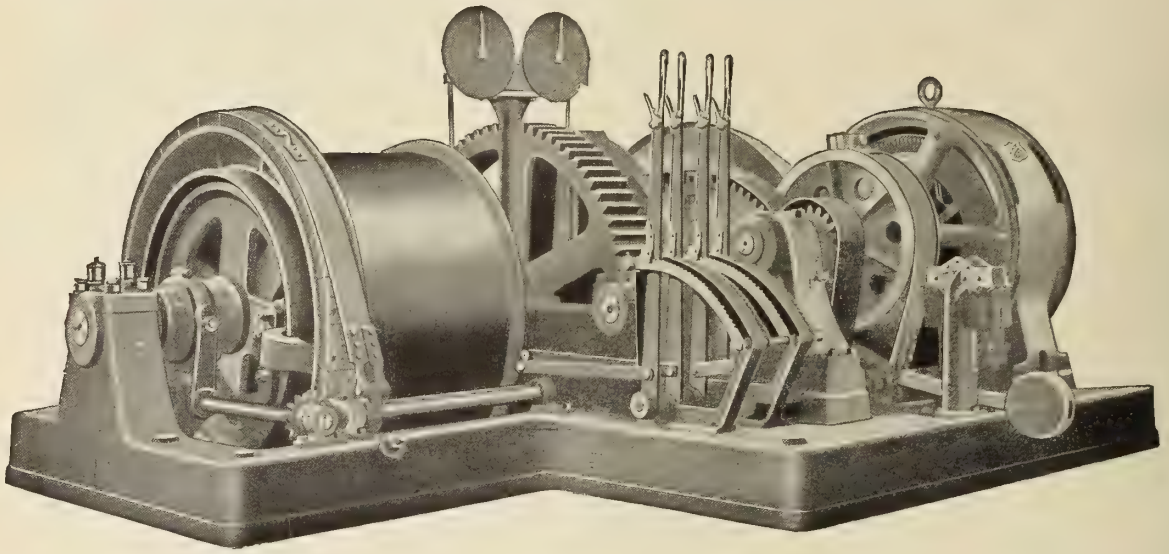
MUSSENS LIMITED

MONTREAL, 318 St. James St. | TORONTO, 73 Victoria St. | COBALT, opp. Right of Way Mine | WINNIPEG, 259-261 Stanley St. | CALGARY, Crown Bldg. | VANCOUVER Mercantile Bldg.

ELECTRIC HOISTS

FOR

MINING WORK



Electric Hoists, to give the best service, must be designed and built to meet operating conditions. The hoist shown in the illustration is operated by a 150 h.p. induction motor and designed for a load of 5,400 lbs. at a speed of 800 ft. per minute. We manufacture both mechanical and electrical parts of these hoists. Miners will find it to their advantage to place their orders with one firm and thereby avoid the delays and annoyances inevitable when responsibility for successful operation of the unit is divided.

ALLIS-CHALMERS-BULLOCK

LIMITED

WORKS - - - MONTREAL

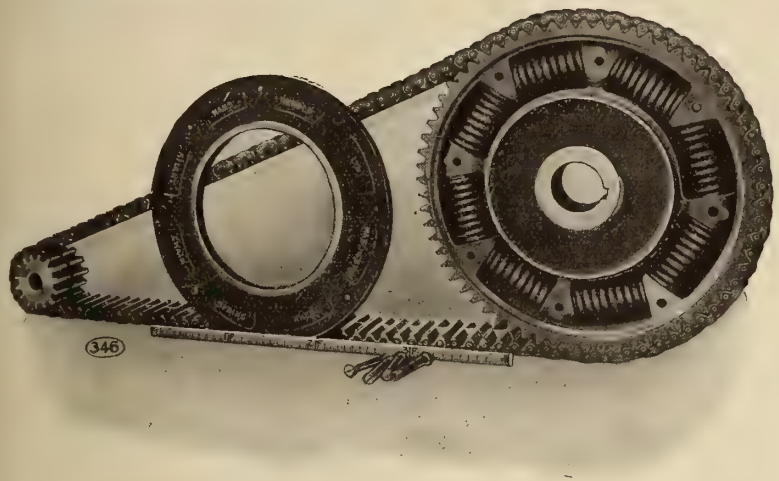
SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

Renold Patent Silent Chain

is constructed on sound, simple principles, and does not require expert knowledge to either install it or make a joint.



Spring Cushion Sprocket with Cover off.

For drives of a pulsating nature, Spring Cushion Sprockets are furnished, in which springs are interposed between the boss and the rim, thus absorbing the fluctuations of the load, preventing the shocks from being transmitted through the machinery. By their use chains are being successfully applied to drives of an extremely severe nature.

WRITE FOR PARTICULARS

JONES & GLASSCO

Sole Canadian Agents **MONTREAL**

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just because it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

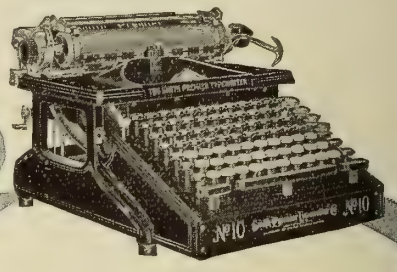
Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



Rapid Sinking

of shafts or winzes depends on your drill's ability to keep the holes free from sludge.

This Pulling Power is found to an exceptional degree in Sullivan Drills; which means that in a given kind of rock, these drills are able to use a heavier blow and to cut more rock at a stroke than other types.

To put it in another way, Sullivan Drills are able to handle longer and heavier steels and to drill deeper holes than others of the same piston diameter.

These facts are constantly being verified in every-day practice. The details of valve motion and rotation which lie back of these advantages are described in Catalogue 660—May we send it?



Air Compressors **Hoisting Engines**
Diamond Drills **Hammer Drills**

SULLIVAN MACHINERY CO. CHICAGO, ILL., CLAREMONT, N. H., U. S.

BIRMINGHAM BUTTE DENVER JOPLIN KNOXVILLE NEW YORK PITTSBURG ST. LOUIS ROSSLAND SPOKANE SAN FRANCISCO SEATTLE PARIS, FRANCE SYDNEY, AUS. SALT LAKE EL PASO

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

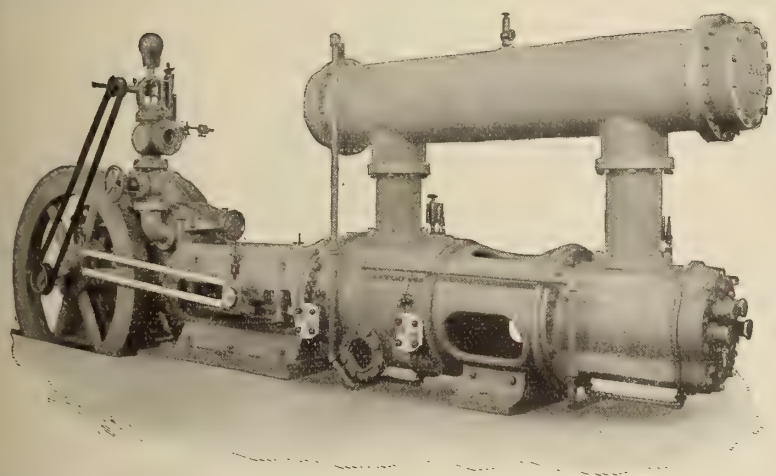
Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

Address nearest office to-day.

THE PATERSON MANUFACTURING COMPANY, LTD.
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Simple Steam Compound Air Compressors



A Straight Line Design with power applied to load in the most direct, positive manner, with the minimum of friction, fewest parts and utmost simplicity.

An ideal machine for the mine, strong, rugged, self-contained with large air output and economical steam consumption.

Ask for our new pamphlet, K-83.

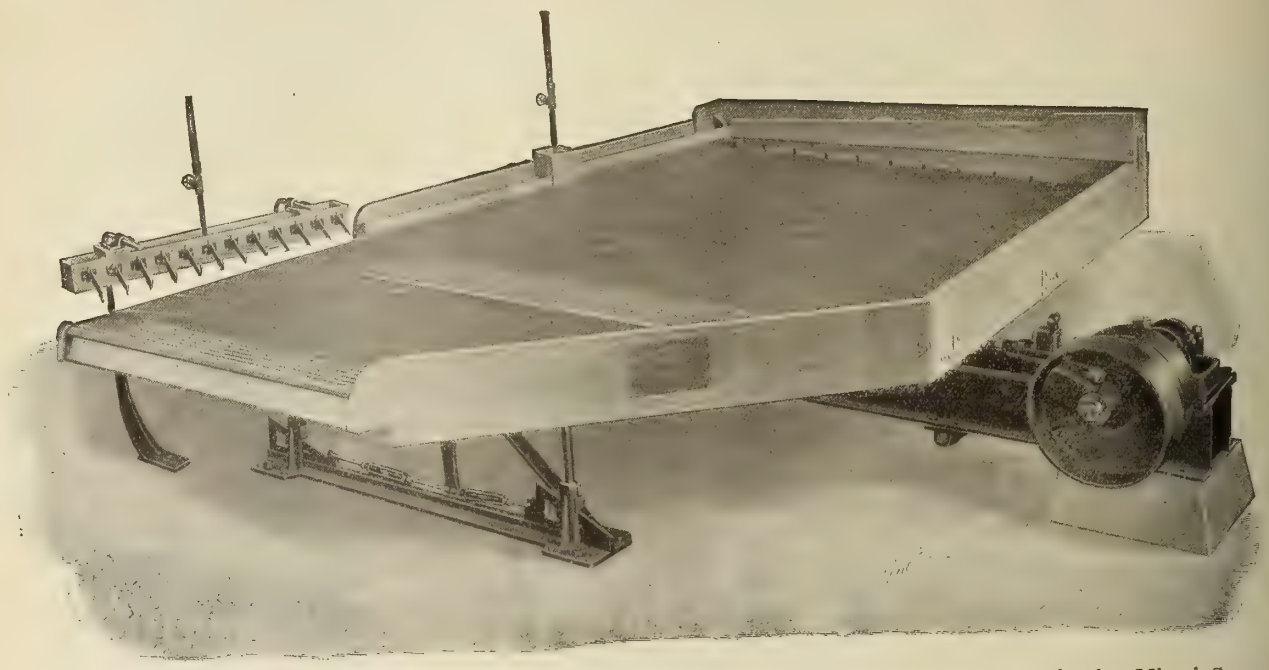
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

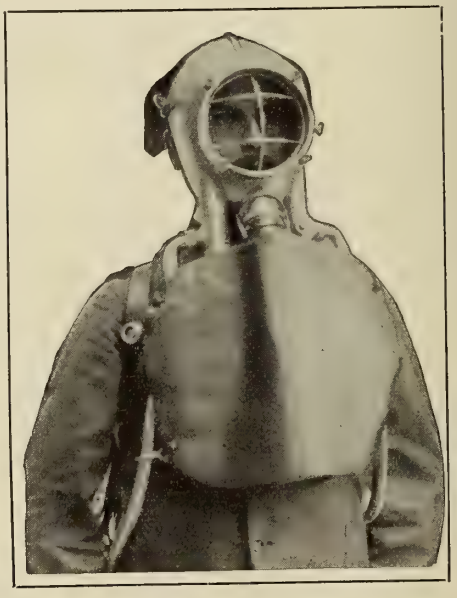
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

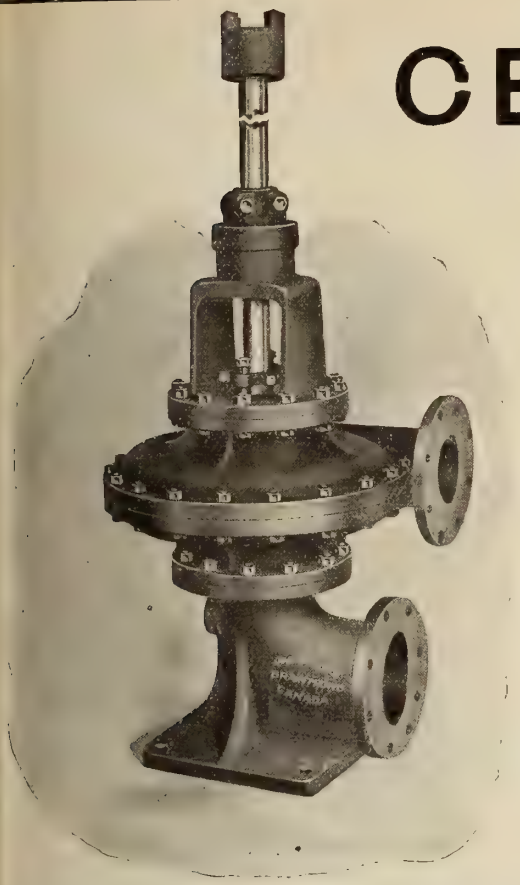
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



CENTRIFUGAL PUMPS

Our pumps are distinguished by their ability to stand up under hard usage. They are built for it. Light and compact, their durability and efficiency under trying conditions has made them deservedly popular for Mine Drainage Work.

Built in sizes with discharge opening up to 14" in diameter. In Horizontal and Vertical Styles. For Pulley, Engine or Motor Drive.

Completely illustrated bulletin No. 200, sent on request.

The Waterous Engine Works Co., Limited,

BRANTFORD, - CANADA.

THE McLEOD TABLE

Has been **thoroughly developed by years** of continuous hard service in competition with the best. One of them has run 24 hours daily for over 5 years except ordinary mill stops and is still in use.

Construction entirely **Steel** and **Iron** except the deck.
Deck held firmly **Down** as well as **Up.**
Warping and Trembling—The curse of many other table decks—**Simply Impossible.**
Each leg a small jack screw, to set exact slope desired.
Legs spread to give broad, stable support. No tremble.
Sharp Stroke. Hand adjusted while table is in motion, and the result can be seen.
Holds the Line for a whole shift without fluctuation—that means constancy of results and fewer men employed. In recovery of values and durability it has no equal. A 1" Belt will run it.
Light Weight, gained by skillful design of parts, yet it is as firm as its foundation, weighs about half the tables you are familiar with, hence
Cuts Freight Bill in Two, putting about $15. to $30. in your pocket for each table bought.



PRICE RIGHT TOO.

THE McKEE & McLEOD CO.

1303 TO 1307 ROCKEFELLER BUILDING

CLEVELAND OHIO - - - - DEPARTMENT A.

EXPLOSIVES

Of Every Description

TRADE MARK CURTIS'S & HARVEY LONDON DRAGON BRAND

BEST QUALITY ONLY

Blasting Powder, Compressed Pellets, Dynamite, Gelignite, Gelatine Dynamite and Blasting Gelatine.
Cheddite will not freeze or exude.

Permitted Explosives for Gaseous Mines :—
Bobbinite has the largest sale of any Permitted Explosive.
Excellite, Kolax, Curtisite, Rippite, Etc., Etc.

Only makers of the Celebrated "Diamond ◆ Grain" Black, "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders.

Manufactured by

Curtis's & Harvey, Limited

Head Office : 3, Gracechurch St., London, E.C.

THE

Bennett Fuse

Crown  **Brand**

MANUFACTURED BY

William Bennett, Sons & Co.

CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.

VICTORIA, B.C.

AND AGENCIES THROUGHOUT THE DOMINION.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

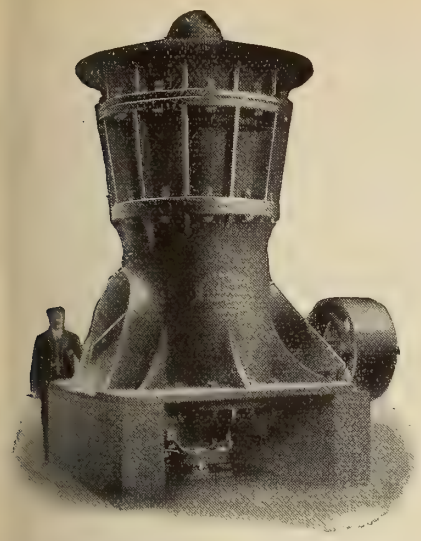
WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

COAL MINING MACHINERY

Revolving Tipples, Screens, Picking Belts, Chutes, Car Hauls, Complete Plants Designed and Built, Mine Cars, Hoists, Pulleys, Transmission Machinery and Conveyors.

Correspondence Solicited

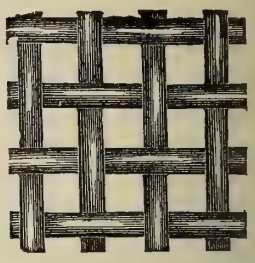
THE BROWN MACHINE COMPANY, Ltd.

ENGINEERS

NEW GLASGOW = NOVA SCOTIA

They certainly do give Good Service. Try them!

Greening's Coal Mining Screens



They are made by our special **Double Crimp** process from the very highest grade of hard steel wire. As a result they are of enormous strength; the openings are square and uniform, and the wires are not easily displaced. We know they will give you the very best of service.

Made in all sizes. Catalogue No. 2 on request.

THE B. GREENING WIRE CO., LIMITED

HAMILTON, ONT. - - - - - - - MONTREAL, QUE.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel,, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

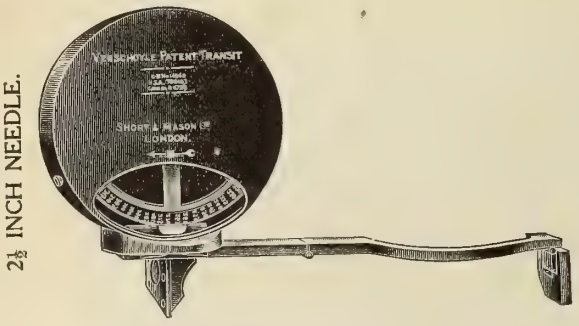
SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DIETZGEN'S Field Instruments

FOR

Civil, Mining Engineers & Surveyors



THE VERSCHOYLE POCKET TRANSIT

combines the useful features of the Abney Level, Prismatic Compass and Clinometer

For preliminary surveys of every description

Catalogue On Request

Eugene Dietzgen Co.

LIMITED.

TORONTO, - 10 SHUTER STREET

Wanted

Shipments of crude minerals—

Fluorspar, Feldspar, Barytes, Rock Asbestos, Fuller's Earth, Graphite, Scrap Mica —and other non-metallic minerals.

Full particulars are wanted as to source of supply, character of mineral, stage of development, possible contract deliveries, price per ton f. o. b. shipping point, etc.

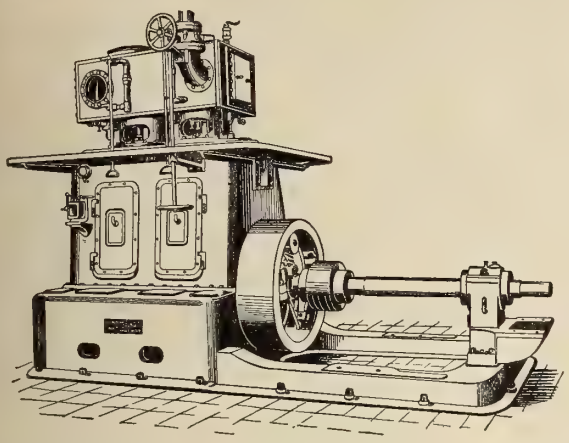
This information is sought by the advertiser for the purpose of ascertaining the practicability of erecting a grinding plant at some central point.

All communications will be regarded as strictly confidential.

Address, A. B. C.,

c/o CANADIAN MINING JOURNAL.

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

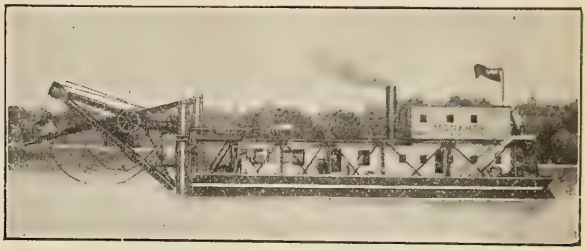
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



We Manufacture
The Most Complete Line of
Babbitt Metal
In the Dominion

Write for Illustrated Circular and Price List.

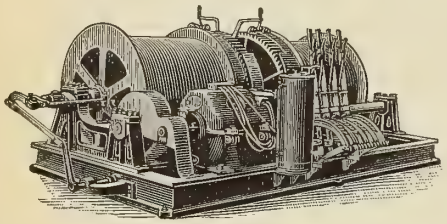
THE CANADA METAL CO., LIMITED, - TORONTO

Flory Hoisting Engines

STEAM AND ELECTRIC

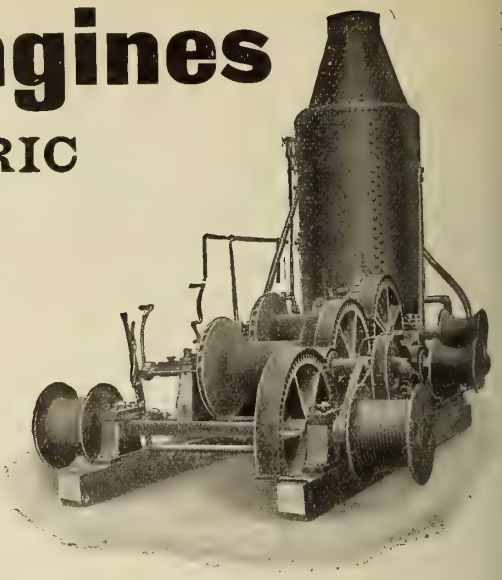
Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 a.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.



WHERE WILL YOU SPEND YOUR WEEK ENDS?

It is not too early to plan your vacation for this year. There are many places where you can rest up and come back Monday morning in time for work, feeling fit and fine

POINT AU BARIL
The finest summer resort on the Georgian Bay.

MUSKOKA LAKES
Ontario's favorite vacation land.

KAWARTHA LAKES
The fisherman's paradise

Ask for a Week End Folder from any Agent of the

CANADIAN PACIFIC RAILWAY

OR WRITE

R. L. THOMPSON, - - District Passenger Agent, - - TORONTO

Behrend System of Concentration

DRY -:- WET

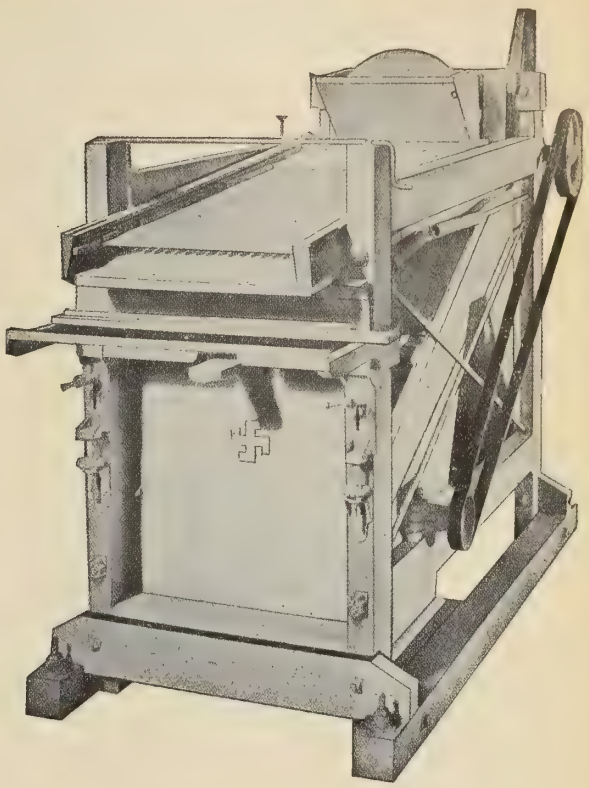
For all ores and minerals.

Highest recovery on slimes.

Send sample of ore for preliminary test to

Behrend Concentrators, Limited

48 Inspector Street, Montreal





Underwood

This is the mark of the Underwood—more extensively used in Canada than all other makes of typewriters combined. No matter what machine you have used, or are using, you will ultimately buy the Underwood.

United Typewriter Co., Ltd.

Adelaide Street East

Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

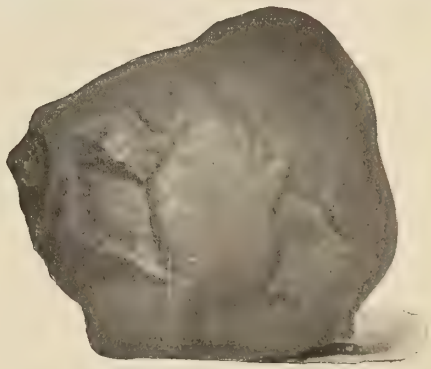
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

For Sale at Public Auction

On June 9th, 1910.

That Gold Mining Property Situated at Harrigan Cove, County of Halifax, Nova Scotia, and known as

St. Anthony Gold Mine.

Owing to circumstances which rendered it necessary, it has been reluctantly decided to offer this well known Gold Mine, together with all the Buildings and Machinery situated thereon, at public auction.

The mine is situated at Harrigan Cove, in the County of Halifax, Nova Scotia, and comprises 192 mining areas, under lease from the Crown. Development work has been done on four of these areas only, on the St. Anthony lead so called. The returns from this lead **Produced $94,000.00 in 18 month's work; averaging about an ounce of gold to the ton.** The property also contains several other gold bearing quartz veins, varying from 18 inches to 8 feet in width, which have not yet been developed. Surface tests taken from some of the veins gave very promising results. Two of the tests gave better results than were obtained from the above mentioned **St. Anthony** lead when it was first opened up.

The following unsolicited testimony regarding this property is contained in Mr. E. R. Faribault's (of the Dominion Geological Survey Staff) report of the survey which he made of the district:—

> "Some very rich float has been found south of the Antecline, and several large belts of quartz veins have been cut in the 600 feet of strata between the Antecline and the St. Anthony lead. **Most of which are well mineralized and show gold.** None of them have, however, been cut in more than one or two places along their course, and they offer a **very compromising undeveloped field for the prospector.** The St. Anthony lead has so far proved the best producing lead of the district. This lead has been traced 1500 feet in length east of the present workings. **It may be said that the very large field of unemployed auriferous belts here present should draw the attention of the prospector and the St. Anthony property already proved productive is capable of being worked on a much larger scale."**

The Buildings and Machinery installed on the property comprise the following:—

1 20 Stamp & Steam Gold Crushing Mill with 10 stamps installed. 1 60 H. P. Engine with shaftings. Pulleys and belting complete. 1 80 H. P. Boiler. 1 Hoisting Engine. 1 Friction Hoist. 2 Silver plated Amalgam Plates. 1 Wilfley concentrating table. 1 Blake Rock Breaker. 1 Water Tank. 2 Bucket Pumps. 1 Steam Pumping Engine with hose. 1 Northey Steam Pump. 1 Upright Boiler and Engine. 1 Rand Steam Drill and Fittings. 3 Shaft Houses. 1 Blacksmith Shop. 1 Office Building. 1 Cook House with accommodation for 15 men. 1 Barn. 1 Barn Waggon. 1 Double Team. 1 Cart. Coal Shed. 1 Magazine Building. 1 Store house for supplies.

This property will be positively offered at Public Auction to the highest bidder in the Board of Trade Rooms at Halifax, N. S. on Thursday, June the 9th, 1910 at 11.30 o'clock a. m.

Terms of Sale,—Ten per cent. at time of sale, balance within Thirty days from date of sale.

Any intending bidder desiring further information can obtain the same by addressing The Secretary, St. Anthony Gold Mining Co., Limited, Box 201, Halifax, N. S.

PECK CARRIER

The Standard Machine for handling Cement, Crushed Rock, Hot and Cold Clinker, Coal, &c.



Horizontal Run of PECK CARRIER in Cement Mill.

IN our book describing this CARRIER we have included an explanation of the principles that govern correct construction and operation of conveying apparatus. Here is a quotation from page 16:

> "Don't use a CARRIER without crossrods between the chains: the weight of the buckets and load will cause the chains to tilt inwardly and the rollers will bear on the inside corner of the rails, instead of on the tread."

If your name is on our list you'll be sure to receive a copy; otherwise please notify us.

Address

LINK-BELT COMPANY

PHILADELPHIA **CHICAGO** **INDIANAPOLIS**

NEW YORK
299 Broadway

PITTSBURGH
1501-2 Park Bldg.

ST. LOUIS
Central Nat'l Bank Bldg

DENVER
Lindrooth, Shubart & Co.

SEATTLE
439-440 New York Block

SAN FRANCISCO
Eby Machinery Company

NEW ORLEANS
Wilmot Machinery Company

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Safest and Best Quality.

LABORATORY APPARATUS	C.P. ACIDS and CHEMICALS
C.P. ACIDS and CHEMICALS	LABORATORY APPARATUS
LABORATORY APPARATUS	C.P. ACIDS and CHEMICALS
C.P. ACIDS and CHEMICALS	LABORATORY APPARATUS
LYMANS, Limited, MONTREAL	LYMANS, Limited, MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

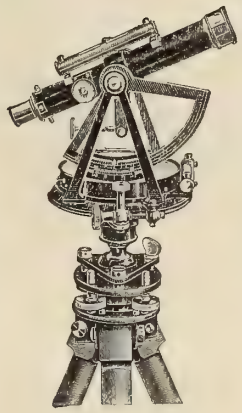
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Casartelli's Improved Mining Theodolite

With Telescope and Levels, 4½-in. compass, 6-in. horizonta circle, and vertical arc, reading to three minutes. Tangent adjustments. Ball and socket motion, and parallel plates, complete in case, with set of jointed legs.

Simpler than any other instrument of equal utility. Strong, yet convenient in use, it is always absolutely precise.

JOSEPH CASARTELLI & SON

Scientific Instrument Makers,

43 Market Street,

MANCHESTER, - - Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys, Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co , Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.
And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.
Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

ANNOUNCEMENT

BRUCE PEEBLES

& COMPANY, LIMITED

EDINBURGH - - SCOTLAND

are now represented in

CANADA

by

VANDELEUR AND NICHOLS

DINEEN BLDG., - - - TORONTO

SPECIALTIES:

DIRECT and ALTERNATING CURRENT.
DYNAMOS and MOTORS for all Conditions of Service.
PEEBLES-LACOUR MOTOR CONVERTERS.
STEAM TURBO ALTERNATORS. TRACTION MOTORS.

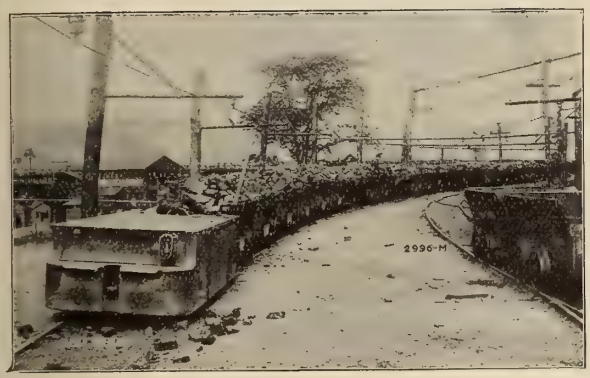
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

JEFFREY LOCOMOTIVES



JEFFREY ELECTRIC MINE LOCOMOTIVES are in the lead because of their simple design, accessible working parts, efficiency and low cost of maintenance. Write to-day for our Locomotive Bulletin No. 17.

JEFFREY COAL CUTTERS



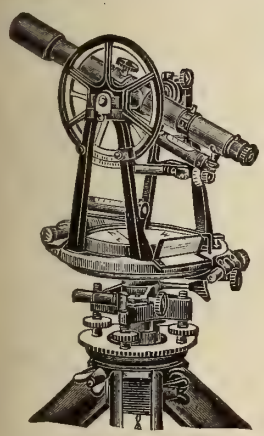
JEFFREY COAL CUTTERS cut faster, cost less for up-keep, and will withstand more rough work than any other machine made. They are operated by electric or air power. Bulletin No. 18 describing our Electric and Air Power Machines will be mailed on request.

WE DESIGN, BUILD AND INSTALL COAL MINE AND TIPPLE EQUIPMENTS COMPLETE.

The Jeffrey Manufacturing Company,
COLUMBUS, - OHIO.

June 1st.

CHICAGO, ST. LOUIS, DENVER, MONTREAL, PITTSBURG, CHARLESTON, W. VA. BOSTON, NEW YORK, BIRMINGHAM.



C. L. Berger & Sons
37 WILLIAMS STREET
BOSTON, - MASS.

SPECIALTIES :
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

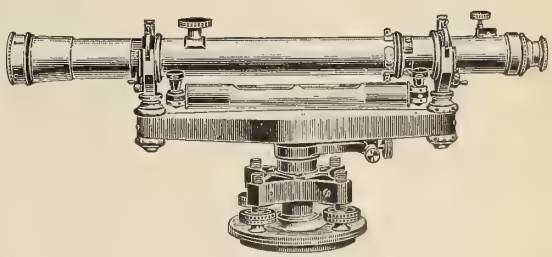
SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196



K & E
Transits and Levels

Give thorough satisfaction. Discriminating engineers select them on account of their accuracy, convenience and general reliability.

Send for our 550-page Catalogue, listing every requisite of the engineer for field or office.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes

HORIZONTAL TUBULAR BOILERS

FOR MEDIUM AND HIGH PRESSURES



HIGH PRESSURE TUBULAR BOILER

All sizes from 10 to 250 H.P. and larger.

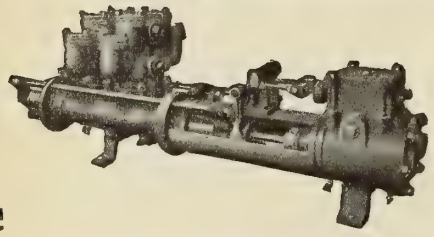
High Pressure Tubular Boilers from 80 to 250 H.P. our specialty.

We invite enquiries and specifications from Contracting Engineers.

The Jenckes Machine Co., Limited

Sales Offices: Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver, Rossland

Works: Sherbrooke, Que. St. Catharines, Ont.



STEAM AND POWER PUMPS

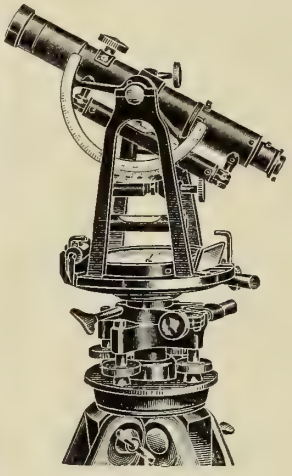
PLUNGER PUMPS

For any service up to a water pressure of 300 pounds.

PACKED PISTON PUMPS

AUTOMATIC FEED PUMPS AND RECEIVERS. COMPOUND DUPLEX PUMPS. INDEPENDENT JET CONDENSERS. CENTRIFUGAL PUMPS. STEAM & OIL SEPARATORS.

THE SMART-TURNER MACHINE CO. LIMITED
HAMILTON - CANADA



DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.
68 BEAVER HALL HILL, MONTREAL

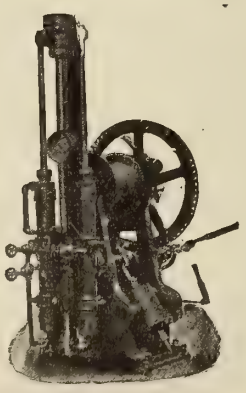
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN
HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, June 1, 1910 No. 11

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office - - Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 321
(a) The New Federal Coal Mining Regulations 321
(b) Industrial Federation 322
(c) The Last Mine Myth 322
(d) Commendation 323
(e) Preventable Accidents 323
(f) Editorial Notes 323
The Canadian Iron and Steel Industry, by Watson Griffin 324
Summer Route to the Porcupine, by Hamlin Brooks Hatch 327
Austrian Nobel Dynamite 329
Western Branch Mining Institute 329
Mining Engineering in Connection with Fort William's Water Supply, by H. Sydney Hancock, Jr..... 330
Oxygen Breathing Apparatus in Pacific Coast Coal Mines, by E. Jacobs 334
The Chibougamau Commission 335
The McKinley-Darragh-Savage Mines of Cobalt, Limited 337
The Cobalt Provincial Mine 343
Personal and General 343
Special Correspondence 344
Mining News of the World 348
Company Notes 350
Statistics and Returns 351

THE NEW FEDERAL COAL MINING REGULATIONS.

By an Order-in-Council, dated April 20th, 1910, certain significant changes are made in the Regulations for the disposal of coal-mining rights. The new Order-in-Council became effective on May 25th, 1910.

Under the new Regulations the term of lease shall be 21 years, renewable for a further term of 21 years, provided the lessee furnishes evidence, satisfactory to the Minister of the Interior, to show that he, the lessee, has complied in every respect with the conditions of the lease. As formerly the lease covered only 21 years, the change is desirable. Yet the question may fairly arise as to whether even 42 years is a sufficient period. Large investors may not think so. The surface equipment of collieries like, for instance, that of the Dominion Coal Company, represents millions of dollars. Each year sees additions to such capital expenditure. The life of a successful coal mine is long. Several of the collieries in the west possess sufficient reserves to predicate a possible life of 100 years. The Nova Scotian Government gave a 99-year lease to the Dominion Coal Company. Would it not be well for the Federal Government to follow this example? One particular aspect of this question is worth touching upon. Each lessee is permitted to acquire as much surface for mining operations as the Minister will grant him. Thus it is quite possible that a lessee, failing to obtain a renewal, may find himself at the end of 21 years in possession of surface rights and equipment but without any right to mine coal. If his surface rights cover the entry to the seams, a new lessee could obtain only the right to mine. In other words the property would be in a fair way to be tied up for all eternity.

The maximum area of a coal mining location is to be 2,560 acres, or four square miles. No person is allowed to hold more than one location. This regulation, of course, is easily evaded. The locator needs but to secure dummies. Hence the paragraph fails entirely of its object. In any case, four square miles is not an adequate area to provide for a coal mine. It would be far saner to fix the limit at from eight to twelve square miles.

The new Regulations provide that a person who has been granted a lease, and who subsequently abandons or assigns it, may, twelve months after the date of the lease, secure another location. This encourages the prospector. May it not, however, tend to restrict needlessly the activities of operating companies that wish to secure new locations?

Prospectors will appreciate the extension of time wherein applications must be filed. In cases where the location is distant more than 100 miles from the office

of a Government agent, the applicant is allowed, in addition to the regular 30 days, one day for each 10 miles, or fraction thereof, in excess of 100 miles. This will meet with warm approval.

One other paragraph calls for comment. Paragraph 13 provides that bona fide settlers shall be entitled to buy at the pit's mouth whatever coal they may require, but not for barter or sale, at a price not to exceed $1.75 per ton. Whilst the intention here is commendable, the wording is too vague. As the law does not specify the grade of coal to be supplied to settlers, the operator is permitted to palm off any kind of slack or culm. Moreover, fixing a definite price per ton is dangerous. Operating expenses are constantly increasing. The cost of coal at the pit's mouth may before long exceed $1.75. We would suggest that as all Dominion agents have free access to the books and accounts of coal mining companies, some effort be made to leave the adjusting of prices in their hands. In fairness to the operators it would be necessary to provide means of appeal and arbitration. It would also be essential to fix the price, not for an indefinite time, but for certain stated periods. We believe, however, that paternalism of this kind, it matters not how laudable the intention, is superfluous. The laws of supply and demand, and the rigours of competition, are the final adjusters of values. To set a fair price cumbersome machinery must be created and kept in motion. To fix an arbitrary price is unjust. Why, then, touch the matter at all!

Incidentally, we would like to have some light thrown upon the question as to what does or does not constitute a bona fide settler. We shall not be surprised if some difficulty is encountered in framing a satisfactory definition.

INDUSTRIAL FEDERATION.

The recently elected President of the Iron and Steel Institute in his opening address departed from precedent. Instead of touching upon matters scientific and technical, he reviewed the social and economic conditions that have obtained in Great Britain since the founding of the Institute, the year 1869.

The president, at the beginning of his paper, points out that while economics have become the recognized basis of politics, yet as the Institute is concerned solely with facts and not with inferences, he had no fear of trespassing upon the political field. His field is, therefore, confined to industrial and social aspects, to the entire exclusion of matters political. But whilst he draws comparisons between the industrial development of Great Britain and that of foreign countries, he makes no such comparison of social conditions, confining himself merely to marking the contrast in Great Britain itself as between the year 1869 and the present day.

On succeeding pages of the address it is shown that, although in the year 1869, Great Britain had an enormous lead over all other nations in the production of iron, steel, and coal, yet this superior position could not be maintained. "The output of coal, iron, a steel, the foundation of the national industry, cann in the nature of things, depend solely on the energy the workers and the ability of administrators. Ho ever rich in natural resources the soil may be, the e ment of area must always be a great factor in t case." Obvious as is the truth of this statement, it equally apparent that part at least of Germany's pr gress is due to something more than mere extent territory. And that something is what Great Brita has always lacked.

Forty years ago Great Britain was easily first in t production of pig-iron, coal, and steel. Now both t United States and Germany are far ahead of he Whilst Great Britain's position is still strong, a poi has been reached where purely physical conditions i dicate the future limits of industrial expansion. E pansion there will be for years yet; but not at anythi like the rate that is observable in larger countrie Comparisons with Germany and the United States a unfair. "We can only regain the position of supren acy that we occupied in 1869 by reckoning in with t United Kingdom our great dominions overseas." Thi we take it, is a constructive plea for imperial industri federation.

Touching the amelioration of social conditions i Great Britain since 1869, the broad statement is mad that since that year there has been a general advanc in money wages and a general decline in the prices o commodities. The wage-earner receives to-day 38 shi lings, where, in 1869, he received 20 shillings. To-da also, the worker is better housed, better fed, bette clad, and in all respects has a better chance in life.

The Presidential address makes cheerful reading The generalizations alluded to above are substantiate by means of statistics.

After reading it carefully, the impression is stron upon us that the British workman has surprisingl little to complain of.

THE LAST MINE MYTH.

Innumerable are the platitudes that have been writ ten concerning the credulity of man. More convincin than all the platitudes are the amazing instances fro real life. The latest and best test of blind belief is a project born in Boston.

Mr. J. Burpee Neily, not unknown to the inhabitant of Eastern Canada, is the president of the Vibora Mining Corporation, capital stock, $3,000,000; par value of shares, $5. Mr. C. P. Bowker is manager of the Viboras mine, which mine is situate eight miles from Hostotipaquillo, Mexico. But the Viboras is no ordinary mine. True, there is reported to be shipping ore running from $500 to $17,000 per ton. This, however, is so insignificant that Mr. Neily suggests counting upon only $100 per ton. And well can he afford this discount, for, within the mine lie 45 tons of silver and 29 tons of gold, hidden treasure that once belonged to

Spanish viceroy. So, at least, Mr. Charles P. Bowker ·lieves. The foundations of Bowker's faith are sug-·sted in the following paragraph—one gem in a scin-llating mass:—

"July 2.—Maximino has told me that there are some nine treasures in the Viboras, and I believe I have located them all with the twig, amounting to 45 tons of silver and 29 tons of gold, belonging to the last Spanish Viceroy and his family. . ."

Would we could quote more! We shall pause but to xplain that Maximino is a horrid person who takes it pon himself to be wise after the event. Whenever owker becomes discouraged, Maximino multiplies the easure by two or three and assures Bowker that it is ust a wee bit farther ahead. Hence Bowker is ever and gain on the point of striking the Spanish bullion. He isses, and Maximino shows him where he has been rong. Bowker has twigged the silver and gold. Far etter would it be for him to use that twig on Maxi-ino.

To those who appreciate the curious in literature e recommend this charming little study. Mr. Neily nd Mr. Bowker, with the assistance of Senor Maxi-ino, have Edgar Allen Poe skinned to death, frazzled o a finish, or even more so.

COMMENDATION.

The Mines Branch, it is announced, will presently ake up two urgent lines of work. It will investigate nd attempt to regulate the use of explosives. It will lso interest itself in the introduction of breathing pparatus for rescue work in coal mines.

Many months ago the CANADIAN MINING JOURNAL rged that the Mines Branch be directed to attack the roblem of life salvage in coal mines. The matter was rought up in the House of Commons by Mr. Claude lacdonell, one of the members for Toronto. The reply f the Hon. Mr. Templeman, though vague, indicated hat steps were to be taken at an early date.

The question of regulating the manufacture, stor-ge, and use of explosives was brought forcibly before he public through the recent disaster at Hull. But he matter was, some time ago, placed before the Mines Branch.

In both directions the Mines Branch should be cap-ble of accomplishing work for which the whole nation will be grateful. We have always had serious misgiv-ngs as to the advisability of Government officials un-dertaking research work of a more or less academic nature. One obvious objection is that such investiga-ions, important as they may be in the opinion of many, ake up time, money, and energy that should properly e devoted to just such problems as those mentioned bove.

The Mines Branch will win and will deserve our open nd hearty support if it gets down to business in regu-ating the use of explosives and in encouraging the ntroduction of rescue apparatus.

As illustrating the present position of affairs, we may instance the fact that after the recent explosion at Nanaimo, B.C., an officer of the United States Geological Survey had to be called on to instruct the men in the use of the Draeger apparatus. This should surely be unnecessary.

PREVENTABLE ACCIDENTS.

One of the most dangerous practices in mining is the habit of drilling or picking into old bottoms of drill-holes. These old bottoms, or "bootlegs," as they are labelled in the west, are due to the hole not breaking to bottom when it is blasted. Miners frequently take advantage of these old holes to start a new hole. If a residue of dynamite happens to remain in the "bootleg" there is a funeral. This fact, however, does not appear to discourage other searchers after short cuts to the future world.

During the session of 1909, the Ontario Government passed an amendment to the Mining Act forbidding drilling or the insertion of any metal tool into a hole that has been blasted. This, naturally, does not restrain the careless miner. But it furnishes to the mine manager the means of controlling and punishing his men. In fact, the Government can do no more than it has done. Upon mine managers devolves the duty of impressing upon their employees the criminality of taking foolish chances.

Incidentally, it must always be remembered that the "bootlegs" are evidence of bad mining.

EDITORIAL NOTES.

The peat producer-gas plant of the Department of Mines is now in daily operation. Visitors are invited to inspect the establishment.

It is satisfactory to learn that Cobalt ore shipments for the first four months of the year, notwithstanding the light shipments during January and part of February, are considerably larger than those reported for the corresponding period of 1909.

In the explosion in the Wellington colliery, White Haven, England, one hundred and thirty-seven miners lost their lives. Apparently the official warning, published all over Great Britain, to the effect that abnormally high barometric conditions rendered such explosions highly probable, was entirely disregarded. It seems that catastrophies are the only effective teachers.

Canada is to have a tungsten mining industry. The discovery of scheelite at Moose River, Nova Scotia, first described in these columns two years ago, is to be worked this summer. The ore is richer than most of the deposits worked at present. Many veins are exposed. The scheelite concentrates ideally, and, except for the presence of a small percentage of mispickel, will make an exceptionally clean shipping product.

THE CANADIAN IRON AND STEEL INDUSTRY.

By Watson Griffin.

III.

In previous articles I have outlined the difficulties that had to be surmounted in establishing the Canadian iron and steel industry, and described the plants at present in existence.

In considering the future prospects of iron and steel manufacture in Canada, the first factors to be taken into account are the character and extent of the raw materials, iron ore, limestone and fuel, their distance from each other and the means of transportation.

For purposes of comparison it may be well to outline the conditions that exist in the United States and the United Kingdom.

The first furnaces in the Pittsburg district were started on local ores, but now almost the entire supply comes from the mines in the vicinity of Lake Superior. James M. Swank, manager of the American Iron and Steel Association, says: "From the iron ore mines of Michigan and Minnesota to the coal of Pennsylvania the distance is 1,000 miles. Connellsville coke is taken 600 miles to the blast furnaces of Chicago and 750 miles to the blast furnaces of St. Louis. The average distance over which all the domestic iron consumed in the blast furnaces of the United States is transported is not less than 400 miles, and the average distance over which the fuel that is used to smelt it is transported not less than 200 miles."

The iron ore used in the Pittsburg district has to be brought from the mines of Northern Michigan and Minnesota by rail to a Lake Superior port, and there loaded on vessels, after which it must be carried through Lake Superior, the Sault Canal, Lake Huron, Lake St. Clair, the tortuous channel of the Detroit River, and finally through Lake Erie to Cleveland and other lake ports, where it is transferred to railways, again to be transported to the furnaces. This makes four handlings of the ore in transportation from the mines to the furnaces. When the iron and steel is made at Pittsburg it has to go by rail to Philadelphia, 354 miles; to New York, 445 miles; to Boston, 675 miles; to Buffalo, 270 miles. The distance from Pittsburg to Montreal is 710 miles by rail as compared with the cheap water route of about 726 miles from the works at Sydney, C.B., to Montreal.

The only blast furnaces of the United States that have their raw materials close together are in the Southern States. Of these the most favorably located are those of the Birmingham district, in Alabama, where fuel and ore are very close together. However, the Alabama furnaces are far from the leading markets both of the United States and other countries, and the freight rates on the pig iron and steel must be added to the cost of production. The nearest seaport is Mobile, 276 miles by rail from Birmingham, the centre of the iron district. It is 349 miles by rail from Birmingham to New Orleans, 448 miles to Savannah, 476 miles to Charleston, 766 miles to Newport News, 804 miles to Baltimore, 855 miles to Philadelphia, and 794 miles to Pittsburg.

The British blast furnaces at one time used only local ores, but now very large quantities of ore are imported. For many years British iron makers have been drawing ore supplies from Spain. In recent years ore has been imported quite extensively from the Gellivara district of Sweden, which is considerably north of the Arctic circle. The ore is carried by rail across Sweden and Norway to the Norwegian harbour of Ofoten, 130 miles north of the Arctic circle, where it is shipped to the British blast furnaces. The London Economist some years ago, discussing the probability of Great Britain losing supremacy in the manufacture of iron and steel, said: "It must be remarked for how long a period the mines in this country have been worked. The output of blackband ore in Scotland has been decreasing for years past and the greater portion of the pig iron now made in that district is from foreign ores. Cleveland, which has been one of the most prolific districts in the country, has now been worked nearly fifty years, and the best ore having been taken out we may soon have to fall back on the poorer, and consequently costlier kinds. It has been known for some time past that the best hematite ores in the Bilbao district in Northern Spain are fast deteriorating, and if we have to fall back on the poorer qualities, those containing a lower percentage of iron, they will be more costly, owing to the proportionately greater cost of carriage by sea."

From the standpoint of the iron-maker, Canada may be divided into four sections, the Maritime Provinces, Quebec and Ontario, the Northwest Provinces, and British Columbia. Economically Newfoundland should be included with the Canadian Maritime Provinces, Prince Edward Island, Nova Scotia and New Brunswick, but unfortunately Canadian statesmen have never realized the importance of bringing that great province into the Confederation.

Newfoundland's resources of coal and iron ore can only be guessed at, as only a very small part of the island has been explored for minerals. Very thin seams of coal have been discovered, but as yet none have been found of sufficient thickness to be of any value. In Conception Bay, about 35 miles from St. John's, there is an island about eight miles long and about two miles wide, known as Great Bell Island, on which are the extensive ore deposits belonging to the Dominion Iron & Steel Company, of Sydney, Cape Breton, and the Nova Scotia Steel & Coal Company, of Sydney Mines, Cape Breton. As shown in my last article, there is now no doubt that hundreds of millions of tons of good ore can be obtained from this source, and it can be laid down at the works at lower cost than ore can be placed at any blast furnace in Pennsylvania, while the coal and limestone are in Cape Breton within a few miles of the furnaces. It is quite probable that valuable iron ore deposits may yet be found on the Newfoundland mainland, but this is only conjecture.

Prince Edward Island is practically without mineral resource, although coal is believed to exist at a very great depth.

Nova Scotia is particularly well endowed with coal having extensive beds on both the eastern and western coasts of Cape Breton Island, in the central county of Pictou, and in Cumberland County at the northwest of the province. There are a number of seams of great thickness.

If all the iron ore in the province were concentrated at one point there would be enough of it to supply very extensive works. There are indications of iron in almost every part of Nova Scotia, and at one time it was commonly supposed that the province had almost inexhaustible supplies of this mineral. Investigation showed that most of the deposits were merely pockets, and

the impression became general that extensive bodies of ore would never be found in Nova Scotia. However, development work carried on in Annapolis County by the Canada Iron Corporation seems to indicate that the deposits there are very extensive. The Corporation owns and controls seven square miles of iron ore lands of Torbrook. The ore is a red hematite, and independent engineers have estimated the quantity obtainable as high as 300,000,000 tons. The Corporation has installed a plant at the mine having a daily capacity of 1,000 tons, and shipping facilities have been provided at Port Wade, N.S., with a dock-loading capacity of 2,000 tons per hour.

The Londonderry iron range in Colchester County extends for many miles and, although the deposits are not very deep, the total quantity of ore is believed to be quite large. As stated in my description of the Londonderry Iron & Mining Company's properties in a previous article, there are a number of varieties of ore in this range, including hematite, limonite, ankerite, siderite, and specular ores. The blast furnace of the Londonderry Iron & Mining Company at Acadia Mines is about midway between the coal fields of Pictou County and the mines at Springhill in Cumberland County.

There is some reason to believe that there is an extensive ore bed at Arisaig, on the coast of Antigonish County, but as no development work has been done this is uncertain.

Except in the case of some small pockets the iron ores of Nova Scotia are too high in phosphorus to make Bessemer pig iron. They are usually low in sulphur, but Nova Scotia coal is commonly somewhat high in sulphur.

Mr. J. E. Woodman, a mining engineer who has prepared a very interesting report on the iron ores of Nova Scotia for the Dominion Department of Mines, expresses the opinion that there are scattered throughout Nova Scotia in close proximity to transportation facilities by rail or water a large number of deposits which, while not individually extensive enough to justify the erection of local smelters, could be economically mined for transportation to smelting centres. He says: "It is even an open question whether it would pay existing smelting companies to buy them up. But if, instead, the individual owners were to develop them and contract for sale of the ore to the smelters, if necessary attempting an understanding with one of the smelting companies whereby the latter supplies the tools in instances in which the owner has no capital upon which to work, even under the present market conditions a number of the isolated deposits could be profitably opened up."

If the iron ore deposits at Arisaig should prove to be extensive, of good quality, and susceptible of being cheaply mined, the ore might be conveniently carried either to the coal of Pictou County or to the coal on the west coast of Cape Breton. It is possible that blast furnaces may yet be located in the vicinity of Pictou Harbour, using Pictou coal and drawing ore supplies from Pictou County, Arisaig and perhaps New Brunswick and Newfoundland.

Mr. J. E. Woodman suggests that Parrsboro, a port on the Basin of Minas, would be a favourable location for an iron and steel plant of large size. He says that ores could be conveniently brought to Parrsboro from the whole western Cobequid. Ore from the Torbrook and Clementsport mines in Annapolis County could be shipped by water to Parrsboro, while Londonderry ores could be brought there by a short rail haul. Brookfield, he says, is but eight miles from Truro, and with a Truro-Parrsboro railway the iron ore there would be within as easy reach of Parrsboro as of Acadia mines (Londonderry) to-day. The Hants County ores also could be taken to Parrsboro as easily as to Acadia mines. For flux limestone could be obtained from the vicinity of Windsor and anchorite could be brought from the Londonderry range. "Fuel," he says, "would come chiefly from Springhill, along the road over which most of the tonnage now goes, giving a short downgrade haul and avoiding the costly and roundabout freightage across the Cobequid Mountains, now necessary on the Intercolonial Railway. The road from Springhill mines to Parrsboro crosses the mountains by a very low pass, which involves no heavy grades. Should the buried western section of the Cumberland coal field be developed there would be one or more additional sources of fuel at close range."

The distance from the Springhill coal mines to Parrsboro by the railway referred to by Mr. Woodman is 27 miles. The distance by rail from the Torbrook iron mines to Port Wade, the shipping port, is 42 1-2 miles, while Port Wade is 77 miles by water from Parrsboro. If a short railway were constructed from Parrsboro to Truro, making connection there with the Intercolonial line to Stellarton, the coal field of Pictou County would be brought within a rail distance of about one hundred miles from Parrsboro. At present the railway distance from Stellarton to Parrsboro is 132 miles via Springhill Junction.

Iron and steel produced at Parrsboro could be conveniently distributed to all parts of Nova Scotia and New Brunswick. The distance by water from Parrsboro to St. John, N.B., is 82 miles.

It has also been suggested that the Torbrook ore might be smelted at Annapolis, to which coal or coke could be brought by water. The distance from Annapolis to Parrsboro is 87 miles. Works at either Parrsboro or Annapolis would have the advantage of not being absolutely dependent upon local raw materials as iron ore, coal and limestone could be brought by water from outside points in any emergency.

The greatest obstacle to the success of a large iron and steel plant dependent upon coal supplies from Springhill is the great frequency of coal miners' strikes in that district. If some permanent basis of settlement for labour disputes could be arrived at which would prevent strikes and assure continuous operation of the mines it would do much to promote industrial development in Nova Scotia.

The coal seams of New Brunswick so far as known are not thick enough to be of much value.

There are indications of iron in many parts of New Brunswick, but the only extensive deposits so far discovered are those of the Canada Iron Corporation in the Drummond iron range near Bathurst, in Gloucester County. The Corporation owns and controls twenty-five square miles of ore lands. The ore is a magnetic hematite and already upwards of 50,000,000 tons have been proven. This is by no means the limit of the deposit, which is estimated to contain hundreds of millions of tons. Of this mine Mr. John E. Hardman, consulting mining engineer, Montreal, says: "It is the largest body of merchantable iron ore known to me to exist in the Dominion to-day."

A railway has been constructed for a distance of seventeen miles, connecting with the Intercolonial Railway, over which ore can be carried to Newcastle, N.B., where docks having a loading capacity of 3,000 tons per hour are being constructed. The distance from the mines to Newcastle is about 56 miles. From the mines

of the Drummond iron range to Parrsboro the railway distance is about 231 miles, but it would be possible to transport the ore by water during about nine months of the year to one of the ports on Northumberland Strait, from which the rail haul to Parrsboro would be short. The railway distance from the Drummond Iron Mines via Newcastle and Oxford Junction to Pictou, N.S., is about 281 miles. During the months that Northumberland Strait is open the water route would be shorter. It might be found advantageous to smelt Drummond iron ore in the vicinity of Pictou Harbour. From the centre of the coal field to Pictou Harbour the rail haul of coal would be between thirteen and fourteen miles. Works located in Pictou County would have the advantage of being somewhat nearer to Montreal than those in Cape Breton are. The railway distance from Pictou to Montreal is about 797 1-2 miles via Oxford Junction and about 829 1-2 miles via Truro, while Sydney is about 985 miles from Montreal via Oxford Junction and about 988 1-2 miles via Truro. During the season of St. Lawrence navigation the deep water route is considerably shorter than the rail route, and of course much cheaper, the distance from Sydney to Montreal being about 726 miles, while from Pictou to Montreal the distance is about the same.

Iron and steel works located in Nova Scotia have the disadvantage of being at a great distance from the central markets of Canada. On the other hand, Nova Scotia has a wonderfully good geographical situation as regards the markets of the world at large. It is nearer to Europe than any other part of the mainland of America and, strange to say, it is nearer to the leading countries of South America and South Africa than the Southern States are.

With reference to the remarkable geographical position of Cape Breton, I may quote from one of a series of articles entitled "At the Front Door of Canada," which I wrote for the "Montreal Star" some years ago. The harbours of Sydney and Louisburg are the front doors of Canada. They might be called magic doors, for they open wonderfully into short passages to the leading markets of the world. It is an extraordinary fact that Sydney and Louisburg, while more than 2,200 miles nearer to Liverpool than New Orleans and Mobile, are at the same time nearly 600 miles nearer to Pernambuco, Rio Janeiro and Beunos Ayres, and nearly 900 miles nearer to Cape Town, South Africa. This is because ham-shaped South America lies far to the east of North America, while New Orleans, Mobile and other ports on the Gulf of Mexico, are a long distance west of the Atlantic Ocean. Moreover, ships from southern ports of the United States cannot take a direct route, because they have to steer clear of the West India Islands. Cape Breton, jutting far eastward into the Atlantic, is much nearer to a direct line drawn north from the east coast of South America. And the Gulf ports are not the only ones over which the Cape Breton ports have an advantage. The whole Atlantic coast of the United States slopes away to the southwest, and Savannah, Charleston, Baltimore, Philadelphia and New York are so far to the west of the direct routes from Sydney and Louisburg that the Cape Breton ports, although farther north, are much nearer to the chief ports of South America and Africa.

The most eastern point of South America is Pernambuco. All vessels going south of that point to Rio Janeiro, Beunos Ayres or other South American ports must pass it. The following table of distances in nautical miles will show the wonderful advantage that Sydney has over all American ports for trading with Great Britain and other countries of Europe, South America, Africa and Asia.

To Liverpool.

Sydney Harbour to Liverpool.	Miles.
(via N. Ireland)	2,282
(via S. Ireland)	2,307
New Orleans to Liverpool	4,553
Mobile to Liverpool	4,506
Savannah to Liverpool	3,571
Charleston to Liverpool	3,500
Newport News to Liverpool	3,157
Baltimore to Liverpool	3,324
Philadelphia to Liverpool	3,160
New York to Liverpool	3,110

To Pernambuco.

Sydney Harbour to Pernambuco	3,567
New Orleans to Pernambuco	4,146
Mobile to Pernambuco	4,133
Savannah to Pernambuco	3,660
Charleston to Pernambuco	3,631
Newport News to Pernambuco	3,591
Baltimore to Pernambuco	3,758
Philadelphia to Pernambuco	3,746
New York to Pernambuco	3,696

To Cape Town.

Sydney Harbour to Cape Town	6,467
New Orleans to Cape Town	7,355
Mobile, Ala, to Cape Town	7,309
Savannah to Cape Town	6,867
Charleston to Cape Town	6,831
Newport News to Cape Town	6,736
Baltimore to Cape Town	6,903
Philadelphia to Cape Town	6,870
New York to Cape Town	6,787

The distances from Sydney to the various points were furnished to the writer by the late Captain W. H. Smith, R. N. R., Chairman Board of Examiners of Masters and Mates, Marine Department, Halifax, while the distances from various American ports were compiled by the United States Commissioner of Navigation. Louisburg is not given in the above tables, but the distances from Sydney and Louisburg are practically the same. Only points on the east coast of South America and the west coast of Africa are given for comparison, but it will be evident to all who examine the map that Sydney must have the same advantage of distance in trading with the west coast of South America and east coast of Africa. It applies also to the whole Pacific coast of North America, to Asia and Australia. It seems strange, but it is a fact that Sydney is nearer to San Francisco than any Atlantic or Gulf port of the United States. The distances given are for routes for full powered steamships.

There are a number of harbours in Nova Scotia open all the year which, although not quite so near to the outside markets as Sydney and Louisburg, are better located in this regard than any port in the United States.

It should be noted, however, that unless regular steamship lines are established to the leading ports of the world the natural advantage of geographical situation will count for little except in the case of a large order for which it might pay to charter a ship to make a special voyage.

St. John, N.B., would possess some advantages as a location for a large iron and steel plant. The harbour is open throughout the year. It is one of the terminals of the Intercolonial Railway; it is the winter port of the Canadian Pacific Railway, and it is probable that both

he Grand Trunk Pacific Railway and the Canadian Northern Railway will have terminals there. It is nearer by rail to Montreal than any other important port in the Maritime Provinces. The railways taking grain and other farm products from central and Western Canada to St. John for export will be anxious to have return freights and would no doubt concede very low rates on finished products to an iron and steel company at St. John. St. John is the commercial metropolis of New Brunswick and is also well located for the distribution of its products throughout the greater part of Nova Scotia. With reference to the markets of the world, it is nearly 400 miles nearer to Liverpool than New York, and it is remarkably well situated for trade with Mexico, South America and South Africa. While not quite so near to world markets as Sydney, C.B., is, it has the advantage of having more established steamship lines There is little doubt that it will in the near future have first class winter steamship services to Mexico, the West Indies, South America, and South Africa, as well as to England. It is not probable that the summer service will ever be equally good on account of Montreal competition.

It is almost certain that a large steel shipbuilding plant will be established in St. John in the near future and some of the ships of the Canadian Navy may be built there. In the days of wooden sailing vessels it was one of the greatest shipbuilding centres in the world, and in ownership of ships ranked fourth among the cities of the British Empire.

Limestone could be obtained near St. John; coal or coke could be brought by water from the Cumberland, Pictou and Cape Breton coal fields; iron ore might be obtained from Torbrook, Londonderry, Arisaig and perhaps Newfoundland, as well as from the Drummond range near Bathurst in New Brunswick, and possibly some nearer point in New Brunswick. As already stated, Parrsboro, the port from which Springhill coal is shipped, is 82 miles from St. John, while the rail haul from the coal mines is 27 miles, and if Pictou coal were brought to St. John via Parrsboro the rail haul would be 132 miles, but this might be shortened by connecting Parrsboro and Truro. The water route from Pictou harbour to St. John is about 485 miles. The water route from Sydney, C.B., to St. John is about five hundred miles. The coal mines on the west coast of Cape Breton are somewhat nearer to St. John. Port Wade, N.S., from which the Torbrook ore is shipped, is about 40 miles from St. John. From the Drummond iron mines, near Bathurst, in Gloucester County, N.B., the rail haul to St. John via Moncton would be about 224 miles. The ore could be transported by rail to Fredericton, a distance of about 170 miles from the mines, and there transferred to boats running down the St. John River.

It has been suggested that blast furnaces might be constructed in the vicinity of the Bathurst mines or at Newcastle, getting coal from Cape Breton, Pictou County, or the Cumberland field. This would be a case of carrying coals to Newcastle in a new sense.

When other advantages are equal, it is more economical to carry iron ore to coal than coal to iron ore, for the coal is much more bulky and more difficult to handle. By converting the coal into coke the bulk is greatly reduced, but the coke requires much more careful handling in transportation than coal.

(To be continued.)

SUMMER ROUTE TO THE PORCUPINE.

(Written for the CANADIAN MINING JOURNAL by Hamlin Brooks Hatch.*)

At the present time, the question of the most feasible route into the new Porcupine gold fields is one of moment to mining men and investors who have interests in the new field. In other years in which any new mining country has been opened up in the winter months, men have been able to figure with some degree of certainty as to the time of the winter break-up. The spring of 1910 has been remarkable in Ontario, owing to the fact that the streams and lakes opened at least four weeks in advance of the time expected. Interested people who placed their faith in records of the break-ups of other years, and who therefore failed to get their supplies in over the good winter roads, are at present forced to devise a good freight route for the conveyance of all mining necessities. So the question of a good summer route into this new country is one of greater importance than it would at first appear.

There are at present four possible routes, two of which are being used now. It is the purpose of the writer to take up each separate route in turn, giving its advantages and disadvantages from both the passenger and the freight standpoint. The writer is himself familiar with two of the routes that will be discussed. The other two have been taken from the Government map of the district and are at present simply possibilities for the future.

Route from 228½ Mile Post.

The first route to be considered will be that starting from the 228½ mile post of the T. & N. O. Railway. This can be termed the all-water route. The station name is Holland. There is one train a day arriving between 7 and 9 p.m., going north, and at 9 a.m., going south. There is a good clean stopping place at this point.

From the steel there is a three-quarter mile portage to Small Lake, at the head of Slim Creek. This portage is good travelling, it being part of an old lumber road. Just before reaching the lake there is a steep down grade. Coming out, the lumber road may be taken, which winds up over the grade, lessening the incline considerably. From this lake it is a short paddle to the mouth of Slime Creek. This creek, which is 10 miles long, is narrow and quite fast. The first six miles from the lake the stream is more or less choked with dead trees and debris, which necessitates the careful handling of the canoe. The last four miles is open and good. The time of going in through Slim Creek to the Frederickhouse River is two hours. Coming out it takes four hours. Slim Creek empties into the Frederickhouse River 1 1-2 miles below the Frederickhouse Lake. Here the current is very fast, and it is necessary to pull the canoe from the shore. It is possible to paddle some of the distance, but the last quarter of a mile runs like a mill-race and no one has as yet been able to negotiate it without resorting to tracking. The west shore is sandy and furnishes a good foothold for this work.

From Frederickhouse Lake it is possible to use

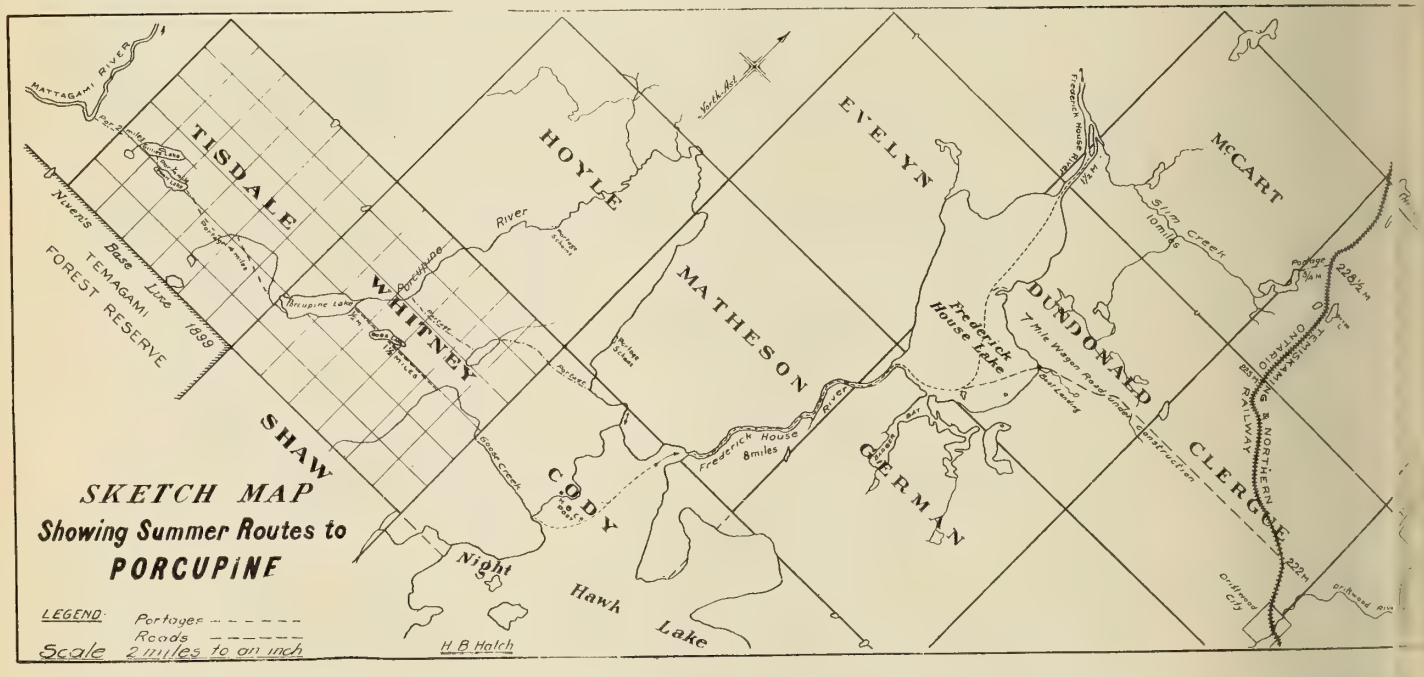
launches all the way into Porcupine Lake. The launches which are to be used are the regular flat-bottomed pointers fitted with engines.

From the head of Frederickhouse Lake the route continues over the five miles separating Nighthawk Lake from Frederickhouse. From the head of Nighthawk it is a short distance to the Porcupine River. This river empties into Porcupine Lake. It is a good wide stream, and throughout its whole length there are only two portages, and both are short, being only five chains. The route ends at Porcupine Lake.

The advantages and disadvantages of this route are about equal. The greatest point in its favour is that with the establishment of launches and the building of good tote roads over the two short portages on the Porcupine, heavy loads of freight can be taken in with scarcely any re-handling. From a passenger standpoint, the route is not advantageous. Time consumed making the trip is the most important objection. Go-

Lake. The route will continue into Goose Creek, whi empties into Nighthawk, just south of the Hudson B Post. Leaving Goose Creek, there is a 1 1-2 mile por age into Bob's Lake. From Bob's Lake there is a on half mile portage into Porcupine. It is intended build good summer roads over these last two portage There should be no difficulty in making the distan either way in one day.

To the writer's mind, with the completion of the sur mer roads, this route furnishes the logical way into t gold fields. Especially is this so from the passenger standpoint. Travellers can easily save 24 hours on t trip by this route. The writer understands that t building of these tote roads at present is being done mining men interested in the country. It would see that the Government should at least do its share opening up this new gold field by financial help in t building. It is impossible to say at the present tir whether or no this route will be best for freight



ing in the sixty-mile canoe journey takes 2 1-2 days, and coming out 14 hours. Of course, with the running of the launches the time will be considerably reduced. It may be said that the writer believes Slim Creek would be at slight expense made safe for the running of light draught launches and that this would make the route practically an all-launch one. The one great objection to this route is that a thirty-mile distance as the crow flies is more than doubled.

The Route from 222 Mile Post.

It will be remembered that mile post 222 was the jumping-off place from which the old winter road started for the Porcupine. Parts of this old winter road are at present being changed so as to be passable during the coming summer. The streams and lakes along the route are used wherever possible.

The route starts from 222, from which a seven mile wagon road will lead due west to Frederickhouse Lake. This wagon road at present is completed for three miles. The four miles remaining will be ready for use shortly. As proposed now, probably only a half mile of this distance will have to be corduroyed. At the Frederickhouse, launches will meet the wagons, and from there the 228 1-2 mile route will be followed with Nighthawk

otherwise. Whether it will be cheaper to re-handle t stuff a number of times than to carry it over the a water route over twice the distance, with practica no re-handling, will have to be determined by expe ment.

The present prices of freight from 222 to the Fred ickhouse are $4 for 100 pounds. This is exorbitant, h is partly justified at the present time by the state the roads. There is no regular passenger service is ye yet on this route. It may be said, however, that t route seems to solve the transportation question as w as it can be solved under the circumstances.

One point which, in regard to both of the abo routes renders them disadvantageous, is the low wa at present prevailing in Frederickhouse Lake a River. This low water is directly due to the blow out of High Falls by Father Paradis. At present at southern end of Frederickhouse Lake there is fr three-eighths to one-half mile of sandbar covered only six inches to a foot and a half of water. It s necessary to pack goods over this distance, as it is impossible to paddle it without running aground. Th are, to the writer's mind, two ways to remedy t Either dam up High Falls or blast out a channel in

lake. It is the opinion of interested people that the Ontario Government should take this matter up at once and provide the necessary money to do either of these things. Time is a matter of importance and there should be no delay. The rendering of Frederickhouse Lake of sufficient depth for launches will solve as well as possible the difficulties of transportation which at present cause trouble.

Other Possible Routes.

There are two other possible routes into the Porcupine country. The writer is not familiar with them, and the data concerning them were obtained from the Government map. Both of these routes have as their main road the Mattagami River.

The more logical of the two starts from Bisco on the Canadian Pacific Railway, from where a trip of 140 miles is taken to Niven's base line. There are numerous portages along this route. A portage of three miles along Niven's base line into Gillies Lake marks the end of the route. Gillies Lake is in the western part of Tisdale Township. The other route necessitates the taking of a construction train west from Cochrane station on the Transcontinental, to the Mattagami River; from there, canoes or launches, 60 miles up the Mattagami to Tisdale Township. There are a number of portages and the going is all against the current. The chief disadvantage of both these routes is their length.

In conclusion, the writer wishes to say that there is no question that with the completion of wagon roads over the different portages, and the installation of launches on the lakes and streams, together with a lowering of the rates now being asked for transportation ,both on freight and passengers, to a fair price, the route as proposed from 222 mile post will solve this question of access to the Porcupine gold district as well as it can be solved under the prevailing conditions.

---

*Mining Geologist, Cobalt, Ont.

AUSTRIAN NOBEL DYNAMITE.

The accounts of the Nobel Dynamite Company, of Vienna, for 1909, show net profits from the four factories of 1,566,000 crowns, as compared with 1,734,000 crowns in the preceding year, and it is proposed to pay a dividend of 25 per cent., being the same rate as in 1908. According to the directors' report the decrease in the financial results was due to the smaller consumption of dynamite owing to the completion of the great mountain railways and the decline in the general situation of trade, whilst the orders for war ammunition were not up to expectations. With regard to the prospects for the current year, the report states that the quite extraordinary increase in the price of glycerine has to be taken into consideration, and existing competition will not permit of a corresponding advance in sale prices. A works was established in Hungary in the past year for the manufacture of nitrate of ammonia explosives, and in view of this fact the Nobel Company proposes to undertake shortly the production of similar and also first-class explosives which have answered the purpose in every way abroad.

The total value of New Brunswick's mineral production for 1908 as computed by Mr. John McLeish, of the Mines Branch, Ottawa, was $579,816. This was only 0.68 per cent. of the total value of the Dominion production.

WESTERN BRANCH MINING INSTITUTE.

The eighth general meeting of members of the western branch of the Canadian Mining Institute will be opened at Grand Forks, on Thursday afternoon, May 26, when routine business will be transacted and several papers having particular reference to the Boundary read and discussed. The director of the Geological Survey of Canada (R. W. Brock) has courteously given permission to Messrs. C. E. Le Roy and L. Reinecke, staff geologists, to take part in the proceedings, and the former will contribute some notes on the geology of Phoenix camp, while the latter will take the West Fork of Kettle River as his subject. Other papers expected are, respectively, on the early history of mining in the Boundary, the electric power transmission system of the district, and probably some notes concerning local transportation facilities. The chairman of the branch, W. Fleet Robertson, Provincial Mineralogist, will endeavour to attend the meeting, arrangements for holding which are being made by the branch secretary, E. Jacobs, of Victoria. Incidentally, it may here be mentioned that as a result of action taken by the branch upon a resolution submitted at the meeting held in Vancouver on February 25, by A. G. Langely, having for its object the provision of facilities for telegraphic communication with Stewart, at the head of Portland Canal, the sum of $16,000 for this purpose has been included in the Dominion supplementary estimates and it is stated that an effort will be made to establish telegraphic communication with Stewart during the current year.

In a recently published tabular statement, compiled by Mr. C. O. Schmitt, a member of the Institution of Mining and Metallurgy, some instructive figures are given as to the relative weights and sizes of stamp-mill parts. Five separate stamp-mills, all on the Rand, are used for illustration. The weights of stamps range from 1,250 pounds to 2,000 pounds. In the former stamp the different parts bear a relation to each other quite different from that obtaining in the heavier stamp. For instance, in the 1,250-pound stamps used on the Simmer & Jack mines, the stem weighs 580 pounds, and constitutes 46.4 per cent. of the total weight; whilst in the 2,000-pound stamps used in the City Deep, the stem weighs only 556 pounds, and constitutes but 27.8 per cent. of the total. In the former stamp the dimensions of the stem are 3 1-2 inches by 18 feet; in the heavier stamp the dimensions are 4 inches by 13 feet. "The head," says Mr. Schmidt, "is a vital part of the stamp and its importance has been more fully realized since the introduction of the heavy stamp. It is evidently that part of the stamp which must mainly serve to increase the weight of the latter, for the reason that its weight does not decrease as does that of the shoe, and also because its weight acts immediately upon the rocks to be crushed. With an increased size of stem the head also had to be increased so as to give the required strength, but as there is a limit in this direction imposed by the distance from centre to centre of stamps, the additional weight required is generally obtained by increasing the length until, at the present time, the length has in some cases reached 4 feet.

The production of nickel from the ores of the Sudbury district in Ontario was more than doubled between 1904 and 1906.

MINING ENGINEERING IN CONNECTION WITH FORT WILLIAM'S WATER SUPPLY.

(Notes from paper read before the Canadian Society of Civil Engineers, by H. Sydney Hancock, Jr.)

[Editor's Note.—The following extract from Mr. Hancock's paper throws a valuable sidelight on a phase of civil engineering that overlaps the realm of mining. Our readers will note the arrangement of drill holes on the headings. From the progress made and the large consumption of explosives, it seems probable that an experienced mining engineer could have effected a considerable saving, particularly in the item of time. We request our technical readers to comment upon the practice here outlined. But whatever fair criticism may be made of Mr. Hancock's mining, it is but just to commend highly the care and thought that marked all his work.]

Power.—Steam was practically out of the question for this purpose. Coal must first come from Pennsylvania, and then be hauled seven miles over a road that took many months to get into passable condition, and had some hills with 15 and 20 per cent. grades. The local supply of wood was limited, and although used only for heating purposes, had to be hauled more than three miles before the close of the work. Gasoline figured out at over $100.00 per h.p. Electric power at $25.00 per h.p. was available on the north side of the river, and it was decided to build a power line, although, unfortunately, the price of copper was at the time abnormally high. The current used was supplied by the Kaministiquia Power Company from their hydraulic plant at Kakabeka Falls—at 2,200 volts, three phase, 60 cycles alternatiing current. Poles, 35 feet in length, were secured from the surrounding country, and spaced 150 feet apart. Two four-pin cross arms were used on each pole, the lower arm carrying telephone lines. The wire was No. 6 solid weather-proof copper, running 112 pounds per thousand feet. The river was crossed by a lead-covered submarine cable of No. 6 copper, laid just within the trench dredged for the west pipe crossing. This cable remained undisturbed for nearly two years, after which it was a constant source of trouble. The first break, early in November, 1908, was caused by a dragging ship's anchor, and nearly five weeks elapsed before a new cable could be secured. The cable was so buried that only 100 feet could be salvaged, after three days' work with scow and diver. The following temporary expedient was adopted to replace it. Three lines of ordinary W. P. stranded copper wire, heavily taped, were bound together. The cable thus formed, was passed through eight lengths of 2 1-2 inch fire hose, and lowered to the bottom with fish plates, lead pipe, and other weighty debris. This worked well for two weeks, when another boat hooked the hose and punctured the rubber. It was taken up and dried, and again laid for a further run of five days. This performance continued until the arrival of the new cable, shortly before the close of navigation. On opening of navigation during the present year (1909), the water level of Lake Superior and the Kaministiquia River was about two feet below normal, and the first boat down the river scraped the cable so that it had to be raised and dried. About two weeks later one wire went dead, and it was thought inadvisable to attempt to dry it again; consequently, one of the taped wires previously used in the fire house was strung through a one-inch lead pipe and connected at the shore ends. No further trouble has been experienced.

The cost per mile of the transmission line, excluding telephone, was as follows:

3 miles, 1770 lbs. No. 6 Wire, at 28c..	$495.60
35 Poles in place, at $5.00.....	175.00
35 4-pin Cross Arms, at 41c.....	14.35
105 Birch Pins, at 2 1-2 cents	2.62
35 Cross Braces, at 8c.....	2,80
105 Double Petticoat Insulators, at 4c	4.10
Freight, at $1.20 per 100 lbs.....	24.00
Labour Stringing Wire	30.00
Total per mile	$748.47

The total expenditure on the line was as follows:

7 miles completed Line, at $748.47..	$5,239.29
Cable and Work at River	358.20
Alterations and Repairs	317.00
Repairs and Renewals on Cable	580.00
	$6,394.49

The alterations were due to the necessity of three times changing the four-pole construction crossing the C. P. R. property to accommodate increased trackage, and of moving the line from the vicinity of a particularly heavy rock cut in the second pressure main.

Plant.—A class E straight-line belt-driven Rand air compressor, capable of compressing 282 cubic feet of free air per minute to a pressure of 100 pounds per square inch, was erected at the main camp. This compressor was operated by a 50 horse-power Westinghouse induction motor, through three 15 kw. 2,200 volts to 550 volts, transformers. A 4-inch air pipe, fed by a 36 inch by 8 feet receiver erected in the compressor house. From this air receiver 3-inch wrought iron pipes, with a union joint every 200 feet, led to the shaft and north portal. At these points were placed 24 inch by 6 feet air receivers, from which 2-inch pipes served the various headings. The 3-inch pipe was carried on the surface of the ground, blocked up where necessary to secure a continuously falling grade. Serious trouble from frost not being anticipated, the expense of excavation in a rocky country was avoided. During continuously cold weather, with temperatures near the zero mark, no trouble occurred, but, at almost every mild spell, work was temporarily stopped by frozen air pipes, a cold night, after a comparatively warm day being the chief cause. It was not feasible to cover the whole line with snow, owing to its height above the ground when crossing small ravines. To overcome this difficulty, drip cocks, threaded to take a small pressure gauge, were placed every 300 feet along the line, and a supply of wood and coal oil kept at numerous points. When a block occurred, a gauge inspection revealed the 300-feet strip affected, and an hour's work or less usually sufficed to thaw it out.

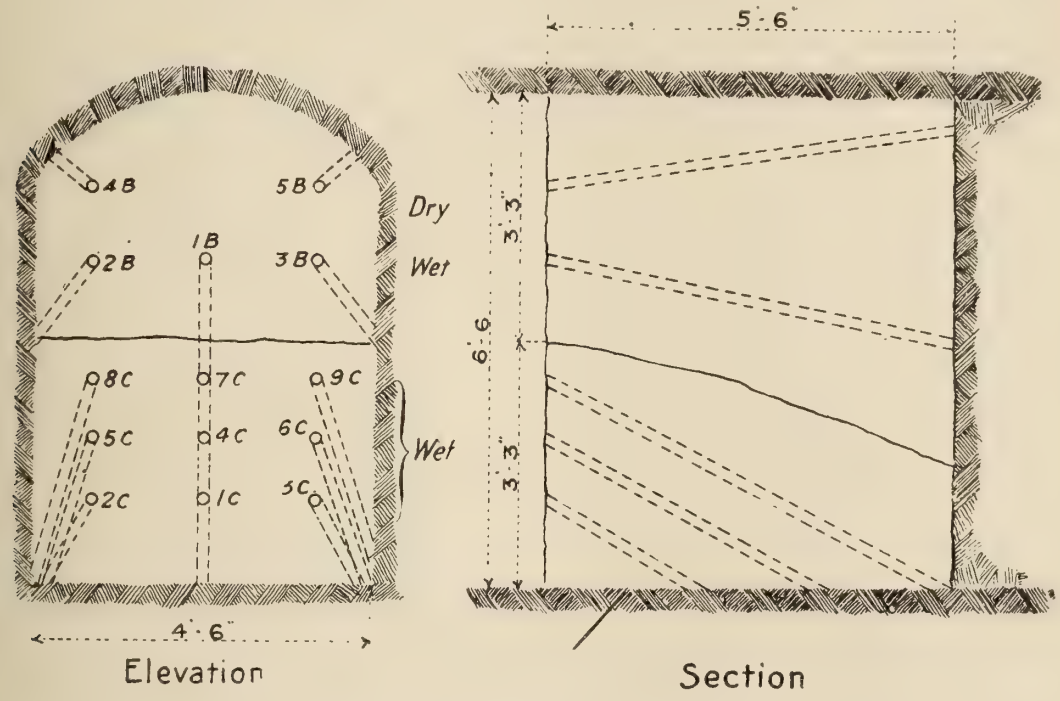
The drills used were No. 43 Rand "Little Giant" drills, with 3-inch cylinders, mounted on 6-feet double screw mining columns, and fed through 50 feet of 1-inch Monarch hose.

Black Diamond steel, with regular cruciform bit

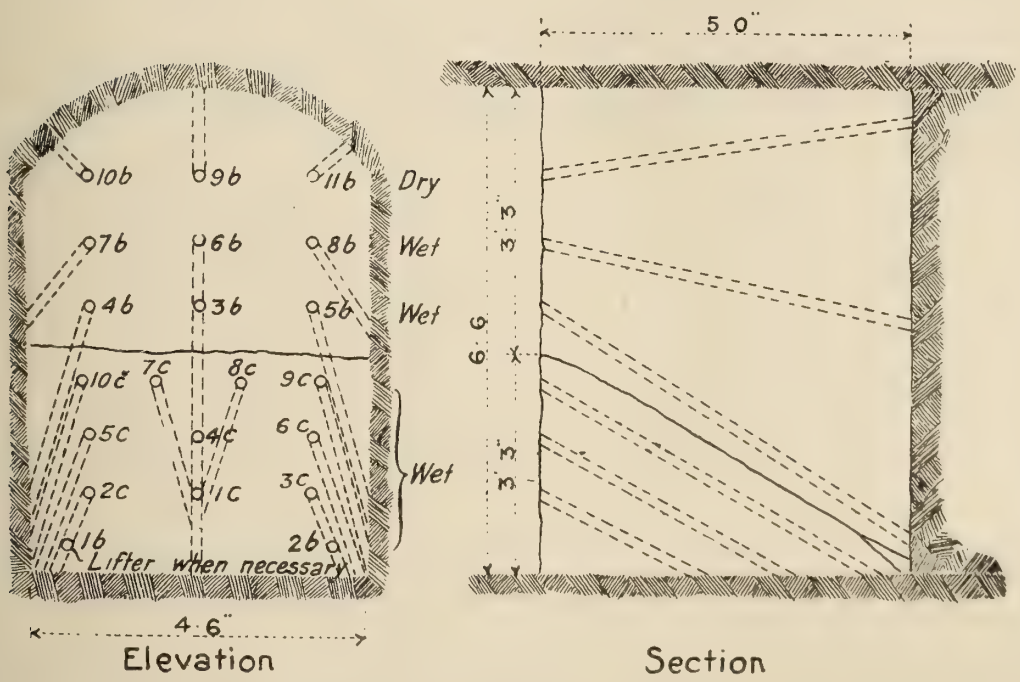
was employed at the commencement of the work in the comparatively soft rock, but the change to the hard black basalt necessitated the use of the best grade drill steel, manufactured by the Jessop and Edgar Allen Companies.

The track was of 50 c.m. gauge, 12-pound rails, 15 feet long, laid on 4-inch by 6-inch by 30-inch ties, spaced 30 inches C.—C. The curves and switches were made of Koeppel portable track on steel ties.

The four cars at the north portal heading were Koeppel all-round dump cars of 18 cubic feet capacity, and at the shaft headings eight detachable body-side dump roller-bearing Koeppel cars of similar capacity were used.



Average Ground



Hard Ground.

SKETCH SHOWING ARRANGEMENT OF DRILL HOLES.

A 5-inch double cylinder Jenckes hoist, operated by compressed air, with a 6-inch by 24-inch drum winding a half-inch steel wire rope, was erected at the shaft.

The shaft sump was drained by a Cameron pump, with a 3-inch suction and 2-inch discharge, rated at 100 imperial gallons per minute and operated by compressed air.

Buffalo forges were used at each end, but the centrifugal blowers were replaced by a compressed air nozzle.

Ventilation was secured by two belt-driven blowers, with 12-inch blades operated by 2 horse-power Westinghouse motors, fed from the lighting circuit and delivering air through a 5-inch pipe made up into 20-foot lengths of 24-gauge galvanized iron.

The dry, hard nature of the rock in the north shaft heading caused much inconvenience from dust, and necessitated the use of a spray, which was furnished from the shaft pump through a 3-4 inch wrought iron pipe.

Light was provided by a single-phase 110-volt circuit, through No. 12 weather-proof wire, from which 16 candle-power lights, protected by wire guards, were dropped every 75 feet. The "breast" work was lighted by a heavily guarded 32 candle-power lamp, furnished with socket handle and hook, and attached to 100 feet of rubber-covered extension wire.

TUNNEL.—The smallest cross-section, consistent with reasonable progress during construction, being more than sufficient for the contemplated water supply, the minimum finished dimensions were specified to be 4 feet by 5 feet 10 inches, carried at a grade of 1 in 1,000.

It was the original intention to line the whole tunnel with concrete, varying in thickness with the nature of the material excavated, but, finally, only those portions showing any sign of weakness were so treated. The generally close, hard nature of the rock removed all fear of seepage or erosion, and the use of a very high co-efficient of roughness still brought the delivering capacity of the tunnel considerably over any possible discharge that could be secured from the watershed.

The rock was excavated on a minimum cross-section, 6 feet 6 inches high by 5 feet wide, and all weak sections lined with 1:2½:5 concrete, leaving a clear waterway, 4 feet wide and 5 feet high, to the springing line of a segmental arch of 4 feet span and 10 inch rise.

Work was carried on at three headings with three machines, two working north and south from the shaft and one working south from the north portal.

SHAFT.—The shaft was sunk at Station 9 + 68, 60 feet in depth and 12 feet by 8 feet inside dimensions. Four sets of 12 inch by 12 inch timber, 6 feet C.—C., backed by 3-inch sheeting, brought the excavation to solid rock. The shaft was divided into two compartments by 2-inch plank casing, the hoisting compartment being 8 feet by 8 feet, and the ladder, pipe, and wire compartment 3 feet 9 inches by 8 feet. Three "rollers" or landing platforms were provided in the latter, making three 16-foot stages and one of 12 feet.

The shaft was sunk by hand labour, prior to the arrival of the machines, at an average rate of 1 foot per shift. An ordinary "jack roll" was used as a hoist.

The head gear was carried on four 12 inch by 12 inch posts, braced against the hoist by 12 inch by 12 inch struts. A 24-inch sheave was supported on two 8 inch by 8 inch timbers, bolted to four 4 inch by 12 inch cross-timbers, which were again supported by four 4 inch by 12 inch timbers, secured to the posts by 3-4 inch bolts, and a shaft house of 1-inch lumber covered the erection at the collar of the shaft. 12 inch by 12 inch stringers, to each of which was spiked a 40-pound rail, formed a track of 6 feet 9 inches gauge, on which ran a platform car fitted with a section of track 19 5-8 inch gauge of 12-pound rail.

The cars used in the shaft drifts were the Koeppel steel side roller-bearing dump cars with detachable bodies. To the hook of the gin block was attached the Koeppel crane attachment. When the cars were brought to the shaft, the bodies were hoisted clear of the trucks to the pit head. A duplicate truck was then run in on the platform car over the shaft, the body car lowered into position, and the platform car run clear to a point where the dump track joined the platform track. The full dump car was then pushed on to the dump track and replaced by an empty car standing on the adjoining "empties" switch, the platform run over the shaft, and the empty car body attached to the crane. On the removal of the platform, the car body was lowered to the vacant truck awaiting it. The full car was then dumped by the "lander" and returned to the "empties" switch. Under ordinary circumstances, this method would have proved cumbersome, but the uniform hardness of the rock in both shaft headings reduced the quantity of material to be handled to the capacity of one "mucker," and as the "landers" soon became "speedy" at their work, this method of hoisting rendered satisfactory service.

The alignment was transferred down the shaft on an 11-foot base line by 12-pound plumb bobs attached to fine piano wire and resting in buckets of water. A transit was then set up in line with the wires and the line produced. This operation was repeated several times whilst the drifts each made 200 feet of progress, and, finally, a centre line 300 feet in length was established on the mean of the five middle readings.

When the south heading was driven through, the alignment was checked by setting up on a hub near the shaft the back sighting 700 feet to a hub set from the surface at the south portal. The error at the breast of the drift heading north was found to be 1 1-4 inches, and was corrected by subsequent operations.

At the north portal Koeppel steel all-round dump cars of 18 cubic feet capacity were also used, the steep hillside affording ample dumping ground for the whole work within a haul of 200 feet from the portal.

The cars were all pushed by one man, and over distances of approximately 1,000 feet. Bye-passes were excavated and a switch installed so as to reduce the haul of the mucker at the breast to that limit. A small Koeppel flat car was provided for handling machines and tools for each drift.

Owing to the scarcity of capable machine men, the work was at first carried on by 10-hour "shifts," but as men became available, three 8-hour "shifts" were organized. A "shift" consisted of one machine man and his helper, and from one to three muckers, depending on the length of haul and character of the work. Two blacksmiths, one at either end, each worked from 10 to 14 hours, varying with the hardness of the rock and the quantity of outside work. The hoistmen and landers at the shaft, as well as the compressor men, worked in two "shifts" of 12 hours. The track-laying, pipe-laying, light extensions, machine and general repair work was handled by two men working usually 10 hours.

The first 1,200 feet of the north heading consisted of a compact blue volcanic ash slate that drilled and broke well, and through which good progress was made. The remainder of the tunnel was through a tough, hard trap, containing numerous diorite dykes of phenomenal

hardness, the specific gravity of which frequently reached 3.4.

Progress through the latter rock was painfully slow, although air was delivered to the machines at from 80 to 85 pounds pressure. Bits of the best steel, tempered to a pitch that would notch a file, were worn smooth and useless without a crack or flaw after drilling less than three inches. It frequently took over three hours to drill a 5 feet 6 inches dry back hole.

The machines were mounted on standard vertical mining columns with two jack screws, the small size of the drift preventing the use of a horizontal bar.

The average advance made by each cut was four feet six inches. In the slate rock eight five foot holes sufficed, the whole breast being fired in one blast, but the tenacious nature of the hard rock sections necessitated from seventeen to twenty-two holes, in order to break the full cross-section. The holes were arranged as shown in the sketch, and the lower nine holes forming the "cut" were fired first with a fuse, timed to explode in the order shown. After the "muck" had been cleared, the "back" holes were similarly fired.

The upper five holes in the back were practically "dry" holes, and proved a very hard drilling proposition in this rock. Two lifters were sometimes used at the bottom of the face to serve the double purpose of striking to the bottom of the cut, and lifting the "muck" away from the face. thus facilitating the speedy erection of the columns for the next attack.

Work commenced with sixty per cent. dynamite, manufactured by the Ontario Powder Company, but the fumes proved too much for the miners, who were constantly being overcome by gas, and forty per cent. dynamite was substituted with satisfactory results. When the very hard rock was encountered, the writer believed that a stronger explosive would be advantageous, and Nobel's seventy-five fumeless gelignite was adopted. After some trouble in getting it properly thawed, and the holes intelligently loaded, the results secured were good, but its odour, to which the "copper country" miners, who were in the majority, were unaccustomed, caused much vomiting and the experiment had to be abandoned. In the slate rock, about six pounds of 40 per cent. dynamite were used per foot of completed tunnel, but in the hard rock it was necessary to use from twelve to eighteen for the same distance.

In the slate rock firing by battery was more or less successful, but in the hard rock, time fuse gave infinitely better results. The "Bennett' fuse was used throughout the work and proved of uniform excellence.

Two accidents marred the success of the work. One on June 21st, 1907, and the second on June 21st, 1908. On the first date the two shaft drifts had each been driven less than forty feet, the ventilating fans not being then in position. Immediately after the midnight blast the two miners in charge of the shifts went down to recharge a missed hole, expecting to get away before becoming affected by the fumes. The air hoses were coiled on the lower "soller," and the precaution of blowing out with compressed air was not taken. Apparently both men were overcome immediately on reaching the bottom ladder, as one sustained a broken arm from the fall. A rescue party of two men from the surface placed the unconscious miners in the bucket, and then attempted to climb out, but both collapsed on the lower "soller." The casing had not been completed in the ladder compartment, so they were hoisted to surface by the bucket. One man, and he the most active of the rescue party, was already dead from the effect of the fumes and the effort of carrying a collapsed comrade up the first ladder. His name was Jos. Chichester, the son of Colonel Chichester, a distinguished British veteran of the Indian Mutiny.

Within a few minutes of one year later, a mucker in the north heading, whilst cleaning up in preparation for the blast, turned up a small piece of dynamite eight feet from the face. On being advised, the man left his machine and began to search with a pick for further fragments, thereby immediately causing an explosion. Both the machine man and his helper were killed and one mucker was permanently blinded, the other standing beside his car, six feet away, was uninjured. The amount of dirt moved did not exceed a cubic foot, but the whole quantity was apparently received in the faces and chests of the victims. Neither the air hose nor the light wire was damaged, and the incandescent globe hanging from the column, only five feet away, was uninjured. Subsequent examination pointed to the probability that the explosion of No. 3 cut hole had cut off No. 6, drilled in this case a few inches below grade, and leaving an inch or two of dynamite in the bottom of the latter hole. An extraordinary feature of the case was that this was the third time the hole had been mucked over, and as half of it showed plainly on the side of the drift it had been examined two days previous to the accident.

The machines commenced work on the 4th day of June, 1907, and the two long headings met at Station 27+56 on the 24th day of May, 1909. The closing error in alignment amounted to three-eighths of an inch, and the difference in elevation was 0.05 feet.

After the tunnel had been cleared out and concreted where necessary, the shaft was covered eight feet above grade line by a 24-inch slab reinforced by old twelve-pound steel rails, supported on walls four feet apart keyed into rock at the sides with 1 1-8 inch drill steel. At the sump, the wall was made three feet wide on top, battering on the outside at 1 in 6. The whole shaft was then filled to the surface with earth.

The monthly progress in the three drifts was as follows:

	N. Portal. Drift.	N. Shaft. Drift.	S. Shaft. Drift.	Total feet.
1907.	ft.	ft.	ft.	ft.
May	49	..	..	48
June	141	43	47	231
July	138	85	98	321
August	142	72	85	299
September	130	105	80	315
October	162	111	64	337
November	160	82	75	317
December	209	103	77	389
1908.				
January	137	97	72	306
February	37*	75	51	163
March	68	81	80	229
April	65	70	37	172
May	73	76		149
June	62	66		128
July	69	71		140
August	73	69		142
September	71	63		134
October	76	80		156
November	30**	45**		75
December	51	66		117
1909.				
January	50	58		108

February	64	60		124
March	70	70		140
April	76	74		150
May	53	76		129
Totals	2255	1798	766	4819

The wages paid on the tunnel were as follows:

Tunnel Superintendent	$150 per month.
Machine men	$3.50 to $4.00 per shift.
Helpers	3.00 to 3.50 per shift.
Muckers	2.50 to 2.75 per shift.
Landers	2.50 per shift.
Hoistmen	.25 per hour.
Blacksmiths	.35 to .40 per hour.
Blacksmiths' helpers	.25 per hour.
Compressor men	.25 per hour.
First mechanic	.40 per hour.
Mechanic's helper	.30 per hour.

*Labour and machine troubles.
**Half month lost by power cable troubles.

OXYGEN BREATHING APPARATUS IN PACIFIC COAST COAL MINES.

By E. Jacobs.

One of the results of the efforts of the United States Geological Survey to make its important exhibit at the Alaska-Yukon-Pacific Exposition, held last year at Seattle, Washington, U.S.A., of practical usefulness to the mining industry is now manifest in the increasing interest being taken in the matter of providing the coal mines of the West with oxygen breathing apparatus for use in cases of need, primarily for life-saving purposes, and next for use in cases of underground fires or other emergencies. The United States Survey exhibit at that Exposition was a comprehensive one, and it included two Draeger helmets with the usual accessories to make this rescue apparatus complete, and in order the better to impress coal miners and others with the serviceableness of the apparatus, which few visitors to the Exposition had ever seen before, a demonstration was made every week day afternoon in a specially constructed room filled with noxious fumes. In this room, which was fitted with large glass windows, the two demonstrators could be seen at work climbing over obstacles, lifting heavy timbers, carrying dummy bodies, etc. In addition to the object lesson thus given, the official in charge of the demonstration work showed the apparatus to all wishing to closely examine it, explained its uses, fitted it on those who desired him to do this, and in every way possible endeavoured to impress enquirers and onlookers with the great value of the apparatus for the purposes designed. Shortly before the close of the Exposition an urgent call came from Roslyn, Washington, for the loan of the apparatus for use in a real emergency, a disaster having occurred in a coal mine there, unfortunately with distressingly fatal results.

The need for the provision of similar apparatus and training in its use having been thus demonstrated, some of the mines in the State were shortly afterwards equipped with the Draeger apparatus, and within four months of the closing of the Exposition a Mine Rescue Training Station was established at Seattle, with an official of the Technological Branch of the United States Geological Survey in charge. Dr. J. A. Holmes, of Washington, D.C., is head of this branch of the Survey, and he placed Mr. H. M. Wolflin in charge of the training station at Seattle. Quarters for the station were found in the building erected in connection with the A. Y. P. Exposition for the Philippine Islands exhibit, which building was one of those left on the campus of the University at Washington in accordance with the understanding reached (when the use of the campus for Exposition purposes was granted) concerning the leaving of certain buildings for university use after the close of the Exposition. The proximity of this building to the main university buildings was an advantage in another respect, namely, its nearness made it convenient for some of the university professors to give lectures in connection with the work of training in progress at the station.

In the mine rescue training work Mr. Wolflin has an assistant. The training course is taken chiefly in a suitable room or compartment strewn with obstacles such as would be met with in actual rescue work in a coal mine. The atmosphere of this room is made as foul with fumes as that of a mine in which rescue work would have to be undertaken. In addition to instruction in the use of the Draeger oxygen breathing apparatus and the actual wearing of the helmet in the room filled with noxious fumes, those taking the training course are required to attend from five to ten lectures delivered by members of the faculty of the University of Washington. In order to break what might otherwise be the monotony of taking the training course, suitable literature is provided in a reading room. Much interest has already been, and is being, evinced in the work of this training station by coal mine superintendents, foremen, fire bosses, and ordinary miners, and already advantage has been taken of the opportunity to become familiar with the mine rescue work, under conditions less dangerous than when there is no such provision made to save life, by a number of those directly concerned. It is gratifying to find that the training station at Seattle is making a record of men duly qualified and certificated during the first six months of its operation. It was opened on February 12 of the current year, and by the end of April certificates had been issued to thirteen men who, after taking the prescribed course of training, had proved themselves entitled to them. A station at Pittsburg, Pennsylvania, also operated under the auspices of the United States Geological Survey, after having been two years in active existence, has during that period issued only 25 certificates; one at Urubana, Illinois, during eighteen months has issued two, and one at Knoxville, Tennessee, four, after having been operated six months. It is evident, therefore, that advantage is being taken by western coal mining men of the opportunity afforded them by the opening of the station at Seattle in larger degree than by others elsewhere for whose benefit similar facilities for mine rescue training have been provided.

It is worthy of mention that the instructions given by the United States Geological Survey to Mr. Wolflin were so wide that when a recent emergency arose at Nanaimo, Vancouver Island, B.C ,he was at liberty to respond immediately to a request that he render assistance. Fire had broken out underground in one of the coal mines of the Western Fuel Company. Mr. Thomas R. Stockett, manager of this company, had already taken the lead in the province in procuring Draeger apparatus, which had been supplied more quickly than the selling agent had expected it would be, consequently the agent had not yet reached the mine in order to give the requisite instruction in the use of the helmets. However, Mr. Wolflin's services were immediately available, and he proceeded from Seattle to Nanaimo and there instructed a number of men how the apparatus could be used underground, so that the measures necessary for

extinguishing the fire could safely be undertaken. In this way a restoration of safe working conditions was expedited and the usefulness of the new addition to the equipment of the mine was demonstrated in a practical way.

Since the occurrence just mentioned Mr. Stockett has been invited by Mr. Wolfin, acting in his official capacity as mining engineer in charge of the station, to send some of his men to Seattle, there to take the mine rescue station training course, for which there would not be any charge made. The expenses of maintenance of this station are at present borne by the coal mine operators of the State of Washington, and Mr. Anderson, president of their association, has stated that operators of coal mines in British Columbia will be heartily welcome to send in some of their men to take the training course without charge. However, while it is probable some men from the province may avail themselves of this opportunity to obtain the requisite training, it is not likely British Columbia mine owners will take advantage of the generosity of their neighbours across the international boundary line to the extent of allowing their men to be trained without charge. The cost of giving a man the course of training, which lasts about two weeks, is approximately $30. The cash receipts on this account are all dealt with by Mr. D. C. Botting, Inspector of Coal Mines for the State of Washington, who attends to the proper disbursement of all money received. This arrangement frees the official representative of the United States Geological Survey from any connection with the financial affairs of the training station.

The great importance of this subject of mine rescue work is becoming generally recognized by coal mine operators. Now that the Western Fuel Company has shown itself alive to the necessity for adopting modern safety measures there is reason to conclude that other mining companies operating in Western Canada will speedily follow so good an example.

The Western Branch of the Canadian Mining Institute, at its meeting held in Vancouver, B.C., on February 25 last, passed a resolution requesting the Dominion Government to arrange for the admission duty free of oxygen breathing apparatus for mine rescue work. This request was forwarded to the Hon. Wm. Templeman, Dominion Minister of Mines, but it is not known whether or not the Government took any action thereon. It was stated at the Institute meeting that the United States Government had exempted such apparatus from duty on its being brought into that country, which was an important consideration in the equipment of mines with such apparatus. Another point urged in connection with the use of oxygen breathing apparatus was the great desirability of having it uniform in character, so that the equipment of one mine might be interchangeable with that of another. The distinct advantage of having the equipments of several mines, together with men trained in the use of it, rushed to the scene of any serious disaster was urged, and the hope expressed that mine owners generally will recognize the especial need for uniformity, so that in times of great emergency there may be readily available ample rescue equipment and many men trained in its use.

Quartz, occurring with feldspar, is shipped from the Richardson mine, Bedford Township, Ont., to the electric furnaces of the Electro Metals Company, Limited., Welland Ont. This company operates four furnaces, of from 1,000 to 1,500 h.p. each. Ferro-silicon is here manufactured.

THE CHIBOUGAMAU COMMISSION.

The Chibougamau region lies about 200 miles northeast of Lake St. John, and 5 miles to the south of Lake Mistassini. Excepting the early explorations made in 1674 by the Jesuit Father Albanel, the first report of importance was that by James Richardson, who examined the district geologically in 1870. Richardson mentions the existence of a zone of chloritic schists, diorite, serpentine, conglomerates, and granite, strongly mineralized in places with iron and copper pyrites, magnetite, etc.

These observations were subsequently confirmed by Mr. A. P. Low, who was in the region in 1885 and who also called attention to the similarity of the rocks to those of the Sudbury district. He states in his report that there are important indications of economic minerals.

In 1897, Mr. H. O'Sullivan, in a report on the country between the Lake St. John and James Bay, mentions that on the portage between Lake Chibougamau and Lake Wacounipi he noticed a compass variation of 166 degrees, caused by some deposit of magnetic iron in the neighbourhood.

Mr. Peter MacKenzie, in 1903, undertook an exploration of the region, from which he brought back good specimens of asbestos and of copper ores.

This was followed in 1904, 1905, 1906, 1907 by further explorations by Messrs. Obalski, Low, MacKenzie, Machin, and Dulieux, with further confirmation of the presence of areas of Huronian rocks and of indications of strong mineralization.

Owing, however, to the lack of transportation, the development of the mineral deposits is handicapped, and the Quebec Government has been strongly urged to take steps to remedy this, either by building a railway into the region, or by granting subsidies towards the construction. But the information that we possess about the region is far from specific. It is the result of explorations on broad lines, and it is not sufficiently detailed to answer such a question as: "Would the Government of the Province of Quebec be justified to either build or subsidize the building of a railroad to develop and work the mineral resources of the Chibougamau region?" The building of such a road would involve several million dollars, and before taking any action in the matter, the Quebec Government has decided to send a commission of geologists and engineers to report on the possibilities and probabilities of the region from a mineral standpoint.

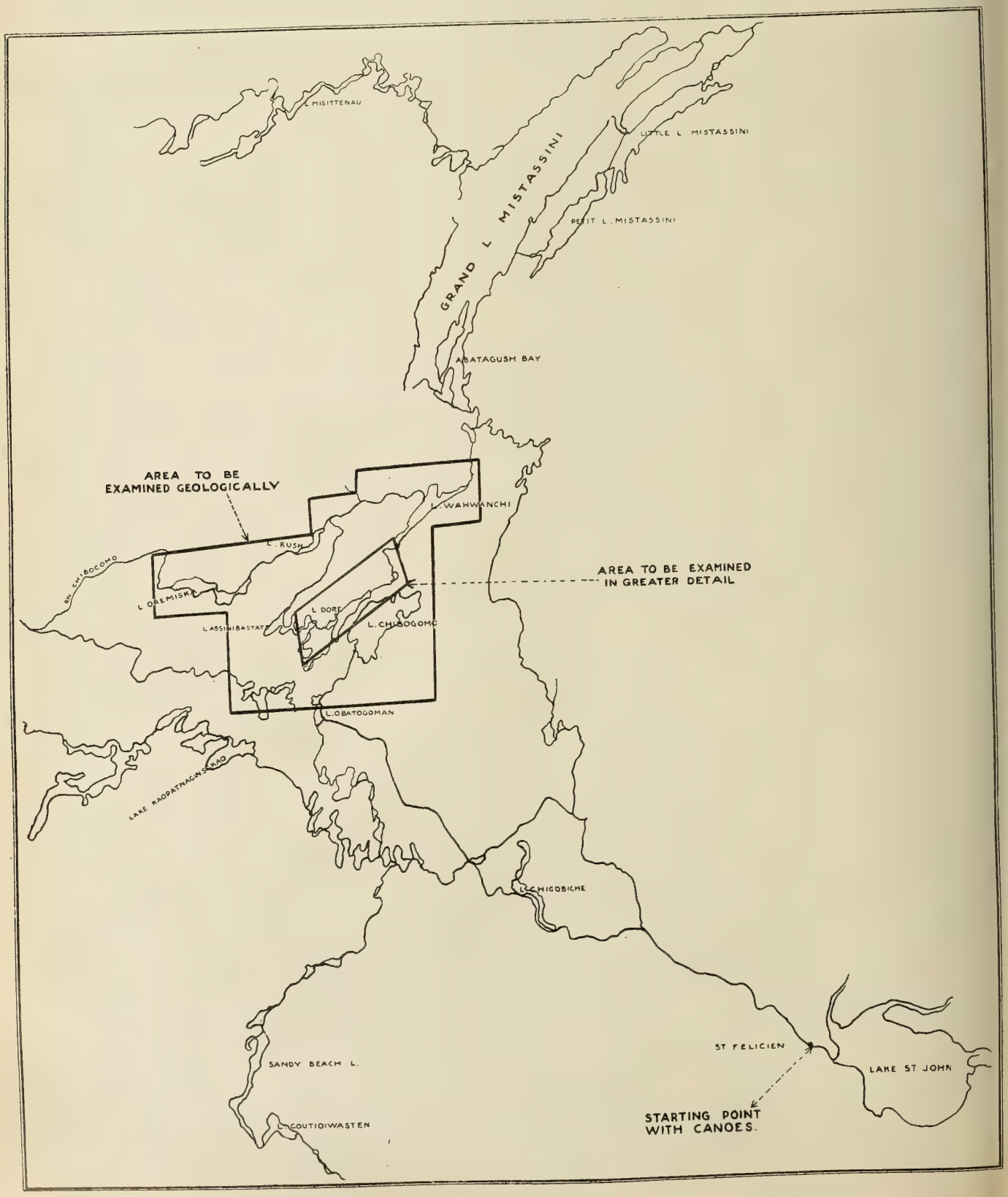
Three commissioners have been appointed: Dr. A. E. Barlow, Mr. J. C. Gwillim, and Mr. E. R. Faribault. The high standing of these three men is a guarantee that the report of the commission will be as authoritative and unprejudiced as possible. Their instructions are to choose their own staff of technical assistants and of miners and labourers, to enquire into the mineral resources of the Chibougamau region, and to advise as to whether or not the Government of the Province of Quebec would be justified in taking steps towards the building of a railway from Lake St. John to Lake Chibougamau.

The party will be composed of the three commissioners, each with a technical assistant, and of Mr. Valiquette, of the Bureau of Mines, who will have charge of a topographical and geological party under the direction of the commissioners. Mr. Valiquette will also act as mining recorder, to issue miners' certificates, mining licenses, and record claims. etc., for the conven-

ience of the prospectors in the region. There will, moreover, be ten or twelve men to do the stripping, drilling, and blasting work.

The party will leave Roberval, on Lake St. John, as soon as the state of the rivers will allow, probably at the beginning of June. They will proceed by the usual route by wagon to Portage à L'Ourse, 25 miles; then by water along the Chamouchouan and Chigoubich Rivers, Chigoubich Lake, Nikoban River and Lake, chain of streams and lakes over the height of land, Obatogoman Lake and Lake Chibougamau, a total of 184 miles. They will remain in the field as late as possible.

Irrespective of what may be the findings of the commission, the Government of Quebec is certainly to be commended for this action. It is a wise policy to spend a few thousand dollars to obtain as much information as possible before rushing into an undertaking which will involve four or five million dollars.



THE McKINLEY-DARRAGH-SAVAGE MINES OF COBALT, LIMITED.

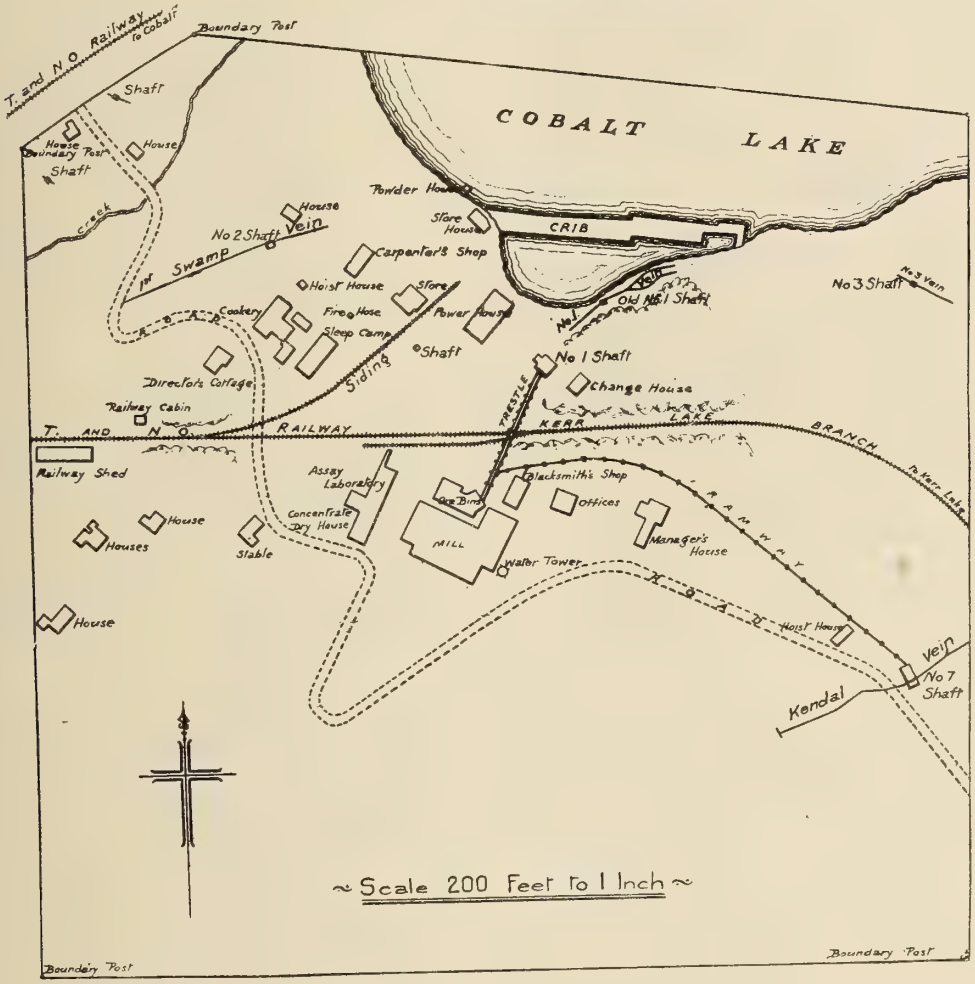
(Concluded.)

Savage Claim.

Extent of Mining Operations.

	Year 1909.	Previous.	Total to Date.	Abandoned.
Shafts	180 ft.	508 ft.	688 ft.	140 ft.
Drifts	303 ft.	517 ft.	820 ft.	399 ft.
Crosscuts	28 ft.	403 ft.	431 ft.	403 ft.
Totals	511 ft.	1428 ft.	1938 ft.	942 ft.
Stoping	90 cu. yds.	100 cu. yds.	190 cu. yds.	130 cu. yds.
Trenching	5800 ft.	4000 ft.	9800 ft.	

= SURFACE PLAN =



Production of Silver.

Year, 1908,	22,654.82	ounces.
Year, 1909,	62,181.52	ounces.
Total	84,836.34	ounces.

Cost of Operations, 1909.

Insurance, Taxes and Miscellaneous	$ 381.10	
Supplies—		
Miscellaneous	$3,801.09	
Explosives	1,798.64	
Fuel	7,517.71	
		13,117.44
Labour		28,279.55
Total		$41,778.09

Cost of Operating Boarding House and Camp.

Supplies	$3,937.38
Labour	1,440.00
	$5.377.38

Men have been charged 60 cents per day for bed and board, deductions from pay roll on this account amounting to $4,969.25, which shows a deficit of $408.13, and which latter amount has been charged to labour.

The average number of men employed upon operations has been 33.

It is rather a misnomer to speak of work upon the Savage as Operations, as nothing but exploration and development has been done.

Returns from McKinley-Darragh having provided funds for dividends, plant extensions and operations, we have been able to proceed slowly, and therefore economically, in developing the Savage.

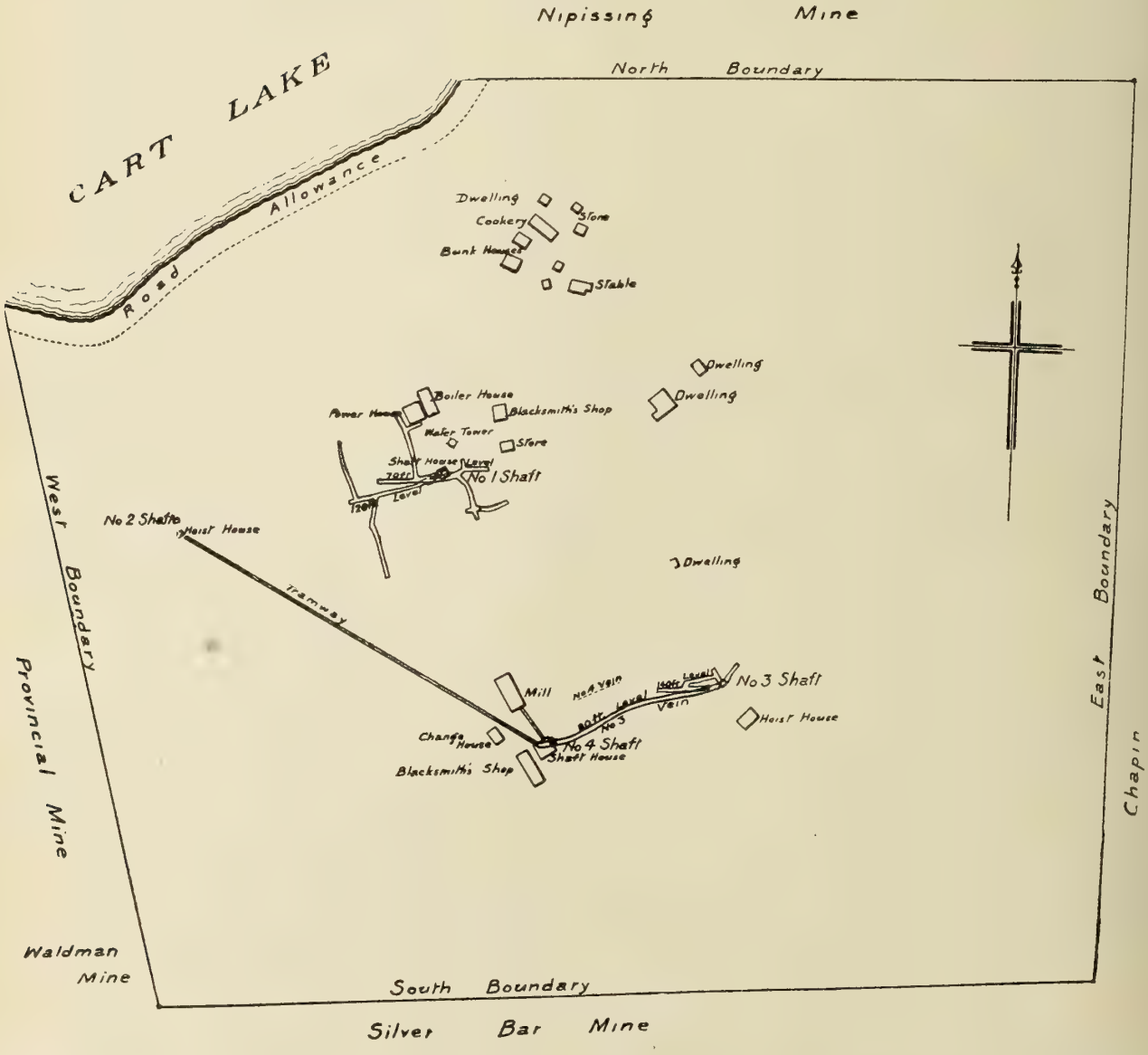
The entire year has been spent in converting this property from a "prospect" into a developed mine, and although the costs have been charged into "operations" they might better be considered as "equipment."

During the past year the importance of the claim as a valuable asset, has developed steadily.

With payable ore in No. 2 Shaft from 40 feet down to 112 feet; No. 3 Vein proven to carry rich values over a distance of several hundred feet; the discovery on the surface of No. 4 Vein carrying nuggets, and

— SAVAGE MINE —

— Plan of Workings —



several other promising veins carrying cobalt, it has gradually become evident that the Savage is worthy of serious consideration as a mine.

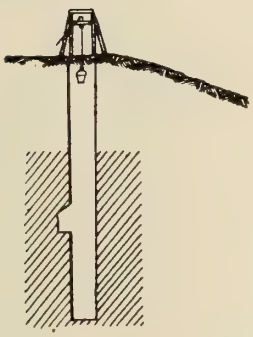
The power plant at present existing upon the property is entirely inadequate for our work, and far greater progress would have been made during the last four months of 1909 if we had had sufficient power available to meet the increased demands made by pumps, drills and hoists.

In fact, during the last three months so great has

— SAVAGE MINE —

— Cobalt, Ontario, Canada —

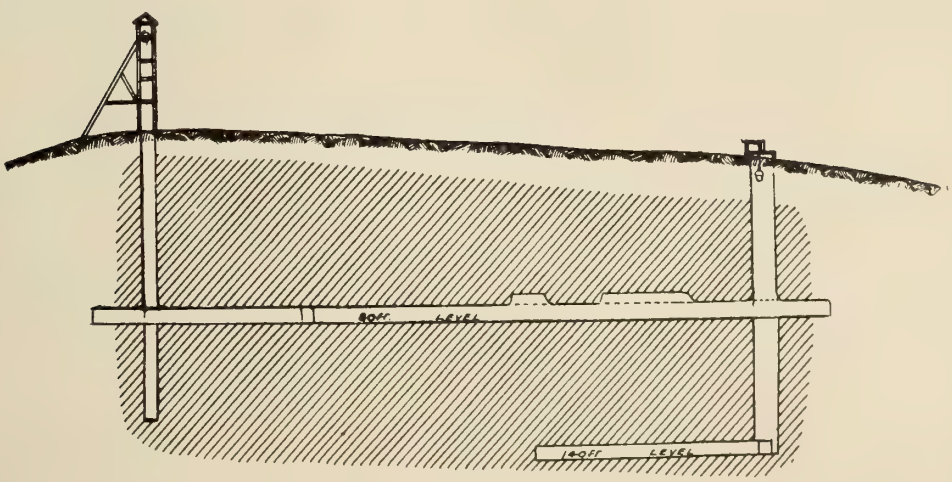
~ Vertical Section on No 2 Vein ~



~ Vertical Section on No 4 Vein ~



~ Vertical Section on No 3 Vein ~



Payable Ore shewn Hatched

been the demand for pumping, that we have been able to operate but one drill.

We have been misled by those companies which propose to supply compressed air and electricity to the camp, as their repeated assurances led us to believe that an abundance of cheap power for all purposes would be available in October and November. With this power supply constantly expected, it has not seemed advisable to spend anything in supplementing our present plant, and the consequence is that we are still struggling along with insufficient power to enable us to push the development of the Savage as it merits. The power supply companies are working steadily upon the installation of their plants and it is probable that there will be a supply of power available in the near future.

With the opening out of the Savage, it became evident that we would be warranted in putting in a somewhat elaborate ore-sorting plant, so that the ore from the various workings could be brought to a central point for treatment. Such a plant has been built and is about completed, the system being as follows

Ore is dumped into bins having a storage capacity of 100 tons. From these bins the ore is drawn out over a grizzley. On the grizzley the ore is washed down and the rich vein matter sorted out and cobbed free of waste. From the grizzley the ore is fed into a jaw crusher and the product from the crusher joins the fine material from the grizzley, both falling into a bucket elevator. The elevator delivers the crushed ore to a sizing screen which makes four products. The finest product from the screen goes to a concentrating table, the next two sizes go to two Hartz jigs. The hutch product from the jigs is elevated to the concentrating table referred to above.

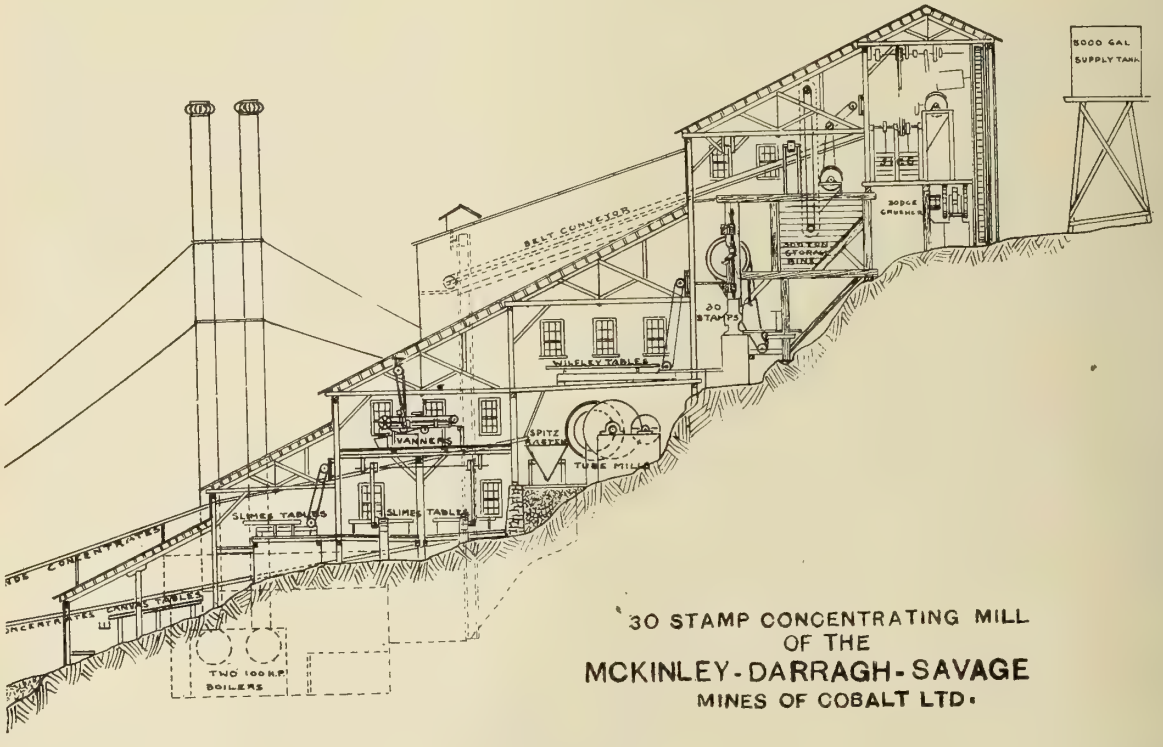
The waste tails from the jigs and from the concentrating table flow out to a dump.

The oversize from the sizing screen is discharged onto a bumping table and is hand picked, the reject going to a dump, there to remain until such time as it will be possible to treat it further in our McKinley-Darragh mill.

The process is illustrated by the "flow sheet," and the details of the ore-sorting plant are shown by the drawings accompanying this report, while the appearance of the plant is shown in the several accompanying photographs.

Our work upon the Savage has demonstrated the fact that only in rare instances do the silver values show upon the surface, and for this reason it is intended to prove up known veins by crosscutting rather than by sinking separate shafts upon each of them.

About six thousand feet of trenches have been dug this year, and altogether about two miles of this work has been done. The result has been the exposure of four veins (one of which carries nuggets at the surface) lying between and extending parallel to veins 2 and 3. Also to the east of No. 3 Shaft a network of cobalt-bearing veins has been exposed.



30 STAMP CONCENTRATING MILL
OF THE
MCKINLEY-DARRAGH-SAVAGE
MINES OF COBALT LTD.

These veins can be reached from the workings on No. 3 vein by means of crosscuts, and all ore and waste rock will be raised through No. 4 Shaft.

This shaft is located at about the centre of the property, on high ground with excellent opportunities for disposing of waste rock and ore, the new sorting plant being fifty feet from the shaft.

A new head gear, hoist house and shop have been erected, and when a supply of power becomes available, it will be possible to develop and mine the property economically from No. 4 Shaft.

The No. 1 workings were abandoned and allowed to flood in January, 1909, as explained in my last annual report. No. 2 Shaft has been pumped out and timbered to a depth of 100 feet, the shaft bottom being 112 feet. A concrete water ring has been installed and a pumping station established at 70 feet, for the purpose of catching up and getting rid of as much water as possible, thereby improving the working conditions in the shaft.

During the summer the Provincial Mine, by means of a diamond drill, proved the continuance of this vein to a depth of 165 feet, and it is my purpose to sink to 200 feet if the ore holds good that far.

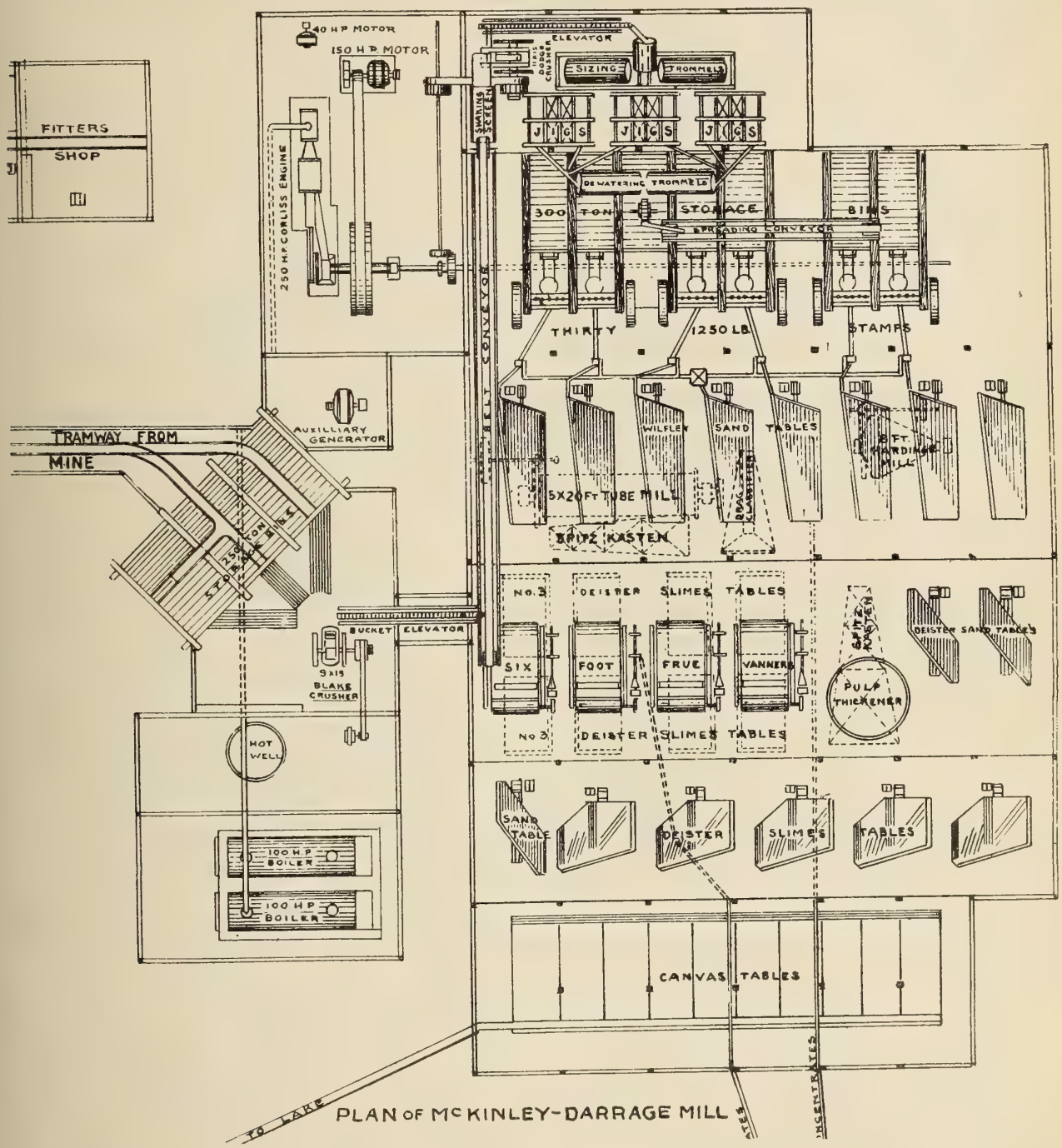
Allowing a distance of twenty feet on either side of the shaft and a vertical depth of 75 feet, I estimate that No. 2 Shaft has developed a reserve which will yield approximately 60,000 ounces, but owing to a lack of knowledge concerning this vein it is not possible to form any accurate conclusions; it is probable that the ore developed will considerably exceed the above estimate.

Pending the completion of the new sorting plant, and the delivery of power, the sinking of No. 2 Shaft has been deferred, and work at present is limited to keeping the shaft pumped out. Meanwhile a trestle has been constructed to connect No. 2 with the new sorting plant at No. 4.

The most important ore body at present known upon the claim is No. 3 Vein.

Sinking No. 3 Shaft, ore was encountered at 20 feet, and for about nine feet the vein was one and one-half inches wide, and carried from 8,000 to 10,000 ounces per ton. From 30 to 75 feet the vein averaged about two and one-half inches in width and carried from 1,700 to 2,500 ounces per ton.

Drifting on the 75-foot level showed ore ten feet to the east of the shaft, at which point the vein ran into an open fissure. No attempt has been made underground to locate the extension of the vein beyond this fissure, but upon the surface it has been located. To the west of No. 3 Shaft the 75-foot level drift has been



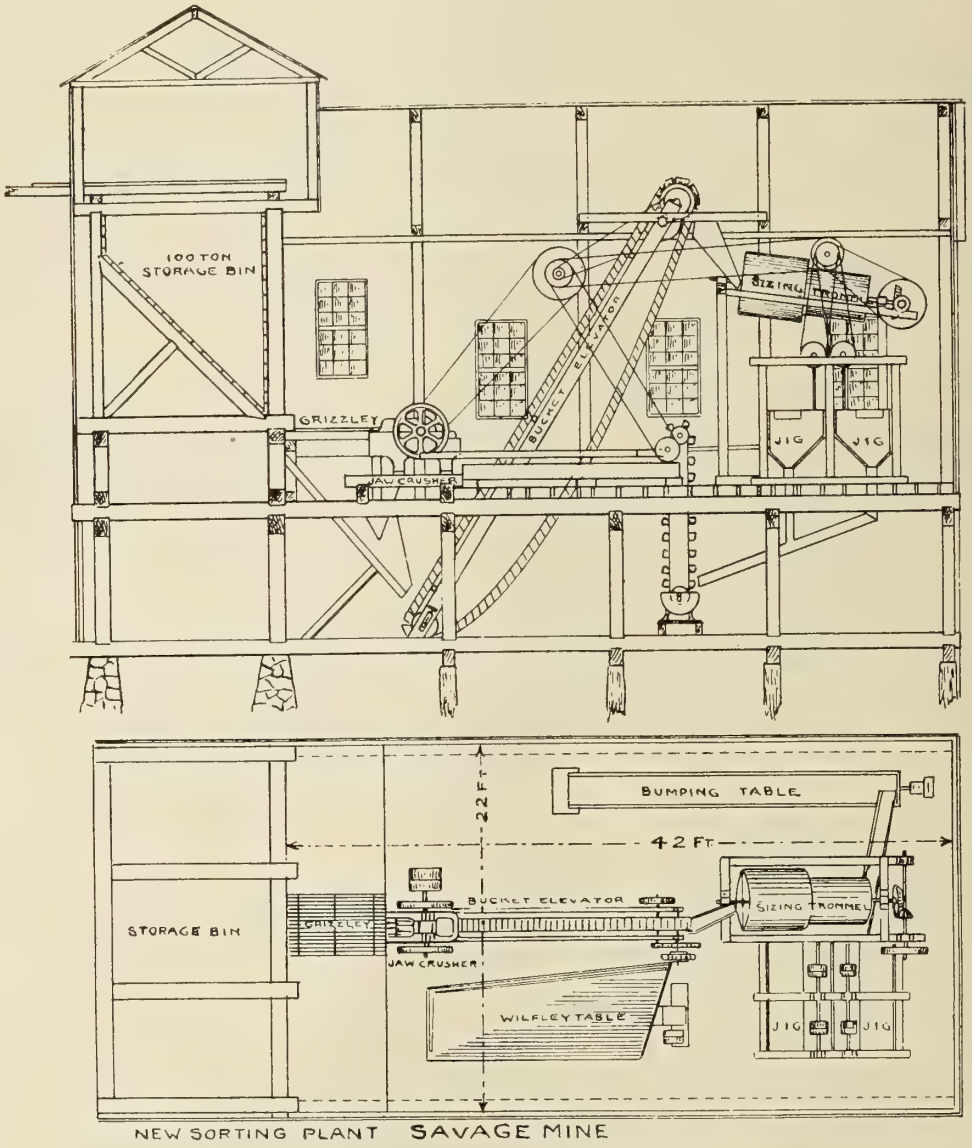
connected through to No. 4 Shaft, a distance of 265 feet, and the drift has been carried 20 feet beyond No. 4.

Between No. 3 and No. 4 the vein averages 2 inches in width, and carries approximately 1,800 ounces per ton.

Below the 75-foot level, No. 3 Shaft was sunk to a depth of 130 feet from surface, and a crosscut of 18 feet was driven to pick up the vein. On this level the time being, until sufficient power is available to meet the increased demands for power for pumping.

STOPING.—Sixty cubic yards, stoped from the roof of the 75-foot level drift, represents the only inroad made upon ore reserves during the year.

ORE RESERVES.—The values of the ore reserve in No. 3 Vein can not be accurately estimated, owing to the great variations in the values per ton at different points. From sampling in the shafts and drifts, checked by smelter returns on ore shipped, I believe that I



NEW SORTING PLANT SAVAGE MINE

vein is small (about ¾ of an inch wide) and patchy, though rich in nuggets. There is some silver in the wall rock. A total of 98 feet of drifting was done at this level.

On the night of August 6th, the No. 3 Shaft house caught fire, being completely destroyed, and the burning debris falling down the shaft caused the shaft timbers to burn out above the 75-foot level . After this accident, work on the 130-foot level was suspended, as it was decided not to rebuild the burned structure, but to push the sinking of No. 4 Shaft, making the latter the main hoisting shaft for the workings.

No. 4 has been carried down to a depth of 125 feet, at which level a strata of water-bearing sandstone was cut, and sinking operations were discontinued for the

am conservative in placing a value of approximately 600,000 ounces on the known extent of No. 3 Vein as developed by shafts 3 and 4, and the drifts at 75 and 130 feet. This estimate does not allow for any persistence of values beyond our present workings.

Since the first of the year we have driven a crosscut north from the 75-foot level of No. 3 vein to prove No. 4 vein. At a distance of 44 feet No. 4 vein has been cut. It is 2½ inches wide, calcite and smaltite, carrying 1,000 ounces in silver values.

Allowing 80 feet of backs and a lateral extent of 60 feet will give a reserve of something over 90,000 ounces for this vein. Continuing the above crosscut to the north, at a distance of 26 feet beyond No. 4 Vein, we have also cut No. 5 Vein. It is 1 1-4 inches wide, smal-

tite, and is very rich in silver. No allowance has been made for this in estimating reserves.

Recapitulation of Estimated Reserves.

No. 2 Vein.....	60,000 ounces.
No. 3 Vein.....	600,000 ounces.
No. 4 Vein.....	90,000 ounces.
	750,000 ounces.

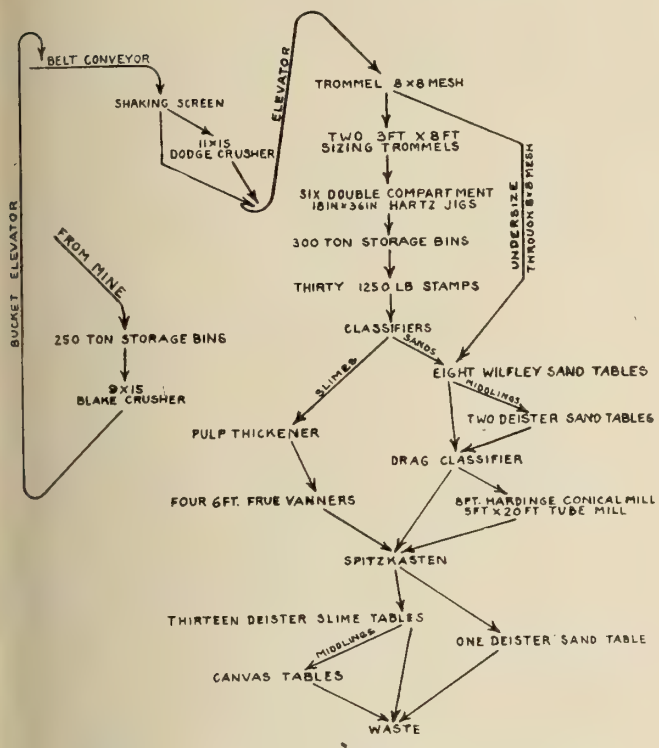
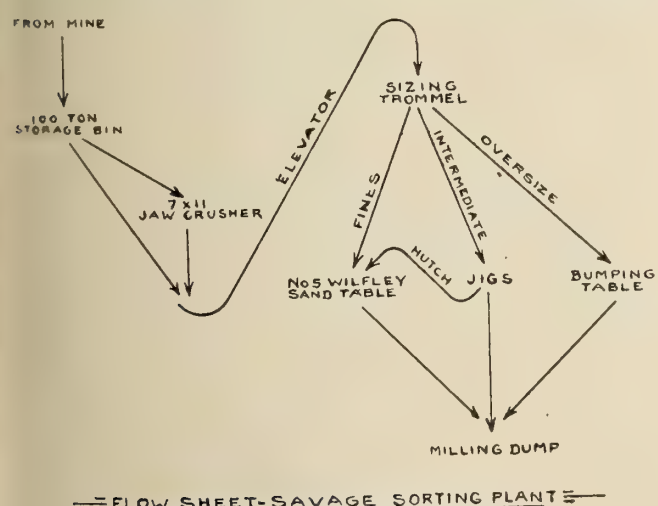


DIAGRAM ILLUSTRATING FLOW OF ORE THROUGH MILL

This is not to be considered as the full measure of the possibilities of the Savage, it represents only the value of that ore which has been fairly well developed.



FLOW SHEET-SAVAGE SORTING PLANT

No. 2 Vein is known to continue to a depth of 50 per cent. deeper than that included in the estimates of ore reserves.

No. 3 Vein has been traced upon the surface for almost twice the length developed underground.

No. 4 Vein has been traced upon the surface for a considerable distance, but has only been prospected at one point underground.

Several other veins, fully as promising in surface showings as were either No. 2 or No. 3, have also been disclosed in trenching.

With these facts in view, one is justified in placing the possible yield of the Savage at a figure greatly in excess of the 750,000 ounces estimated above, and while not venturing any definite figures, I feel that the Savage is destined to become a factor of far greater importance than it is at present.

THE COBALT PROVINCIAL MINE.

(Special Correspondence.)

Many of the readers of the CANADIAN MINING JOURNAL will be interested to know that the Provincial mine, now being operated by a private company, is showing up very well. The principal shaft, near the boundary that marches with the Savage claims, is down 130 feet. Under Government regime this has been sunk 70 feet. At 84 feet a high grade 6-inch vein was encountered. At 100 feet the vein dipped out of the south side of the shaft. Within 50 feet of the No. 2 shaft a rich vein was cut by diamond drill at a depth of 125 feet. This has not yet been cut by the workings. Four veins in all were encountered by the drill. But the best showing was the big calcite vein cut at 125 feet, which showed silver in the core. The shaft was sunk so that this vein could later be cross-cut. The other discoveries were pleasant surprises.

The indications are that the conglomerate here is deeper than in most parts of Cobalt camp. The diamond drill has demonstrated it to be at least 200 feet deep.

Power is now being furnished by the Cobalt Hydraulic. Two Mack drills are in commission.

PERSONAL AND GENERAL.

H. Koppers, by-product coke oven constructor, with offices at Joliet, Ill., has contracted to build 60 by-product ovens for the Woodward Iron Company, at Woodward, Alabama, near Birmingham. The by-product plant will include Koppers' direct ammonia recovery process, and will be built with a capacity to handle the by-products from the plant enlarged to 120 ovens in the future. The coke production from the 60 ovens will be 655 tons per 24 hours. In addition there will be 4,700,000 cubic feet of gas, 4.700 gallons of tar and 9.4 tons of sulphate of ammonia. This is the same type of oven being built so extensively by the United States Steel Corporation. The rapid growth enjoyed by the Koppers' coke oven is evidenced by the following:—Number of Koppers' ovens built and under construction in America, from opening of American office in 1907 to date, 1,376. Total number of Koppers' ovens built and under construction in America and abroad since this type of oven was introduced in 1903, 5,609.

Mr. R. B. Lamb, of the C. L. Constant Company, has retired from that organization to become associated with the Proprietary Mines Company of America, offices at 15 Broad Street, New York City.

Mr. J. B. Comstock, for six years with the Westinghouse Electric & Manufacturing Company at its East Pittsburg Works, and for four years manager of its publication department and printing plant, severed his connection with that company in April to accept a similar position with the P. & F. Corbin Company, of New Britain, Conn.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, May 17th, 1910.—Since the U. M. W. A. strikers returned to work at Glace Bay, the outputs of the Dominion Coal Company's collieries have increased about one-third, but they are not yet up to the summer maximum. The total production for May will be about 280,000 tons, comparing with 316,000 tons in May of last year. It is anticipated that the June figures will be large, as there is an unusually plentiful supply of labour. The strikers have not all found work at the time of writing, but they are being placed as rapidly as it is possible. Several of the collieries have been placed on double-shift, and the new winnings which the company is undertaking in the Morien and Lingan fields are being vigorously prosecuted. There is every prospect that this summer's coal production in Cape Breton will be larger than ever before, as all the companies are well supplied with men. This state of affairs is rather novel in Cape Breton, and is, of course, due to the importations of men that were made during the U. M. W. troubles.

The mining rates have been fixed at Dominion No. 12 Colliery by agreement between the P. W. A. and the company, and from now on this colliery will rank as an important producer. The surface works on No. 14 will be finished this summer, and No. 15 is now producing about 100 tons per day from development work. No. 16 slopes are being sunk, and other mines are in contemplation. Before long a district where the industries were farming and fishing will become one of the busiest and most prosperous places in the Island.

Owing to the extensive developments which are being undertaken by the three leading industrial concerns in Cape Breton, namely the Dominion Steel and Coal Companies and the Nova Scotia Steel & Coal Company, there has been a marked restoration of business confidence. The coal-steel "merger" has put an end to the protracted friction between these two mutually dependent enterprises, and now that the U. M. W. trouble is past, there seems every reason for optimism for the future of the coal and steel industries of Cape Breton.

The Colliery Relief Societies.—The Nova Scotia Government has just enacted a Workmen's Compensation Act, but they have excepted from its provisions those coal companies at whose works relief societies are established, on the understanding that the scope and usefulness of these societies are to be enlarged. The president of the Dominion Coal Company, together with the general manager, lately met a deputation representative of all the relief societies at the mines of the Dominion Coal Company and explained to them the desire of the company to give effect in the very fullest manner, to the evident wish of the Government, that adequate provision shall be made for the victims of industry throughout the province. The president expressed his desire to see a scheme of benefits arranged which should be second to none in Canada, and announced that the company would contribute equally with its workmen to the cost of any scheme which should be decided upon. No definite plan was presented, as the meeting was purely of a preliminary character, advantage being taken of Mr. Plummer's presence in Cape Breton to enable him to meet for the first time a committee of the workmen at the mines. Mr. Plummer and Mr. Butler both emphasized the necessity of commencing properly and with an adequate scale of contributions. It has been suggested that the sole desire of the Coal Company, in advocating an extension of the relief societies, is to enable them to escape the cost which a Workmen's Compensation Act would bring upon them, and one newspaper irresponsibly stated that the cost to the Dominion Coal Company alone under such an Act would be $200,000 per annum. This newspaper has absolutely no grounds for such a statement. The yearly cost for death claims, under the scale proposed by the Nova Scotia Act, would not exceed $25,000 to $30,000 at the highest computation. This would leave say $175,000, as the cost of non-fatal accidents. The average maximum of the Coal Company's employees is about 7,500 men. The Act provides for weekly payments as compensation for injury, which amount to about half of the wages which would be earned at work. A little calculation will show that in order to incur such an enormous bill for compensation, would mean that every employee of the company would lose one month out of every year by reason of disability to work caused by injury. There is surely no reason to point out the absurdity of such an assumption. As a matter of fact, if the tentative proposals now before the relief societies are put into effect, it is doubtful whether there will be much to choose on the score of cost between the company's share of the expenditure of the relief societies, or the amount it would have to disburse for injuries under a Compensation Act. But any person who has had any experience with the clerical work which is associated with the actual operation of a Compensation Act, the dissatisfaction it occasions, the litigation and bickerings between employers and employees, between doctors and lawyers, added to the insufficiency of such a law to relieve many of the most pressing cases of need, will appreciate the desire of any corporation to be relieved of its operation, even if it involved a greater expenditure in money. Owing to the peculiar ideas which many insurance companies hold as to the dangers of a miner's life, men engaged in this trade are unjustly deprived of insurance facilities which are open to men engaged in other trades, many of them, if the insurance companies only knew it, far more dangerous to life and health than that of a miner. The miner in his individual capacity cannot insure against accident and sickness, except through some form of mutual friendly society, and the Compensation Act does not adequately meet his needs alone. This fact is thoroughly appreciated by the miner. The relief societies have in the past been the miners' sheet anchor, and their future usefulness bids fair to increase as the years go on. The interests of the employer and the workman are identical in these societies, malingering is checked, provision is made for sickness and accident also, the extent of the relief disbursed increases automatically with the extent of the family that is dependent, the less onerous demands of the single man help out the needs of the married man, the provision for widow and children is disbursed in small sums, which is often a preventative of misuse and waste. Those who are advocating the enlargement and consolidation of the relief societies at the collieries have a more intimate knowledge of the needs of the miner than either the legislature or the press, and are building wisely and well.

ONTARIO.

Cobalt, May 18th, 1910.—The fight for the control of the Beaver was ended at the annual meeting, when the present management was sustained. Another car of rich ore has been shipped from the property, which will raise sufficient money to carry on the work for some time to come. The veins underground are looking well and the management could ship more ore if they desired, but their object is to thoroughly develop the property and block out reserves.

The Fisher Eplett, which adjoins the Beaver, and is one of the La Rose holdings, is now being prospected, twenty-five men having started trenching. No work has been done on this section of the La Rose holdings for over two years, but the good ore being found on the Beaver has encouraged the management to continue their prospecting.

The official figures for the production of the Cobalt camp for the year 1909, published by the Bureau of Mines, Toronto, show a total output of 25,835,983 ounces of silver. The estimated production was only 24,000,000 ounces, so that the returns much exceeded expectations. The production from South Lorraine amount-

ed to 144,953 ounces shipped from the Keeley and Wettlaufer, the latter company having been the largest contributor.

On the Yorke-O'Brien lot in the Gillies Limit, the vein was cut in a crosscut from the 100-foot level. It shows several inches of calcite with native silver, and will probably assay in the neighbourhood of 500 ounces per ton. The shaft has been continued a depth of 150 feet, and a crosscut from this level will be run to intercept the vein. Work has been stopped until air from the power companies can be obtained, as the property is equipped with only a small steam plant. The vein recently cut is a continuation of the one worked on the Red Jacket. The latter company, however, closed down shortly after its discovery and no work has been done since. Trouble among the owners is said to be the reason and a few days ago, the supplies of all sorts were sold to satisfy a debt due one of the banks.

Toronto men who are interested in the Bartlett property in Gowganda are endeavouring to get things running again. It is stated that McLaughlin and McIntyre, the original owners, have contributed 350,000 shares, to be placed in the treasury and sold for 25 cents. A considerable sum of ready money has also been raised, in order to commence work as soon as possible. The property is equipped with a splendid plant, including a twelve-drill compressor and a complete machine shop. It is understood that the whole thing cost in the neighbourhood of $125,000 by the time it was installed. Only a small section of the company's holdings has been prospected and it controls a large acreage in the richest section of the district. One shaft was put down about 100 feet with a small amount of crosscutting accomplished, when the company had to close down for lack of funds. The shipments from Gowganda last winter proved the district to be worthy of serious consideration, and are largely responsible for the increased public confidence. The Millerett was the heaviest shipper, and it already has another carload on hand. The development work now being accomplished is proving up the ore bodies in a satisfactory manner. At the Reeves Dobie, there is a considerable body of ore blocked out above the 80-foot level, and next winter will probably show a material increase in its shipments. The shaft is down 160 feet and will be continued to the 250-foot level. At this point a crosscut will be run to cut the vein. The crosscut from the bottom of the shaft of the Miller Lake-O'Brien has cut the vein which shows good ore. Last winter an English syndicate took an option on the Morrison property, which has one of the most sensational surface showings in the whole district. They agreed to spend $100,000 in proving the claim, but owing to the early breakup, it was unable to get its machinery in. On this account the option has been extended for a further period of six months.

For the past week or so bush fires have been causing considerable uneasiness, and the plants of some of the outlying properties had a narrow escape from being burned. The lack of rain has made everything very dry, and the fires were probably started through carelessness.

The best ore in the history of the Rochester is now being taken out of that property from the vein opened up a short time ago. It is believed that only the apex of the ore shoot has been cut, as the ore is much better in the bottom of the level. The vein varies up to five inches in width and is exceedingly rich. The shaft will be sunk an additional 75 feet to the 150-foot level, and from that point a crosscut will be run to cut the vein. A considerable amount of ore has been bagged, and it is probable that a shipment may be made in the near future.

The Nipissing Central Railway, the electric road between Cobalt and Haileybury, has now been running for some time, and has proved a great boon to these two places. As an outcome of the road, several quite important settlements have sprung up along the right of way, and these are growing rapidly. As an evidence of the business done it may be stated that during the first nine days the cars were running, they carried 30,000 people. It is probable that this summer the road will be extended to Liskeard.

Conditions at the Cobalt Lake Mine continue to be very satisfactory, and in the drift from the bottom of the winze there are thirteen stringers of ore across the face. A crosscut is being run to intercept the Pellatt and Morrison veins and should these have good values at this depth, the mine will have a very considerable ore reserve. Two or three cars of screenings are now ready for shipment and will be sent out shortly.

A car of ore has recently been shipped from the Provincial Mine for the Ontario Government. This ore was lying in the ore house at the time the property was sold, and was taken out when operations were carried on by the Government. A short time ago the new owners of the property found a high-grade vein near the boundary of the Savage Mine.

Two new veins have already been found on the Nipissing by the gangs employed trenching. They have been stripped for about twenty feet, and although narrow, contain high grade ore.

Several parties of Government geologists have started for the different districts of Northern Ontario, where they will thoroughly explore and map the country. Professor Miller, with his assistants, will work out the geology of the Porcupine district, while another party will examine the lignite deposits near the Mattagami River. An engineer recently returned from there, states that the lignite is of inferior quality, but suitable for domestic purposes. The deposits, however, cannot be utilized commercially, until railroad transportation is available. Other parties from the Provincial Department, are being sent to the Sturgeon Lake, Port Arthur and Rainy River districts.

The Temiscaming and Hudson Bay has declared another dividend of 300 per cent., or $3.00 per share. This will be payable on May 25th and makes a total of $12 per share already paid for 1910.

The condition of the La Rose is steadily improving, and the latest favourable development is the opening up of a new ore body on the No. 11 vein of the Lawson. This vein was cut on the fifty-foot level and shows altogether about ten inches of high-grade ore. This vein was discovered last year on the surface, and has been traced for nearly 1,000 feet. This makes the second vein on the Lawson giving high values at any depth.

The O'Brien is now shipping silver bullion, more or less regularly, to the Bank of England. The last shipment amounted to 17.116 ounces, bringing their total shipments of bullion up to 85,366 ounces.

The new concentrator at the Nova Scotia has commenced running, although it is not yet operating to its full capacity. The Silver Cliff mill has been running for some time and has made its first shipment of concentrates amounting to 20 tons. The Trethewey concentrator is also ready, and part of the machinery has been running. When these new mills are operating their output of silver will show a material increase.

The question of compressed air power is still unsettled, as at the present time neither of the two companies is in a position to make deliveries. The Mines Power started some time ago, but so far its air service has not been satisfactory, due to frequent interruptions. Such power as was delivered was very good, the air being clean and dry and maintained at a constant pressure of about 105 pounds. The company, however, has had all its generators at the Matabitchouan plant burned out, and although it is running sufficient to supply electric energy to its customers, it is still unable to run its compressors. The management expects to be in a position to turn on the air again on May 22nd, and should then be able to proceed without any more serious interruptions.

The Hydraulic Company has the plant at Ragged Chutes nearly completed, and should be able to deliver power in a short time.

Porcupine.—Due to poor transportation facilities, very little is being heard of this district, but the reports that do come are very satisfactory. The Miller Company has obtained assays from the big vein that run as high as $238.00 per ton. These samples were taken across the vein, but doubtless in the richest portions. The Timmins are stated to be putting up a test plant of 15 tons capacity, to treat some of the ore produced in development work.

The treatment will consist of amalgamation and cyaniding, and the plant will give the owners a much better knowledge of the value of the ore than would be possible by sampling. At the Hollinger, the plant is now running and a force of 90 men is employed. In the crosscut from the No. 2 shaft at the 60-foot level, assays of $347.00 per ton were obtained. Free gold has been found in the south of Shaw Township, and a few days ago three claims in that vicinity were sold for $20,000. It is possible that before the season is over, several of the camps may run short of supplies, as the number of men employed is greater than was anticipated.

Kenora, Ont.—At a meeting of the Prospectors' and Mine Owners' Association of the Kenora Mining Division, held May 11th, Mr. A. L. Parsons, lecturer in Mineralogy of the Toronto University, addressed the members and gave them a very interesting little lecture upon the methods which should be employed by the ordinary prospector in his search for mineral wealth, exemplifying by means of one or two incidents from his own experience the necessity for the prospector not to confine his energy to the examination of the rocks for one thing only, but rather to be in a position to recognize any ore of commercial value with which he might come in contact. At the close of his lecture a hearty vote of thanks was tendered to Mr. Parsons for his courtesy in meeting the members of the Association.

This district is at present becoming somewhat excited over the reported finds of tin in the boundary country, some thirty miles west of Kenora. The main deposits from which it is claimed this tin is obtained varies in width from 300 to 1,200 feet, and has been staked for a distance of 8,000 feet. This ore which appears to be very heavily mineralized, carries a larger percentage of sulphur and requires thoroughly roasting before any results can be obtained by fire assay, but under this treatment from the results obtained so far, it seems to promise very well. The West Hawk Lake district comes to the front this time with some samples of pyrrhotite which has been located on the contact. The vein is eight feet wide on the surface, and has been traced and staked for a distance of two miles. No direct analysis of this ore, giving its percentage of nickel, has come to hand; but the parties interested are making arrangements to have this ore thoroughly tested so as to be in a position to place their holdings upon the market. The Star Lake properties are still being developed and the holders of these properties are expecting very shortly to announce the closing of a deal with the syndicate, who will operate the whole group of claims.

The work is still progressing of opening up the Alley Island copper property, whose discovery was reported some months ago. This is one of the few properties in which copper occurs native in any quantity. The action of the Government in sending up a geologist to correct several inaccuracies in the existing geological maps of this district, and to make a further report on the geology shows that they are at least becoming awakened to the importance and the large possibilities of this territory.

BRITISH COLUMBIA.

Available information relative to the progress of mining in the province during the four expired months of the current year indicates that ore production has been on a larger scale than for the corresponding period of any previous year. Complete returns are not obtainable before the close of each year, but for the chief ore-producing districts the statistics published weekly by the Nelson "Daily News," afford a general idea of the situation. These show that production for the year to the end of April, was as follows: For Boundary district, 636,191 tons; Rossland, 85,441 tons; Slocan-Kootenay, 111,431 tons; total, 833,063 tons. The corresponding figures for 1909, were: Boundary, 491,489 tons; Rossland, 80,346 tons; Slocan-Kootenay, 60,815 tons; total, 632,650 tons. This comparison shows an increase in the tonnage of the district named of nearly one-third. Of the 200,000 tons increase, 145,000 was from Boundary district mines, 5,000 tons from those of Rossland, and 50,000 from those included under the head of Slocan-Kootenay. The increase in tonnage of ore reduced at the several operating smelters of the districts under notice, is evident from the next following figures:

At Smelter of	Smelted during First Four Months of 1909.	1910.
Granby Company	313,223 tons.	427,263 tons.
B. C. Copper Company	140,505 tons.	144,960 tons.
Total for Boundary	453,728 tons.	572,233 tons.
Consolidated M. & S. Co.	117,502 tons.	169,622 tons.
Total	571,230 tons.	741,845 tons.

Of the increase of 170,000 tons smelted, 114,000 was credited to the Granby Company, 4,000 to the B. C. Copper Company, and 52,000 to the Consolidated Company. The tonnage of ore milled during the same periods was, in round figures, 61,000 tons in 1909, and 91,000 in 1910, the latter showing an increase of nearly 50 per cent.

Beside the increased production of lode mines, there is good reason to look for an equally satisfactory increase from both placer gold and coal mining, operations in connection with both of these being on a larger scale than in 1909. It would appear, therefore, that if nothing occurs to check progress and interfere with production at present rate, the output of minerals should this year prove to be the largest in the history of mining in British Columbia.

CARIBOO.

Barkerville.—Placer gold mining for the season has been fairly commenced. Mr. John Hopp's hydraulic mines, the Mucho Oro on Stout's gulch, the Forest Rose on the east Branch of Williams Creek, and those on Lowhee and Mosquito Creeks, are being worked; provision having been made for an increased supply of water for gravel-washing, and the prospects for the season being favourable, there should be a larger quantity of gold recovered from these mines than in previous seasons. Other hydraulic mines are being operated, though not on so large a scale as those of Mr. Hopp.

Quesnel Forks.—In Quesnel division the most important work in progress is that of dam and ditch construction for the Philadelphia company, represented by Mr. Howard W. DuBois. Between 200 and 300 men and a number of horse teams have been employed in connection with the preparations for the development of a large hydraulic mine at Twenty-Mile Creek, on Quesnel River, about 20 miles below Quesnel Forks. Construction of a ditch and flume to carry 6,000 to 7,000 miner's inches of water from Swift River to Twenty-Mile Creek, is being expeditiously proceeded with. The undertaking is a big one, the whole enterprise involving an expenditure stated to be estimated at about $1,500,000. Mr. John B. Hobson intends to hydraulic gravel on some of his placer-gold leases and looks for profitable returns from the season's operations.

EAST KOOTENAY.

Placer Gold.— On Wild Horse Creek the Invicta and Nip and Tuck properties are again being hydraulicked. On Perry Creek operations have been commenced with one large hydraulic plant, and it is intended to again use the steam shovel, put in here several years ago, to handle the gravel. On upper Moyie River and on several other streams in Fort Steele mining division, small hydraulic plants are at work.

Lead-Silver.—The St. Eugene is regularly maintaining an output of lead-silver concentrates and shipping same to the Consolidated Mining & Smelting Company's smelter at Trail. The same company is working the Sullivan group, near Marysville, and has this year shipped to Trail about 4,000 tons of ore from that mine. The Aurora, situated across Moyie Lake from the St. Eugene Mine, will send ore to the Alice Mine concentrator near Creston; it is expected that by this arrangement it will be found practicable to make a marketable product at a cost which will leave a margin of

profit to the mine-owners. Preparations are being made to ship ore from the Society Girl, on which ore has been cut by a long crosscut tunnel.

Coal.—The Crow's Nest Pass Coal Company looks for conditions being favourable for larger production at its mines henceforth. An adequate supply of railway cars for hauling the coal away has been promised, and arrangements have been made with the Great Northern to take about all the coal the company shall find it practicable to supply that railway with. The C. P. R. Mine at Hosmer, and the mine at Corbin, owned by a Spokane company, are both being regularly worked; the prospects for these comparatively new mines are that their output will be larger this year than last.

WEST KOOTENAY.

Ainsworth.—In Ainsworth camp proper there is not much being done at present, but those directly interested are endeavouring to arrange for an early resumption of work at both the Highland-United and Krao properties. The Blue Bell, across Kootenay Lake from Ainsworth, is not now being worked; the manager, Mr. S. S. Fowler, has gone to Europe with the stated purpose of meeting the larger shareholders of the French company owning the mine and informing them what plant and machinery are required to allow of the big mine being worked to advantage. There is much lead-zinc ore accessible, but hoisting and pumping machinery is required to make this available for milling. On the south fork of the Kaslo Creek the Cork Mine is to be worked again this season, besides several smaller mines also on that creek. The Whitewater group has resumed shipment of concentrates, some 10,000 tons of ore having been milled during the four expired months of the year; both lead-silver and zinc-silver concentrates are produced. The Utica and Wellington Mines will be producers again this year.

Slocan.—The rebuilding of several bridges, so damaged some time ago that no trains have since been run over the Kaslo and Slocan Railway beyond McGuigan, has been ordered, so transportation facilities for mines near Sandon will ere long be improved. Recent developments at the Rambler-Cariboo Mine are the most important in recent years at that property. The finding of valuable shoots of silver-lead ore on the 900 and 1,000-foot levels had added considerably to the producing capabilities of the mine. The annual meeting of the Rambler-Cariboo Mines, Limited, will be held at Kaslo in June, and it is expected the report then to be presented will be the most favourable since the mine's dividend-paying periods of years ago. Shipments from the Richmond-Eureka mines, owned by the Consolidated Mining & Smelting Company, were in excess of 1,600 tons for four months to April 30th. With the melting of the snow working conditions should be favourable to an increased output. The Slocan-Star and Ruth-Hope groups, both in the vicinity of Sandon, will contribute substantially to this year's total output. The concentrating mill at the former will probably be operated again after having been idle for several years. Above Cody Creek, the Noble Five, Surprise, Reco and Sunset, are all being worked. About Slocan Lake there is also encouraging activity. The Mollie Hughes, near New Denver; Standard, Van Roi, and Hewitt-Lorna Doone group, in Four-Mile Creek camp; Eastmont (Ellis Silver Mining Company) at Ten-Mile Creek, and Ottawa, on Springer Creek, all tributary to Slocan Lake, are also being worked, with good prospects for an appreciably large total production of ore this year.

Nelson.—Near the city of Nelson the Granite-Poorman group is keeping its gold stamp mill running continuously, and at the Silver King is shipping silver-copper ore to Trail. The latter has this year sent out about 1,300 tons by the end of April. The acquirement recently of the old Molly Gibson Mine by the Consolidated Mining & Smelting Company, leads to the expectation of an early resumption of production there, though it is not yet known whether the mill put in by the La Plata Mines, Limited, which worked the mine during two years, will again be used for concentrating purposes, or all the silver-lead bearing ore mined be shipped crude to Trail. In the southern part of Nelson mining division, mining gives promise of improvement, there being work in progress in Ymir, Salmo, Sheep Creek and Erie camps. This year's shipments from the Yankee Girl, at Ymir, had, by the end of April reached a total of rather more than 2,200 tons. The Emerald, near Salmo, has shipped about 1,100 tons of lead ore in 1910. The Queen and Nugget, at Sheep Creek, are both producing steadily, the former having this year milled about 7,000 tons at its 20-stamp mill, and the latter 2,000 tons at its 4-stamp mill. Development work in the Mother Lode, another Sheep Creek mine, is stated to be resulting satisfactorily and arrangements have been made for operating power drills in this mine in place of hand drills. Gold is the chief valuable metal in Sheep Creek ores.

Rossland.—The War Eagle Mine, of the Consolidated Mining & Smelting Company's Centre Star group, is reported to be in a position to supply during several months a fairly large tonnage of ore containing a higher average of gold than usual. There has not been any development of importance in connection with the exploration of the Le Roi by diamond drills, no large body of ore of good grade having yet been found. Fire has destroyed the head works at the No. 1 mine of Le Roi No. 2, Limited, but as all the ore has for some time been hoisted through the company's Josie shaft, production will not be interfered with. The loss, which is partly covered by insurance, is reported to have been about $10,000, this including head-frame and electrically-operated hoist. The year's total receipts of ores and concentrates at the Consolidated Mining & Smelting Company's works at Trail to May 7th, are stated to have been nearly 180,000 tons, as compared with 125,000 tons for the corresponding period of 1909.

Boundary.—The tonnage of ore shipped in 1910 to May 5th has reached a total of 660,500 tons; of this, 450,000 tons was from the Granby Company's mines, 145,500 tons from those of the B. C. Copper Company, and practically all the remainder from the Consolidated Mining & Smelting Company's Snowshoe Mine. The Granby Company's total gives an average output of a little more than 3,600 tons for each of the 125 days of that period. It is reported that the B. C. Copper Company expects to soon have enough men to admit of its mines and smelter being worked to ordinary capacity. Numbers of the men who lately refused to continue working with non-union men have left the district. Two of the three blast furnaces at this company's smelter at Greenwood, are being enlarged. New York news is to the effect that 25,000 tons of ore from the New Dominion Copper Company's mines will be smelted at Greenwood, results to be taken as a guide in making permanent arrangements between the two companies for the reduction of Dominion Company's ores.

Similkameen.—Further development of the Hedley Gold Mining Company's Nickel Plate Mine is in progress, and additions are being made to plant and machinery at the company's 40-stamp mill. The V. V. & E. Railway, constructed by the Great Northern, is being operated to Princeton, and the further extension into the Tulameen country is in hand. Coal from the Vermilion Forks Mining & Smelting Company's Princeton colliery has been shipped over the new railway.

Nicola.—Coal mining operations are gradually assuming larger dimensions in Nicola Valley district. The Nicola Valley Coal & Coke Company is steadily enlarging its output. Last year this company mined about 70,000 tons; production for the four expired months of this year must be well on to a similar total. Several other companies are preparing for a regular output.

Coast.—The reported sale of the Dunsmuir coal mines to Mackenzie & Mann interests, and some local excitement relative to Portland Canal mineral claims, are the chief features connected with mining in the Coast district. The Portland Canal Mining & Development Company is the only organization that has yet done much actual mining on its property in the new camp, though two or three others have also driven some tunnels.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

The Dolcoath's new shaft has now been completed. It is three thousand feet deep, vertical from the surface, is lined throughout its entire depth with nine inch brick, and is seventeen feet nine inches in diameter—inside measurement. It is considered to be the finest piece of work of its kind in the West of England, and numerous mining engineers and others have visited it during the progress of the work. The contractors (Messrs. Piggott) have opened up the entrance to the north and south headings at the bottom, or five hundred fathom level, and are now engaged sinking below this point in order to make a sump for this new shaft, after which they will continue to drive from the south heading to intersect the Dolcoath lode.

At the Home Office April 21st, Mr. Churchill received a deputation consisting of the Parliamentary Committee of the Trades Union Congress, the Miners' Federation, Durham and Northumberland deputies and enginemen and the Wind Enginemen's Federation, who urged him to embody in a Bill some of the recommendations suggested by the Royal Commission on Accidents in Mines.

Mr. Churchill congratulated the deputation upon the steady progress made in adapting the whole industry to the conditions of the Eight Hours Act. The Home Office would give effect to the view that pump miners' hours were not applicable to bona fide hauliers. The great bulk of the recommendations of the Royal Commission required legislation to give effect to them, and at present great delay hung over all legislation. In addition, the Commission had not completed its labours and it would be better that a Bill for regulating the work of coal mines should cover the whole ground. He thought the inspectors should be strengthened, but the difficulty of money came up. There was to be a conference with mine owners at the end of May with a view to ascertaining how best to improve and systematize rescue apparatus and working. The Treasury had sanctioned the provision of a testing station, and they were now looking for a suitable site. In conclusion, Mr. Churchill said that when the Bill came to be framed, if he was responsible for the task, he should confer not only with employers, but with representatives of the men and make sure that the measure did contain practical points.

At the special meeting of the Coal Conciliation Board of South Wales and Monmouthshire, held at Cardiff, April 8th, the clauses of the new agreement were discussed, and steps were taken to insert the terms agreed upon which the workmen have balloted. No serious difficulty arose during the discussion and the agreement was duly signed by the representatives of the owners and workmen, with the exception of Mr. C. B. Stanton, miners' agent for Aberdare, who stated he could not sign because the majority of the men in his district had voted against the acceptance of the new terms.

The result of the ballot of the miners employed in the South Wales coalfield was an overwhelming vote in favour of the signing of the new agreement. The official figures were:—

For the agreement	97,273
Against the agreement	34,963
Majority for	62,310

The ballot thus brings to a satisfactory and peaceful settlement the protracted negotiations which have been in progress between the representatives of the coal-owners and the men since December last. The new agreement is for a period of five years.

Manchester, Friday, May 13th.—One hundred and thirty-seven miners lost their lives in an explosion in the Wellington coal mine at White Haven. Rescue parties succeeded in saving four men, but fire has broken out in the works, leaving practically no hope for those who are still entombed.

Throughout the day rescue parties made considerable progress at the mine, but their work was stopped by the collapse of the roof.

It is curious that a colliery warning was published in many of the newspapers in the mining districts of the Kingdom yesterday to the effect that an unusually high barometric condition rendered fire-damp explosions extremely probable, and that underground workers ought therefore to be on the alert. The barometer reached the highest reading in the White Haven district.

King Gorge sent a message of sympathy to the owners of the colliery.

NORWAY.

Advice has been received from the Sulitelma Company's mines in Norway, that for the month ending April 30th, 1910, 845 tons of concentrates containing 8.18 per cent. copper, were produced by the Elmore process.

GERMANY.

The Dynamite Company (formerly Alfred Nobel & Company), of Hamburg, states, in the report for 1909, that the less favourable situation of the coal and iron and steel industry exercised an influence upon the sales of explosives during the year, but the total turnover was very favourable as more satisfactory results were obtained in other branches of the company's activity. In order to enonomize freight charges and other expenses, a new factory has been erected at Saarbrucken for the manufacture of dynamite and other explosives, and it was recently set in operation. After appropriating £50,000 for depreciation in 1909, as compared with £34,500 in the preceding year, the accounts show net profits of £144,000, as against £106,000 in 1908, and it is proposed to pay a dividend of 22 per cent., as contrasted with 6½ per cent. in 1908.

TURKEY.

Interesting developments in connection with the petroleum deposits in Turkey are pending. The existence of considerable oil deposits in the vilayets of Morkul, Bagdad and Baskorak has been known for some time past, and it is now intended to commence exploitation in these districts. Refineries are to be built and liquid fuel to be introduced on the railways, in the fleet and in private industry. Rumours are in circulation that an American company has obtained an exclusive concession from the Government for the exploitation of these lands.

EGYPT.

Suez.—The third oil well at Jemsah has become a gusher. Dr. Ball and the staff of the Government Survey Department were present when the well was drilled in. One hundred and eighty tons of oil flowed in the first six hours. The flow was steadily increasing when it was shut off.

SOUTH AFRICA.

Johannesburg.—Mr. W. W. Mein, consulting engineer to Messrs. Ecksteins, is contributing a paper to the Association of Mining Engineers on Rand mine returns, criticizing as unscientific the much-discussed proposal by Mr. H. F. Marriott, consulting engineer to Messrs. Wernher Beit, to substitute per fathom for per ton in future statistics.

It has been decided to construct at once four seven-compartment shafts on the Modder State mines, two of which will be located at 2,000 feet on the line of contour and two at 3,000 feet. It is intended to dispense with temporary headgears with the view to economizing time and money.

AUSTRALIA.

The gold yield of New South Wales during the month of April was 15,381 ounces, valued at £52,149. The yield for the past four months was 75,301 ounces, valued at £269,544.

MEXICO.

Guadalajara, Mex., May 16th.—The Santa Domingo Mining Company, which is now controlled in Boston, has resumed development work in the Santo Domingo mines in the Hostotipaquillo district of this state. A party of twelve investors recently visited the mines, and two other parties will visit the properties during the next sixty days. The erection of a reduction plant is planned. But little work has been done in the Santo Domingo mines since the fall of 1908, but during the three years prior to that time several thousand feet of tunnels and drifts were driven. It is stated that since the resumption of development work high-grade ore has been opened in a new drift on the El Favor vein.

UNITED STATES.

Butte, Mont.—To some extent a curtailment policy was observed by the larger operating companies in Butte during the month of April and the total output, which amounted to 27,451,000 pounds of copper, was nearly 1,000,000 pounds less than for the month of March. The Butte-Ballaklava Copper Company has developed into a permanent producer and during April averaged about 72 tons of ore a day, the average mineral content being 10½ per cent., as no great quantity of second-class ore was shipped.

Butte, Mont.—During the month of April the Alex. Scott shaft was sunk to a total of 106 feet, making a record close to the highest record for deep-shaft sinking in the Butte camp. The shaft is now down about 1,524 feet and by June 1st it is anticipated that a depth of 1,600 feet will have been attained. At the latter depth a station will be cut and an electric pump will be installed. Also a crosscut will be run to intersect all of the veins traversing the property and the work of placing the mine in condition for heavy shipments will be pushed aggressively.

From the 500-foot level to the 1,400 the Alex. Scott has opened up a number of veins carrying copper and silver in commercial quantities. On the 1,400-foot level the main vein has been drifted upon to a considerable extent and an ore body more than 20 feet in width has been developed to the producing stage. The ore carries considerable bornite and copper glance, although in a conglomerate form, and it is believed that on the 1,600-foot level the ore will be found in a more compact form.

Goldfield, Nev., May 10.—The greatly extended scope of development at depth in the mines of the Goldfield Consolidated Company has rendered necessary the employment of a larger amount of electrical power and, to meet the growing requirements, the company is now preparing for the installation of a large storage battery and power equalizing plant at Jumbotown, a collection of houses a short distance from the town of Goldfield, situated near the Clermont and Laguna claims of the Consolidated.

Houghton, Mich.—The Michigan Copper Company in 1909 sold 1,979,305 pounds of copper at an average of 13.16 cents, yielding $260,551. By assessments its total income was swelled to $429,577. The annual report shows a deficit of $8,174, against $15,392 a year ago. President Brady considers the timber resources as of value, consisting of about 5,250,000 feet of excellent white pine, and an equal amount of hemlock and other timber. "A" shaft has been sunk to a depth of 2,133 feet and underground work tested values of the Minnesota vein, but nothing of interest was exposed. "B" shaft openings were confined to the 14th level east on the Calico lode.

There was opened from "C" shaft 894 feet on the Calico, 471 feet on the North Amygdaloid and 209 feet on the Minnesota vein. Light copper ground was shown on the 7th level west on the Calico. Both the 8th and 11th levels east were driven through excellent copper ground. The character of the copper contents at these points was spotty and its width averaged four to four and a half feet.

Deadwood, S.D.—E. C. Johnson, manager of the Gertie Tin Mining Company of Hill City, has recently received patents for a rock-grinding device which promises to have a marked effect on the ore-milling industry. In point of efficiency it is claimed to be far superior to any of the machinery now in use for the purpose and the demonstrations which have been made with models of smaller size than standard machine, appear to substantiate these claims.

The invention is called the Johnson Rod Tube Mill, its chief feature of difference from other tube mills in use being that instead of pebbles or chilled steel balls the grinding is effected by the use of chilled iron rods extending from end to end of the machine. The standard machine, as it will appear when turned out of the Homestake Company's shop, where it is now being put together, will consist of a metallic cylinder six feet in length by 18 inches in diameter. The inside surface is protected by a casting of corrugated chilled iron, against which the grinding is effected. The rods which extend practically the entire length of the mill, are sufficient in number to occupy one-quarter of the interior space of the cylinder. They are made of chilled iron with a core of rough iron.

Goldfield, Nev., May 16th.—The detailed statement issued by Manager J. R. Findlay, outlining the operations of the Consolidated Mines Company in April, shows that in point of production the record was surpassed in but one month of the company's history and exceeded the bullion output of March last, which heretofore has ranked second. This heavy production was made in the face of most unusual obstacles. On April 8th the mill was damaged by fire to the extent of $125,000, necessitating the complete closing down of the plant for a period of eight days, and resulting in a reduction of mill capacity since that time of 30 per cent. The great belt conveyor of 1,000 tons daily capacity, which carries the ore to the stamp bins, was destroyed, as were all stores of cyanide, zinc dust and materials employed in treatment, together with thirty of the stamps.

Victor, Colo.—Stratton's Independence, Limited, operating at Victor, Colo., paid on April 29th last a dividend of $60,000, bringing up the dividends paid during the first nine months of the fiscal year to 15 per cent. per annum on the capitalization of the company.

The cyanide mill is in steady operation, treating by cyanidation and concentration nearly 7,000 tons a month of low-grade dump ore, while the mine is producing better than 2,000 tons a month or one and one-quarter ounces ore.

The combined earnings of mine and mill, as published in London, amounts to 20 per cent. per annum on the capital.

Coalinga, Cal., May 16th.—In another two weeks the Producers Transportation Company's pipe line system, tapping the five big oil fields of the San Joaquin Valley, will be in complete operation, and crude oil from Coalinga, mingling with that from Kern River, McKittrick, Sunset and Midway, will start from the Junction on its journey to the sea, and hence into the markets of the world.

Globe, Ariz.—As a conservative estimate, the first of January, 1911, is set as the date for the beginning of production of ore from the mine of the Miami Copper Company. The concensus of opinion among the members of the management is that within six months from date, or by the first part of November, the concentrating plant, including the power plant and water system, will be completely equipped for handling a daily ore production of 1,000 tons, which output will be increased shortly

afterward to 2,000 tons, the tonnage for which the plant was originally designed. Although the construction plans have been changed and a concrete foundation built for a mill of a capacity of 3,000 tons daily, the third unit will not be added until a later date. At present, most of the concrete work is completed, and the steel frame for the concentrator building is well advanced, so that the principal construction work in the future will be that of installing the various machines in the concentrator and power plant buildings. Large shipments of machinery and structural steel are received almost daily, and with a force of nearly 500 workmen, a large number of whom are skilled machinists, these shipments will be readily taken care of.

Washington, D.C., May 17th.—President Taft has signed the bill creating a bureau of mines, but has as yet taken no action looking to the appointment of a chief of the new branch.

The bureau was created for the purpose of making diligent investigation of the methods of mining, especially in relation to the safety of miners, and the appliances best adapted to prevent accidents, the possible improvement of conditions under which mining operations are carried on, the treatment of ores, and other mineral substances, the use of explosives and electricity; and other inquiries and technological investigations pertaining to the mining industry.

The new bureau will be a branch of the Interior Department. Work in connection with mining which is now being conducted by the Geological Survey, a bureau of the Interior Department, will be transferred to the mines bureau. Such work includes the investigation of structural matters, the analyzing and testing of coals and the ascertaining of the causes of mine explosions.

While the act creating the new bureau was designed largely to practicalize the investigations of the Geological Survey and meet the demand for action to prevent the constantly recurring coal mine explosions throughout the country, it was drawn on broad enough lines to permit of the extension of many benefits to mines where explosions do not often occur.

The bureau of mines is to be under control of a director who will receive a salary of $6,000 a year. J. F. Callbreath, of Denver, secretary of the Mining Congress, has joined in a petition to the president for the appointment of Dr. J. A. Holmes, of the Geological Survey, to the position.

ALASKA.

Valdez, May 14th.—The first attempt at quartz mining in this district has proved highly successful, returns received here to-day from the first eighteen days' operations of the Cliff Mining Company's claim showing an output of 860 ounces of gold, besides $4,000 in concentrates, from 150 tons of ore.

The company was organized eight months ago to develop the quartz vein on Valdez Bay, and a thousand foot tunnel and an uprise was driven, and a three-stamp mill installed.

COMPANY NOTES.

INTERNATIONAL COAL.

The annual report of the International Coal & Coke Company, which has just been issued, shows that the net profits for the year, after paying all operating expenses at the head office and the mine, amount to $246,271, which sum has been derived from the various departments of the company's coal and coke business.

Four quarterly dividends at the rate of one and a quarter per cent., amounting to $145,000, were paid, the balance, $101,271, being carried to the surplus account, which now reaches the handsome sum of $34,595.

The president's report says that during the year development work proceeded apace, some 2,303,352 tons being in sight on December 1st, 1909, after due allowance for working and waste had been made. These figures show a net gain of 323,352 tons developed over and above the tonnage extracted.

The Hedley Gold Mining Company, which purchased the famous Nickel Plate mine and reduction works at Hedley last August, has issued a statement covering its operations during 1909.

The company took an option on the property in May of last year for $715,000, which was exercised on August 13th, 1909. During the life of the option exploratory work was carried on and the new company received half of the profits made during that period, its share amounting to $15,748.89. The net profits from August 13th to December 31st were $68,812.57. The first dividend of three per cent. was paid January 4th, 1910, leaving a surplus as of December 31st, 1909, of $79,041.46.

Mr. I. L. Merrill, president of the Hedley Gold Mining Company, in his report to stockholders last month, says: "At present we are wholly dependent on our water power. Low temperatures and drought interfere with this power and stop our mill. We have been fairly fortunate this winter, losing but little time until February 24th, when a temperature of 24 degrees below zero shut down the mill. We hope to be able to resume by or before April 1st. Our engineers are figuring on building a larger dam, to give a water power that would be unaffected by weather conditions; or, as an alternative, adding an auxiliary steam plant to run the mill when our water power fails.

"Prior to our taking possession of the property the tailings were wasted. We are now impounding them and a substantial profit is hoped for from their retreatment. Your president, with the aid of the best experts, is conducting experiments to determine character of needed changes in reduction plant. The changes can probably be made this summer. They should increase the tonnage of ore handled and save most of the gold now going into the tailings. The additional recovery hoped for is estimated at $1.25 per ton of ore treated.

"Your president believes that the outlay needed to enlarge and improve the reduction plant and power plant will not exceed $100,000. The company at its inception, was provided with $280,000 working capital, so that the cost of new plant is much more than provided for. No outlay will be made until we are satisfied that it will be quickly repaid by increased profits."

The production returns from August 12th to December 31st, 1909, were as follows:

	Tons Milled.	Assay Value.	Net Profits.
August and September...	6,092	$11.90	$18,190.70
October	3,914	11.75	16,186.68
December	3,392	12.80	14,556.29
November	3,691	12.76	17,918.01

The company has since declared its second quarterly dividend of three per cent., which was payable on April 2nd last.

The Temiskaming Mining Company has issued a statement for the first three months of the fiscal year. Profits for the quarter ending April 30th were $96,684.05, which practically places the company out of debt. The statement of the president claims the mine is now working in good ore, and that excellent results are being obtained from the concentrating plant, although the work at the mill was retarded owing to the delay in getting sufficient electric power.

STATISTICS AND RETURNS

Cobalt, Ont., May 10th.—For the first four months of 1910, the following ore shipments were made from the Cobalt district:

	Tons.
Nipissing	1,958.81
La Rose	2,082.81
Kerr Lake	1,446.00
Crown Reserve	962.21
McKinley-Darragh	483.05
Buffalo	356.14
Drummond	332.10
Right of Way	305.05
Coniagas	257.48
O'Brien	244.67
Temiskaming	208.25
City of Cobalt	142.83
Trethewey	186.73
Cobalt Central	127.74
Chambers-Ferland	112.68
Cobalt Lake	97.30
King Edward	87.98
Peterson Lake	85.22
Colonial	62.68
Hudson Bay	61.68
Silver Cliff	33.00
Waldman	32.00
Cobalt Townsite	27.25
Hargraves	20.90
Casey Cobalt	10.00
Total	9,724.24

Gowganda and Elk Lake shipments, bringing the total for the northern Ontario camps up to 10,065 tons. Bullion shipments to the amount of $96,750 have been made.

This compares favourably with 9,456.68 tons for the first four months of 1909, and 5,650.01 for 1908.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending May 20th, and those from January 1st to date:

	May 20. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver		120,450
Buffalo	66,000	825,558
City of Cobalt		363,835
Chambers-Ferland	64,260	291,060
Cobalt Central	46,300	293,265
Cobalt Lake		196,000
Cobalt Townsite		68,000
Colonial		107,260
Coniagas	52,400	623,795
Crown Reserve	84,000	2,381,295
Corkill E. P.		65,000
Drummond		664,200
Hargraves		41,800
Hudson Bay		123,695
Kerr Lake		3,077,991
King Edward		174,966
La Rose		4,824,003
McKinley	201,408	1,246,579
Nipissing	120,400	4,372,541
O'Brien	64,100	648,046
Peterson Lake		270,450
Right of Way		616,757
Silver Cliff	51,500	117,510
Temiskaming		421,830
Trethewey	63,700	447,650
Waldman		63,992

Ore shipments for the week ending May 13th were 814,068 pounds, or 407 tons.

Total shipments from January 1st to May 13th were 22,447,580 pounds or 11,223 tons.

CONSOLIDATED MINING AND SMELTING COMPANY'S RETURNS.

Following are the production returns of the Consolidated Mining & Smelting Company of Canada for the month of March last and the eight months previous:

Metals Produced in March.

	Quantity.	Value.
Gold	12,487 oz.	$254,507
Silver	178,542 oz.	92,368
Copper	468,565 lb.	62,267
Lead	3,766,388 lb.	106,565
Total value		$515,798

Production During Nine Months, to March 31st.

Gold	101,340 oz.	$2,074,853
Silver	1,548,780 oz.	808,013
Copper	4,500,754 lb.	590,197
Lead	31,851,801 lb.	896,357
Total value		$4,367,420

Percentage of Value of Production.

	March. Per cent.	Nine Months to Mar. 31. Per cent.
Gold	49.34	47.51
Silver	17.91	18.45
Copper	12.07	13.51
Lead	20.68	20.53

For purposes of comparison the following figures, being the company's production at its smeltery at Trail, for the fiscal year ended June 30th, 1909, are here given: Gold, 114,920 oz.; silver, 2,443,475 oz.; copper, 4,637,631 lbs.; total value, $5,505,526. It should be noted that these figures are for twelve months while those given in the second table above are for only nine months.

B. C. ORE SHIPMENTS.

(Week ending May 14th.)

	Week.	Year.
Boundary.		
Granby	22,509	473,130
Snowshoe	22,483	69,273
Other Mines		146,098
Total	24,992	688,501
Rossland.		
Centre Star	3,849	73,818
Le Roi No. 2	621	11,665
Le Roi (milled)	300	5,700
Le Roi	275	5,400
I-X-L	007	041
Other Mines		229
Total	5,052	96,857
Slocan-Kootenay.		
St. Eugene (milled)	2,775	52,725
Whitewater (milled)	600	11,400
Van Roi (milled)	800	15,200
Kootenay Bell (milled)	70	1,330
Granite-Poorman (milled)	250	4,750
Queen (milled)	420	7,980
Nugget (milled)	110	2,090
Van Roi	122	511
St. Eugene	368	7,024
Rambler-Cariboo	021	378
Sullivan	129	4,033

Richmond Eureka	29	1,719
Ferguson	60	385
Yankee Girl	128	2,392
Other Mines		21,845
Total	5,882	133,762

Total shipments for week, 35,926 tons, and for year to date, 919,120 tons.

Smelter Receipts.

	Week.	Year.
Granby, Grand Forks	22,509	473,250
Consolidated Co., Trail	8,323	188,210
B. C. Copper Co., Greenwood.		145,935
Total tons	30,832	807,395

TORONTO MARKETS.

Metals.

May 23.—(Quotations from Canada Metal Co., Toronto.)

Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 34.50 cents per lb.
Copper, casting, 13.75 cents per lb.
Electrolytic, 13.75 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

May 23.—Pig Iron (Quotations from Drummond McCall Co., Toronto.)

Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee No. 2, $23.00 (f.o.b. Toronto).
Midland, No. 1, off the market.
Hamilton, No. 1, $21.00 (f.o.b. Hamilton).
Hamilton No. 2, $20.50 (f.o.b. Hamilton).
Clark's, $21.00 (f.o.b. Toronto).
Cleveland, $20.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50, for 1¼-inch lump.

Coke.

May 20.—Connellsville coke (f.o.b. ovens).

Furnace coke, prompt, $1.70 per ton.
Foundry coke, prompt, $2.25 to $2.35 per ton.

May 20.—Tin (Straits), 33.35 cents.

Copper, Prime Lake, 13.00 cents.
Electrolytic copper, 12.75 to 12.85 cents.
Copper wire, 14.25 cents.
Lead, 4.40 to 4.50 cents.
Spelter, 5.35 to 5.40 cents.
Sheet zinc, (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.37½ cents.
Aluminium, 23.25 to 24.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, ordinary, $29.00 to $29.50 per ounce.
Platinum, hard, $34.50 per ounce.
Bismuth, $1.75 per lb.
Quicksilver, $48.00 per 75-lb. flask.

SILVER PRICES.

May	7	53⅜	24 11/16
"	9	53⅝	24 11/16
"	10	53⅞	24 13/16
"	11	54⅛	24 15/16
"	12	54	24⅞
"	13	53¾	24 13/16
"	14	54	24⅞
"	16	54	Holiday
"	17	54	24⅞
"	18	53⅞	24 13/16
"	19	53⅞	24 13/16
"	20	53⅞	Holiday

SHARE MARKET.

(Courtesy of Warren Gzowski & Company.)

Miscellaneous.—May 23rd, 1910.

	Bid.	Ask.
Amalgamated Asbestos	22	22½
Dominion Coal Company	67⅝	68
Dominion Steel Company	67⅝	68
Nova Scotia Steel	79¼	80
Granby	41½	42
Consolidated Smelting	77	81
Crow's Nest Pass	85	..

Cobalt Stocks.—May 23rd, 1910.

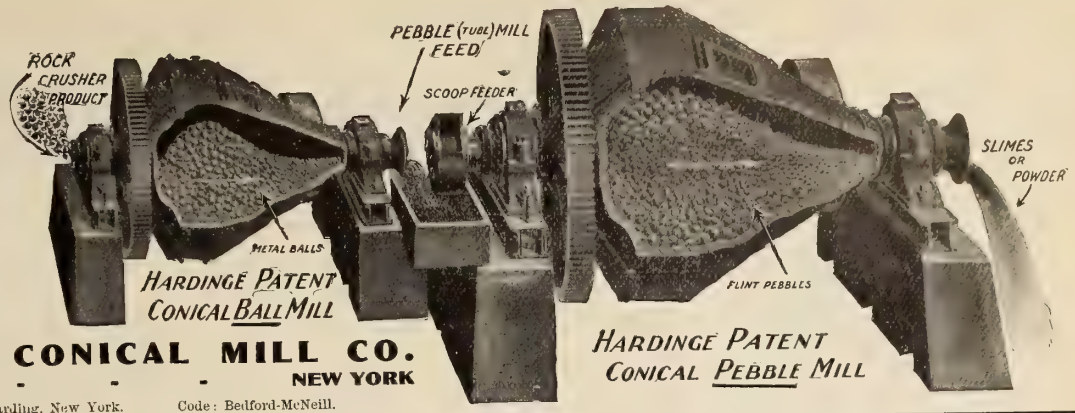
Amalgamated	.02	.04½
Beaver Consolidated	.33⅜	.33⅝
Buffalo	2.20	2.60
Chambers Ferland	.25	.25¾
City of Cobalt	.27¾	.28½
Cobalt Central	.06½	.09
Cobalt Lake	.28¼	.28½
Coniagas	4.95	5.00
Crown Reserve	2.90	2.96
Gifford	.09	.10½
Foster	.16	.18
Green Meehan	.02½	.03½
Great Northern	.08¾	.09½
Hudson Bay	105.00	125.00
Hargraves	.26	.29
Kerr Lake	9.00	9.08
La Rose	4.60	4.70
Little Nipissing	.22⅛	.22½
McKinley-Darragh-Savage	.92	.94
Nancy Helen	.05	.06
Nipissing	11.10	11.25
Nova Scotia	.41	.42
Otisse	.05½	.06
Peterson Lake	.26	.26½
Right of Way	...	...
Rochester	.20	.20⅛
Silver Leaf	.07	.07¼
Silver Bar	.06¼	.06¾
Silver Queen	.10	.12
Temiskaming	.67½	.68
Trethewey	1.24	1.29
Watts	.10 offered	
Ophir	.30	.41
Wettlaufer	.85	.90

New York Curb.—May 23rd, 1910.

Boston Copper	17	20
British Columbia Copper	6	6¼
Butte Coalition	20	21
Canadian Mines	6	7
Chino Copper	13¼	13½
Davis-Daly Copper	2	2⅜
Ely Consolidated	½	⅝
Gila Copper	6¼	6⅝
Giroux Mining	7½	7¾
Goldfield Consol	8 5/16	8 7/16
Green-Can	8⅜	8⅝
Harcuvar Copper	..	..
Inspiration Copper	7 3/16	7 5/16
Miami Copper	22	22¾
New Baltic Copper	6	8
Nevada Con. Copper	21¼	21½
Ohio Copper	2 15/16	3
Rawhide Coalition	33	34
Ray Central	2 1/16	2⅞
Ray Consolidated	19¼	19⅜
Union Mines	1 1/16	1 1/16
Yukon Gold	4⅜	4½

STEP REDUCTION
Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of,"



HARDINGE CONICAL MILL CO.
37 Wall Street, - - - NEW YORK
Cable Address: Halharding, New York. Code: Bedford-McNeill.

NOTICE

STUDENTS EMPLOYMENT REGISTER,

The CANADIAN MINING JOURNAL has opened an employment register for students taking mining or metallurgical courses at Canadian Universities or Technical Colleges. Mine operators who wish to employ students during the summer months are requested to communicate with the Business Manager.

Students are requested to send in their names, along with brief records of experience. These will be filed and no effort will be spared on our part to place applicants in immediate communication with possible employers.

SAFETY — SPEED — SPLENDOR
CANADIAN PACIFIC RAILWAY CO'S
"EMPRESSES" of the ATLANTIC
FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

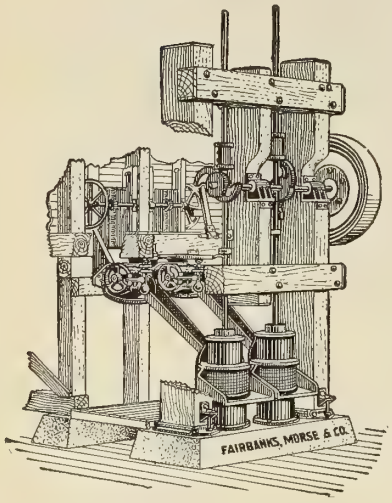
"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"
hold all records between Liverpool and Canadian Ports
900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA
For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

J. S. CARTER, General Agent,
217 McDermott Ave.
Winnipeg.

I. E. SUCKLING, General Agent,
S. E. Cor. King & Yonge Sts.
Toronto

Save 50% of the Power
by using NISSEN STAMPS

Descriptive Pamphlets on request



Owing to the great crushing efficiency secured the power required to operate Nissen Stamp Mills is about half that of other mills of the same capacity output.

One user writes :—

THE CANADIAN FAIRBANKS CO., TORONTO, ONT.

Dear Sirs,

In answer to your inquiry regarding the Nissen Stamps supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one inch hole.

The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening .018. With a coarser screen the tonnage would of course be larger.

The shoes and dies wear even, and the splash is well distributed over the screen.

The arrangements for keeping up the weight of the stamps are very good.

I can recommend the Stamps. Yours truly,

(Sgd.) F. J. Bourne, Superintendent,
NORTHERN CUSTOMS CONCENTRATORS, Limited
COBALT, ONT., December 31st, 1910.

The Canadian Fairbanks Co., Limited
MONTREAL

Branches: Toronto, St. John, Winnipeg, Calgary, Vancouver.

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management

Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

ORES WANTED

Molybdenite	Tungsten	Talc
White Mica	Barite	Graphite
Zincblende	Corundum	Fluorspar
Feldspar	Arsenical ore	Asbestos
Lead	Apatite	Tin
Cinnabar	Pyrites	Copper
Sodalite	Pink quartz	Beryl
Magnesite	Titanite	Rutile

Address "SPINEL"
Canadian Mining Journal - Toronto

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,
Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
McGee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
C. L. Constant Co.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects. Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M A., B. SC.
MINING ENGINEER
24 Adelaide St., West, Toronto, Can.
Cable Abmott Phone Main 5063

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N.Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers aad Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman · Charles W. Kerr
C. S. MacInnes · J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

S. F. KAVANAGH
Assayer
Mining Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors. Civil Engineers. Assayers.
Mining Properties bought and sold.
Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont.
Fabre and Chibogamou, Que.
627 Goristine Bldg., Montreal.
Phone M-7515

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, ROOM 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

THE PETERSON LAKE SILVER COBALT MINING CO., LTD.
Notice is hereby given that the annual meeting of the Stockholders of the above Company for the election of Directors and Auditor, and for the transaction of such other business as may be brought before the meeting, which will be held at the head office of the Company in the City of Toronto, Ontario, on the 30th, day of May, 1910, at the hour of 11 o'clock a.m. The Transfer books of the Company will be closed after office hours on the 19th day of May, up to and inclusive of the 30th day of May, until the annual meeting is over.
R. F. SEGSWORTH,
Secretary-Treasurer.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.

THE CALL OF THE WILD

The Opening Season is calling hundreds of enthusiastic prospectors away to their summer's labor in the wilds.

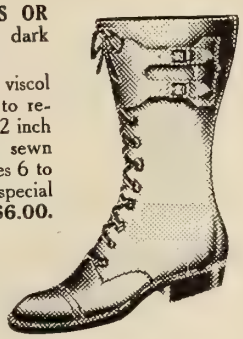
If you are Going, What About Requirements?

In many lines we are peculiarly fitted to help you get your outfit. From watches, instruments and firearms to tents, flybars and clothing we handle most of the necessaries.

OUR SPECIAL BOOT FOR MINERS OR PROSPECTORS is made from heavy, dark "tan colored" winter calf.

The leather is treated in a solution of viscol oil, makes them soft and pliable, helps to resist the wet. It's high cut, having a 12 inch left with heavy double goodyear welted sewn soles and bellows tongue to top. Sizes 6 to 11. The highest kind of value at the special price per pair.....**$6.00.**

NOTE:—We recommend the use of "Visole" to be applied freely which will give additional wear to the leather, per tin 15c.



Compound arnica and witch hazel. This is the best preparation we know of for putting on bruises, if applied immediately it saves the hurt one much suffering, it soothes the pain and reduces the swelling, the bruise not getting black at all. Price pint bottle 50c. quart bottle $1.00, small bottles 15 and 25c.

Mosquito and black fly oil applied over the exposed parts, will prevent insects from biting, 4 oz. bottle 25c., per gallon $7.25.

Peruvian Ointment, an antiseptic healing ointment for burns, scalds, cuts, sores, etc. Price per bottle 15c. per lb., jar 75c.

Bandages (cotton) all 6 yard lengths.
1 inch wide.....2 for 5 per doz. .30
2 " " .....5 each, 6 for .25
2½ " " .....5 each, per dox. .60
3 " " .....2 for .15, 4 for .25

Zinc Oxide Adhesive Plaster on spools, 5 yard lengths. For strapping up cuts, broken ribs, or any purpose where strapping is necessary. ½ inch wide 30c. each; 1 inch wide 40c. each; 2 inches wide 60c. each.

New Skin, an antiseptic waterproof liquid court plaster, for cuts, burns, blisters, etc., Price 15c.

Fine cold drawn castor oil, pint bottle 20c.

Lewis Astringent cordial for diarrhoea, cramps, etc., 4 oz. bottle 25c.

THE T. EATON Co LIMITED
TORONTO CANADA

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

---

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners

Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide
Smelter and Refinery at Deloro Ontario

Branch Office:

32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES

43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderai

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTI.

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MIMERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1.00.**

DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **1.50** paper cover, **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of those books in their library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis-Chalmers-Bullock, Inside Front Cover.
Ackroyd & Best, Ltd xii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.....outsde B.C.
Astley, J. W. xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown..... xix
Beatty, M., & Sons, Ltd. ix
Bazzanger, Jacques & Co.....xi
Bellias & Morcom, Ltd i
Berger, C. L., & Sons xv
Bryant, C. M., & Co. xx
Blackwell, Geo. G., Sons & Co...xxiv
Bath, Henry, & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennet, Wm. & Sons..... vi
B. C. Assay and Chemical Supply..... xxvii
Behrend Concentrators Ltd..... xi
Brown A. H. xx
Bruce Peebles..... xiv
Brown Mach. Co., Ltd..... vii

C

Canada Metal Co..... ix
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd iii
Canadian Bank of Commerce....iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell .....xix & xx
Curtis & Harvey, Ltd..... vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co. ..xxxii
Canadian Bag Co iii
C. P. R. Steamship Line xvii
Casartelli, Joseph, & Son.....xxiii
Canadian Fairbanks Co. Ltd ... xviii
Crabtree..... xiv
Canadian Copper Company ...xxiv
Crow's Nest Pass Coal Co.....xxix
Canadian Bronze Powder Wks....xxiv
C. L. Constant Co..... xviii
Cobalt Electric Equipment Co., Ltd..... xiv

D

Deister, Emil iv
Dominion Bridge Co. ix
Draeger Rescue Apparatus..... iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables..... iv
Davis, John & Son..... xvi
Dessau's, S. Sons..... vii
Deloro Mining & Reduction Co...xxiv
Eugene Dietzgen Co., Ltd..... vii

E

Evans, J. W..... xix

F

Fleck, Alex., Ltd. xii
Flory, S., Mfg. Co. x
Fowler, S. S. xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C. xix
Goldie & McCulloch Co., Ltd.... v

H

Hardman, J. E. xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd. xx
Heys, Thos., & Son xx
Hamilton Powder Company ..xxxii
Hore, R. E..... xx
Hadfield's Steel Foundry Co..... vii
Hardinge Conical Mill Co.....xvii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Classco..... i

K

Keuffel & Esser Co xv

L

Ludwig Nauen..... xvi
Loring, Frank C xx
Laurie & Lamb i
Lymans Ltd..... xii
Link Belt Co. xi
Leckie, J. Edwards xx
Ledoux & Co xx
The Lancashire Dynamo and Motor Co., Ltd..... xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ...xxiii
Mining and Scientific Press ..xxiii
Morton's B. C. Drill Steel....xxix
Montreal Steel Works xxxi
Mussens, Limited.....Front Cover
McGee, Boyd xx
McKee & McCleod Co..... v

N

Nova Scotia Steel & Coal Co....viii
Newton & Treloar xxvii
Nova Scotia, Province of.....xxvi
Nissen Stamps..... xviii
Northern Canada Supply Co. Ltd..xiv

O

Ontario Powder Co. vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros.....vi, vii, xvi
Patterson Mfg. Co. iii
Peterborough Canoe Co., Ltd....xviii

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xx

S

Sullivan Machinery Co. ii
Standard Diamond Drill Co..... xii
Stanley, W. F., & Co., Ltd.....ii
Smart-Turner Machine Co., Ltd. xvi
Scott, C. N. xx
School of Mining xxiii
Simpson, Robert, Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co.....ii
Smith, Thos. & Wm. Ltd xxix

T

Tyrrell, J. B. xx
Toronto University xxvii
Turner, J. J. & Sons..... xviii

U

United Typewriter Co,, Ltd xi

V

Vandeleur & Nichols..... xiv

W

Waterous Engine Works Co..... v
Walker Bros. vi
Willmott, A. B. xx
Ways Pocket Smelter Co. ...xxvii
Wetherill Separating Co..... xiv

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS
EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST. JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Boilers—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
John McDougall Caledonia Iron Works
Goldie & McCulloch Co.
Peacok Bros.
Mussens, Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd.

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus & Supplies—
Lymans Ltd.

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings (Diamond —
Montreal Steel Works, Limited
Peacock Bros.

Coal Washers—
Jeffrey Mfg. Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Emil Deister
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
McKee & McCleod Co.

Crushing Plants—
Allis-Chalmers-Bullock
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Works Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock

Dredging Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
Link Belt Co.
Mussens, Ltd.
Peacock Bros.

Drills (Rock —
Allis-Chalmers-Bullock
M. Beatty & Sons
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills (Diamond)—
American Diamond Rock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd.

Electric Generators—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock
S. Flory Mfg. Co.
M. Beatty & Sons
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.

Engineering Instruments—
O. L. Berger & Sons
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock
Alex. Fleck Limited
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
The Waterous Engine Works Co.
Laurie & Lamb.
Mussens, Ltd.
Peacock Bros.

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery.
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock
Canadian Cleveland Drill Co., Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock
M. Beatty & Sons
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jacks—
Mussens, Ltd.

Jigs—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Motors—
Vandeleur & Nichols

Mica Dealers—
E. Shaaf-Regelman
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck Limited
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd.

Printing—
Newton & Treloar

Prospecting Mills—
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.

Prospecting Machinery—
Standard Diamond Drill Co.
Mussens, Ltd.

Pulsometers—
Mussens, Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock
M. Beatty & Sons, Ltd.
Alex. Fleck Limited
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works
Morris Machine Works
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg. Co.

Rescue Apparatus—
Richard Jacobson

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock

Scales—
Canadian Fairbanks Co.. Ltd.

Screens—
B. Greening Wire Co.
Allis-Chalmers-Bullock
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCullough Co.

Smelting Machinery—
Allis-Chalmers-Bullock
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd.

Stamp Mills—
Allis Chalmers-Bullock
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
O. L. Berger & Sons
John Davis & Son
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros.

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis Chalmers-Bullock
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis Chalmers-Bullock
Peacock Bros.

Winding Engines—
Allis Chalmers-Bullock
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis Chalmers-Bullock
Peacock Bros.
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works
Jenckes Machine Co.

Vaults and Safes—
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

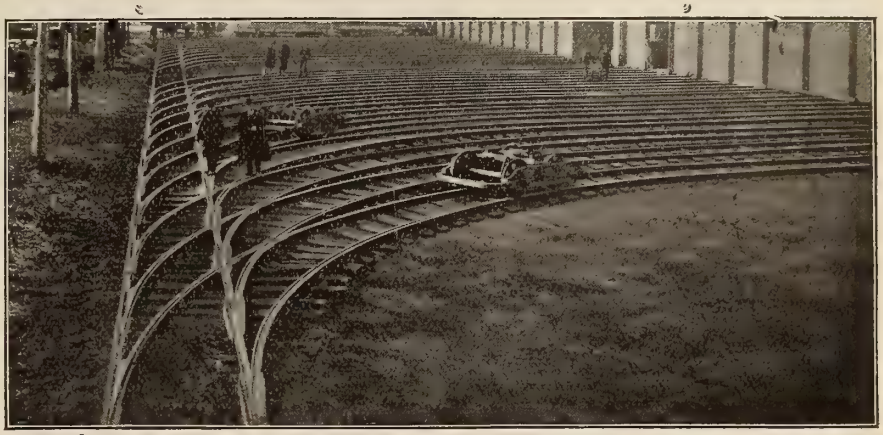
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

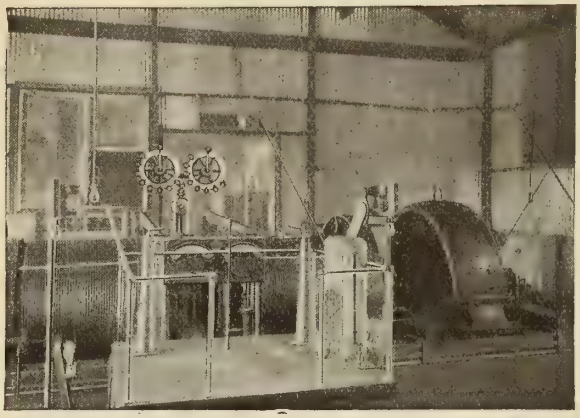
"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.



Calumet and Arizona Mining Co's Hoisting Plant, Bisbee, Arizona. Consisting of a Denver Engineering Works Hoist, driven by a Westinghouse 220 H. P. Direct—Current 550 Volt Motor which derives its power from a Westinghouse Fly Wheel Motor—Generator set consisting of a 180 K. W. Type "E. M." shunt wound generator, a 23,000 pound Laminated Steel Fly Wheel and a 180 H. P. Induction Motor.

Read what the Superintendent of Machinery says:

The normal duty of this Hoist is 6,000 pounds unbalanced load, maximum speed 1,000 feet per minute, ultimate depth of shaft 1,200 feet.

The plant is operated under the

Westinghouse Equalizer Hoisting System

"The machine has been very satisfactory in operation, and everyone who has examined it remarks on the ease with which it is handled and the complete control which the hoist engineer has over it. *I can heartily recommend this type of hoist* to anyone on the market for a machine of this character, and would be only too glad to show the machine at any time and, further, would be pleased to correspond with anyone who is interested."

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
Portage Ave. East, WINNIPEG.
8th Street West, CALGARY
232 St. James Street, MONTREAL.
92 Hollis Street, HALIFAX.

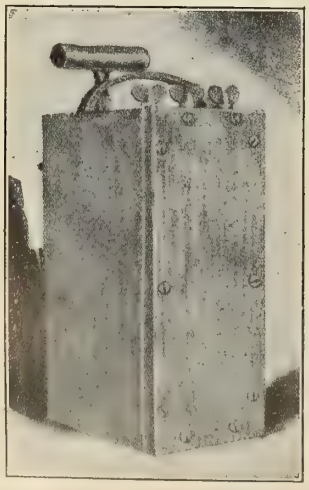
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines

Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

Two Interesting Items for Prospectors, Etc.

FIRST

A SPECIAL BOOT with ten-inch leg, Blucher cut, heavy double sole, Goodyear welt, reinforced shank, black mule and white elk leather, *as waterproof as a leather boot can be made.* All sizes, 6 to 11. Sterling value at

$8.00 per pair.

SECOND

A SPECIAL FLY-NETTING with *smaller mesh* than the ordinary mosquito netting, so that it is proof against black flies, and all other insect pests. This netting we have had made to meet a special demand from the north country; per yard—9 cents, or piece of 24 yards for

$2.00

36 INCHES WIDE, WHITE OR GREEN.

THE ROBERT SIMPSON COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

VOL. 31 TORONTO No. 12

The BLEICHERT SYSTEM OF AERIAL TRAMWAYS



Bleichert Tramway of the Yampa Smelting Company, of Bingham, Utah.

Showing portion of 750-ft. span and 90 ft. support. Length of line 12,270 ft. Capacity 60 tons per hour. Cost of operating 2 cents per ton a mile. No contour too rugged for a bee-line route. Parallels the famous Highland Boy line which has been twelve years in operation.

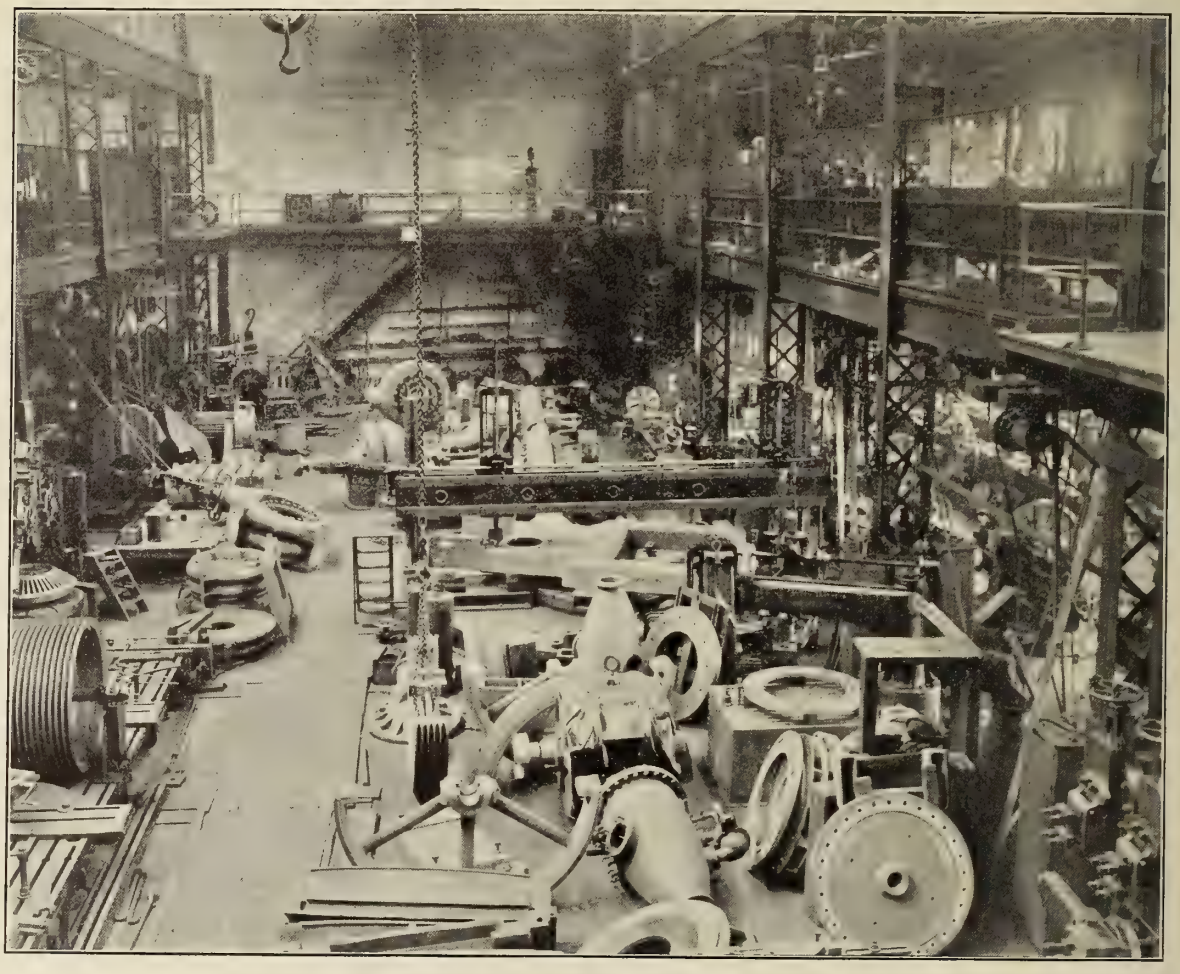
Illustrated book upon application.

MUSSENS LIMITED

MONTREAL	TORONTO	COBALT	WINNIPEG	CALGARY	VANCOUVER
318 St, James St.	73 Victoria St.	Opp. Right of Way Mine	259-261 Stanley St.	Crown Bldg.	Mercantile Bldg.

WORTHINGTON TURBINE PUMPS

OVER 80 PER CENT. OF ALL THE TURBINE PUMP INSTALLATIONS IN CANADA HAVE BEEN BUILT IN OUR SHOPS IN MONTREAL FROM THE DESIGNS AND UNDER THE SUPERVISION OF OUR CONSULTING ENGINEER MR. W. C. BROWN.



THIS VIEW OF OUR PUMP DEPARTMENT TAKEN APRIL 15TH SHOWS THE FOLLOWING TURBINE PUMPS UNDER CONSTRUCTION

6	**for Toronto, daily capacity**		**each**	**6,500,000**	**gallons.**
3	**" London,**	**"**	**"**	**1,500,000**	**"**
2	**" Hamilton,**	**"**	**"**	**6,000,000**	**"**
1	**" Lachine,**	**"**	**"**	**5,000,000**	**"**

SEND FOR DESCRIPTIVE LITERATURE

The John McDougall CALEDONIAN IRON WORKS CO., LIMITED

Works: Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.



Motor Driven Compressor, 500 ft. capacity, 80 lb. pressure.

Belliss & Morcom Air Compressors

Working parts all enclosed and lubricated under pressure of 15 lbs., ensuring absence of friction and wear; hot bearings unknown.

Air Valves of Hoerbiger patent type; very reliable and noiseless in working

Copy of letter from The Eldorado Banket Gold Mining Co., Ltd., Eldorado Mine, Rhodesia, to Messrs. Reunert & Lenz, Salisbury.

Dear Sirs:—

I have much pleasure in testifying to the good work done by the 10 drill Belliss Morcom Air Compressor supplied by you to this Company. It started work in May of last year, and since that time it has had hardly one minute stoppage.

At present the Compressor drives 7 large Ingersoll Sergeant Drills, 2 large Air Hoists, and 3 underground Pumps,

Yours faithfully,
(Sgd) H. STEPHAN,
Manager.

Sole Canadian Agents

Laurie & Lamb 211-212 Board of Trade Bldg. Montreal

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO. LIMITED

COBALT, ONT.
P. O. Box 310

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



CHOOSE THE RIGHT DRILL
FOR YOUR PARTICULAR CONDITIONS.

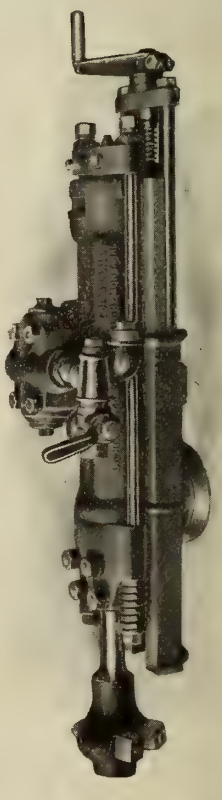
If too small, your drill holes will not be large enough or deep enough to shoot the rock economically; or your repairs will be unduly high.

If too large, labor and power will be excessive. Some valve-motions work well on heavy pressure, against hard even rock, others excel in soft or broken ground, on lower air pressure.

There is a Sullivan Drill which may be relied on to develop the highest possible efficiency and economy under any given set of working conditions.

As specialists in fitting drills to the service required, we solicit your inquiries.

ASK FOR CATALOGUE 660



Air Compressors Hammer Drills
Coal Cutters Diamond Core Drills

SULLIVAN MACHINERY CO.

CLAREMONT, N.H. CHICAGO, ILL., U. S. A.

BIRMINGHAM DENVER KNOXVILLE PITTSBURG COBALT, ONT. SAN FRANCISCO PARIS, FRANCE SALT LAKE
BUTTE JOPLIN NEW YORK ST. LOUIS NELSON, B. C. SPOKANE SEATTLE SYDNEY, AUS. EL PASO

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

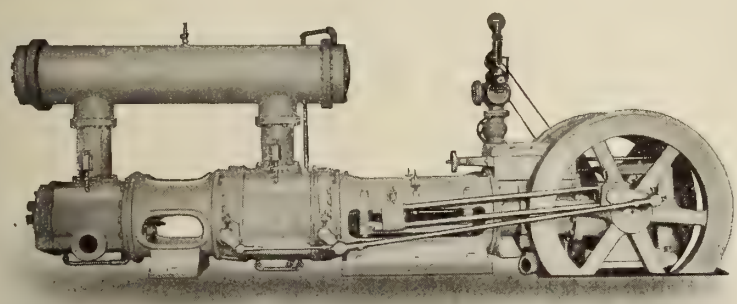
Address nearest office to-day.

THE PATERSON MANUFACTURING COMPANY, LTD.
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Straight Line, Steam Driven Compound Air Compressors

High *efficiency, simplicity* and ease of accessibility are distinct characteristics of the Class C-2 Compressor.

Corliss Inlet Valves on Low Pressure Air Cylinder, giving exceptionally large direct intake areas, practically unlimited life, quiet operation at all speeds and sustained high volumetric efficiency.



A simple direct Corliss Valve motion in which all complications have been eliminated and best efficiency obtained.

Sole Agency for B.C. Drill Steel in Cobalt Territory.

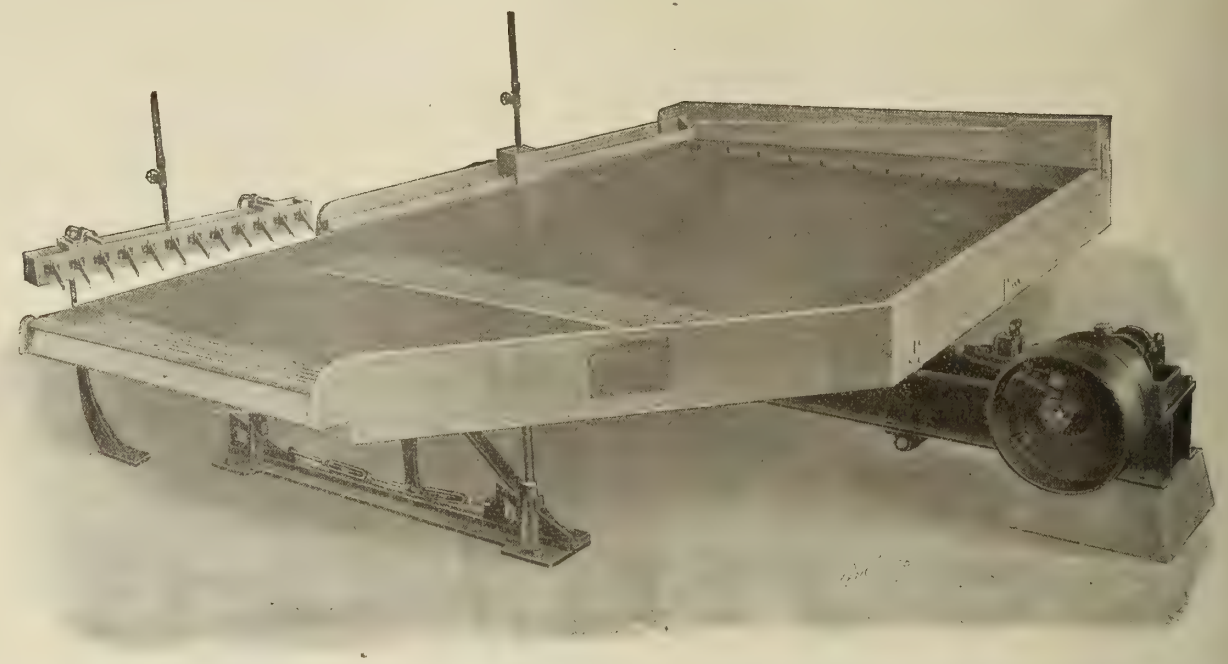
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

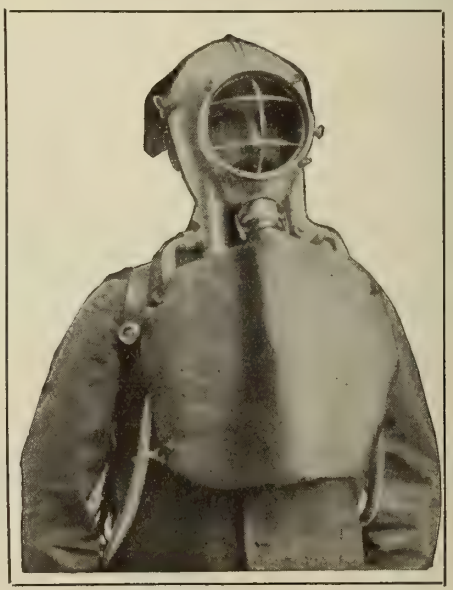
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

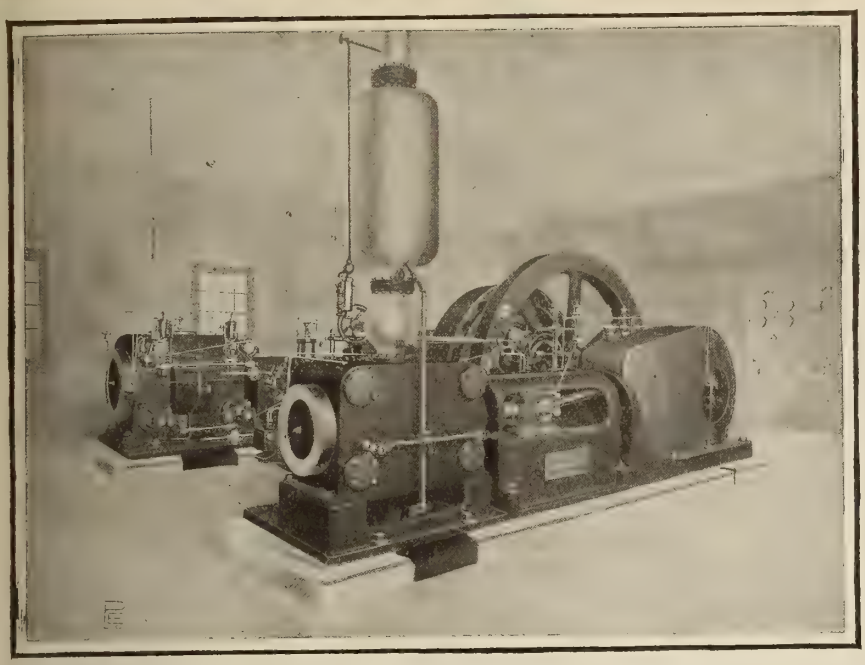
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc Rescue Stations

3,000 IN USE



POWER PLANTS

FOR

MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.



If I Could

Only See You

I could help you save money, oil, fuel and wear and tear on your plant.

Harris Heavy Pressure Bearing Metal

is the best for general machine bearings.

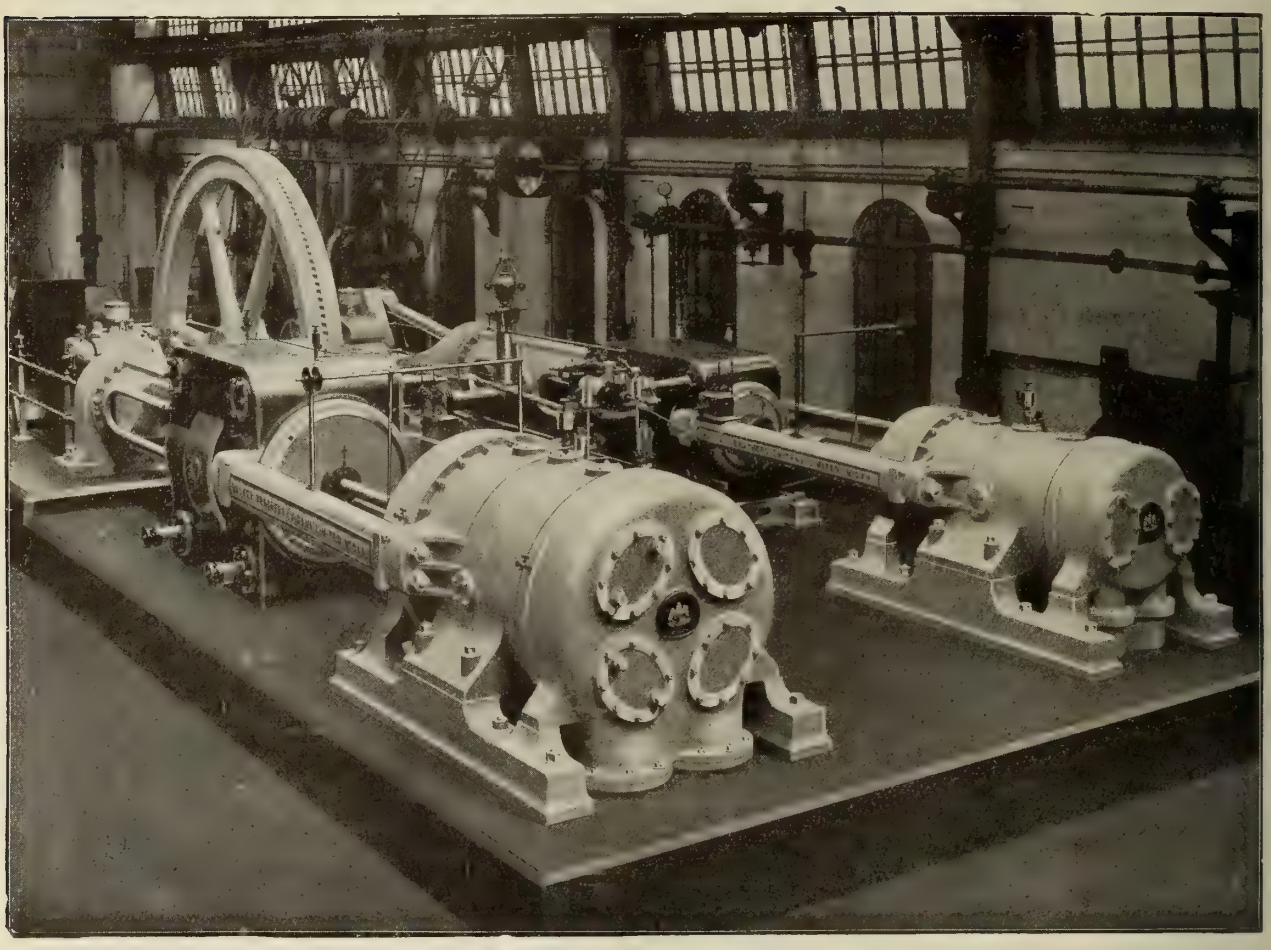
Will you write for price?

We will gladly quote and send you Booklet on Babbitt Metals Manufactured and guaranteed by

THE CANADA METAL COMPANY, LTD., TORONTO

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

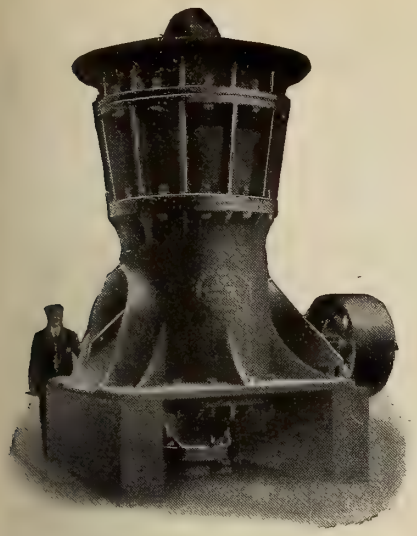
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF
AND ALL KINDS OF
BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

COAL MINING MACHINERY

Revolving Tipples, Screens, Picking Belts, Chutes, Car Hauls, Complete Plants Designed and Built, Mine Cars, Hoists, Pulleys, Transmission Machinery and Conveyors.

Correspondence Solicited

THE BROWN MACHINE COMPANY, Ltd.

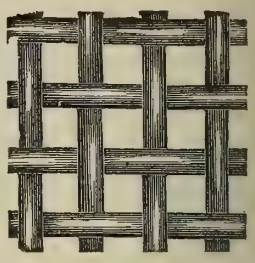
ENGINEERS

NEW GLASGOW = NOVA SCOTIA

They certainly do give Good Service. Try them!

Greening's Coal Mining Screens

They are made by our special **Double Crimp** process from the very highest grade of hard steel wire. As a result they are of enormous strength; the openings are square and uniform, and the wires are not easily displaced. We know they will give you the very best of service.



Made in all sizes. **Catalogue No. 2 on request.**

THE B. GREENING WIRE CO., LIMITED

HAMILTON, ONT. - - - - - - - **MONTREAL, QUE.**

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. **CORRESPONDENCE SOLICITED.**

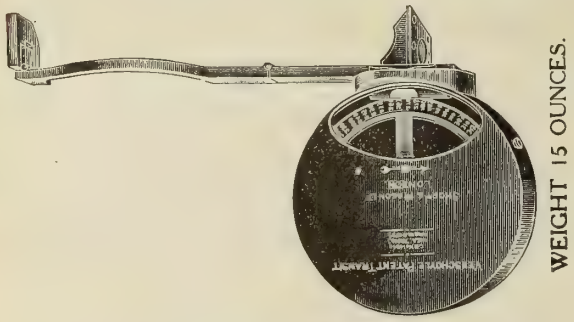
Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DIETZGEN'S Field Instruments

FOR

Civil, Mining Engineers & Surveyors

2½ INCH NEEDLE.



WEIGHT 15 OUNCES.

THE VERSCHOYLE POCKET TRANSIT

combines the useful features of the Abney Level, Prismatic Compass and Clinometer

For preliminary surveys of every description

Catalogue On Request

Eugene Dietzgen Co.

LIMITED,

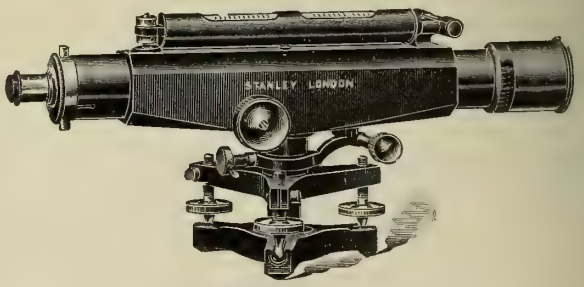
TORONTO, - 10 SHUTER STREET

STANLEY, LONDON

The largest manufacturers of

Surveying and Drawing Instruments

in the World.



New Engineer's Level

The strongest and most compact level yet made

Please send for our J 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE

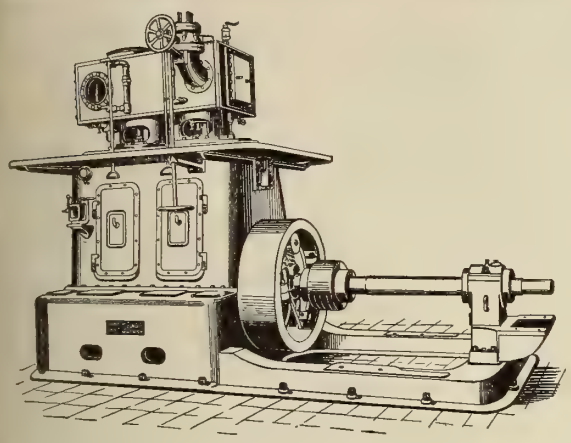
STANLEY

MARK

W. F. Stanley & Co., Limited

Great Turnstile, London, England

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

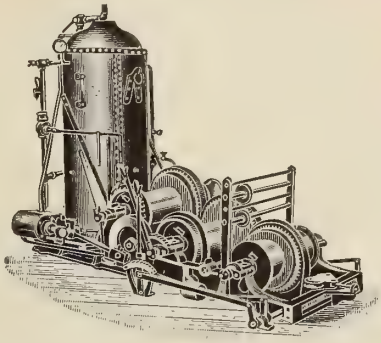
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que. R. W. Robb, Manager
Traders Bank Building, Toronto, - - Wm. McKay, "
Union Bank Building, Winnipeg, - - W. F. Porter, "
609 Grain Exchange Building, Calgary, Alta. J. F. Porter "

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

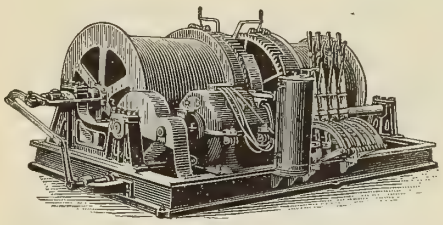
Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

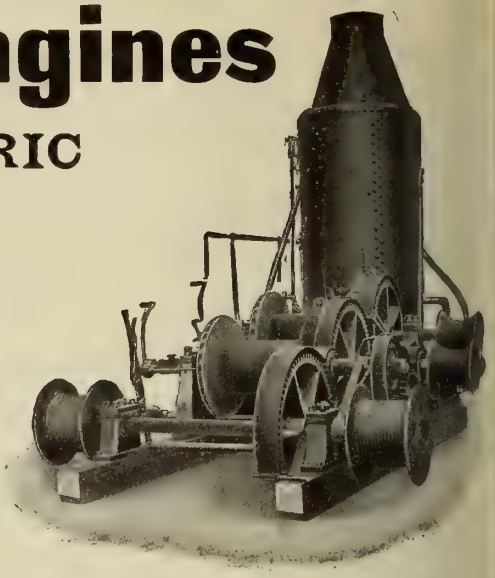
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 a.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.



WHERE WILL YOU SPEND YOUR WEEK ENDS?

It is not too early to plan your vacation for this year. There are many places where you can rest up and come back Monday morning in time for work, feeling fit and fine

POINT AU BARIL
The finest summer resort on the Georgian Bay.

MUSKOKA LAKES
Ontario's favorite vacation land.

KAWARTHA LAKES
The fisherman's paradise

Ask for a Week End Folder from any Agent of the

CANADIAN PACIFIC RAILWAY

OR WRITE

R. L. THOMPSON, - - District Passenger Agent, - - TORONTO

Behrend System of Concentration

DRY -:- WET

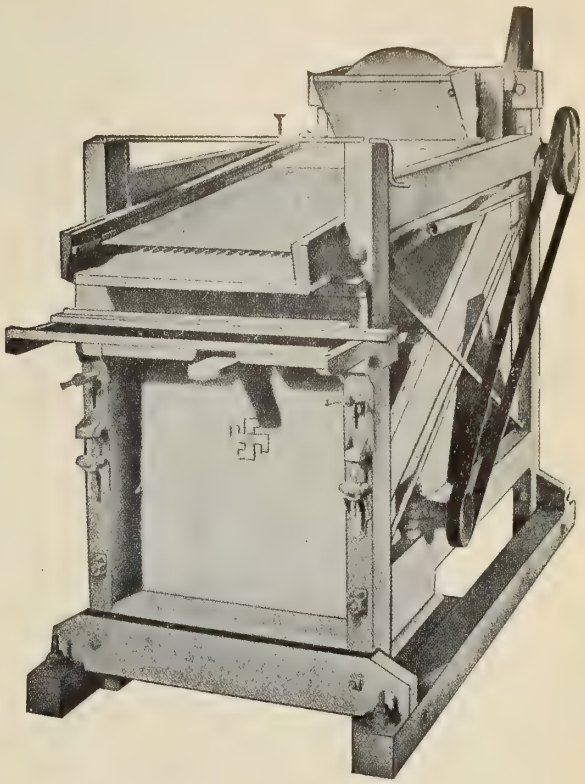
For all ores and minerals.

Highest recovery on slimes.

Send sample of ore for preliminary test to

Behrend Concentrators, Limited

48 Inspector Street, Montreal





There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,
108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

The Davis Handbook

OF THE

Cobalt Silver District

By H. P DAVIS.

ILLUSTRATED WITH PHOTOGRAPHS

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

PRICE $1.50 PAPER COVER $2.00 STIFF COVER

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

A New, Complete and Authoritative Treatise.

Cyanide Handbook

By J. E. CLENNELL.

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid.

Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

CONTENTS

Part I. General.

Introduction.—I. Early History of the Cyanide Process. II. Outline of Operations in the Cyanide Process.

Part II. Chemistry.

I. Cyanogen and its Compounds with Non-metals. II. Simple Metallic Cyanides. III. Metallic Compounds of Complex Cyanogen Radicals. IV. Chemistry of the Dissolving Process. V. Chemistry of the Precipitation and Smelting Processes. VI. Manufacture of Cyanide.

Part III. Preparatory Treatment of Ore for Cyaniding.

I. Crushing Machinery. II. Grinding Machinery. III. Mechanical Handling of Material for Cyanide Treatment. IV. Hydraulic Classification, Separation and Settlement of Slimes. V. Amalgamation and Concentration.

Part IV. The Dissolving Process.

I. Percolation. II. Agitation. III. Filtration by Pressure and Suction. IV. Handling of Solutions.

Part V. The Precipitation and Smelting Process.

I. Zinc-Box Construction and Practice. II. Clean up of Zinc-Boxes. III. Acid Treatment and Roasting of Precipitate. IV. Fluxing, Smelting and Refining of the Precipitate.

Part VI. Special Modification of the Cyanide Process.

I. Direct Treatment after Dry or Wet Crushing. II. Crushing with Cyanide Solution. III. Roasting before Cyanide Treatment. IV. Use of Auxiliary Dissolving Agents. V. Electrolytic Precipitation Process. VI. Other Precipitation Processes. VII. Treatment of Cupriferous Ores.

Part VII. Assaying.

I. Sampling. II. Assay of a Typical Siliceous Ore. III. Roasting III. Special Methods of Assay for Particular Ores and Products. IV. Assay of Gold and Silver Bullion.

Part VII. Analytical Operations.

I. Analysis of Ores and Similar Siliceous Material. II. Analysis of Bullion and other Mainly Metallic Products. III. Analysis of Cyanide Solutions after Use in Ore Treatment. IV. Analysis of Commercial Cyanide. V. Analysis of Sundry Materials.

Part IX. Metallurgical Tests.

I. Density Determinations. II. Alkali Consumption Tests. III. Screening and Hydraulic Separation. IV. Concentration and Amalgamation Tests. V. Cyanide Extraction and Consumption Tests. VI. Useful Formulae.

BOOK DEPARTMEMT

Canadian Mining Journal

Confederation Life Bldg., Toronto.

ACKROYD & BEST, Ltd.

MORLEY, LEEDS, ENGLAND.

CANADIAN AGENTS

Messrs. G. M. GRAHAM & CO.

North Sydney, C. B.

Are the only makers of an unpickable Magnetic Lock, and of an Electrically-lit Oil Lamp having a snuffer which completely snuffs the wick, and are the only makers of a Relighting Machine for the Mine which is Flame and Fool Proof.



ONCE AGAIN

We reiterate that we are always prepared to submit quotations for Laboratory Apparatus and Chemicals, yet our policy insures to the purchaser uniform prices, whether bids are asked for or not.

Better write us to-day.

LYMANS, LIMITED

(Established 1800)

WHOLESALE DRUGGISTS

Importers and Dealers in Chemical and Assay Apparatus

MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Casartelli's Patent Mining Dial



SIGHT limb moves on axes cast on the compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indices attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Telescope attachment if desired.

The Simplest Mining Dial made—the most efficient—most durable—quite the **best.** Proof of this in Catalogue F—free on request.

Sizes 5 inches and 6 inches.

JOSEPH CASARTELLI & SON

Scientific Instrument Makers

43 Market Street, Manchester, Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co, Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

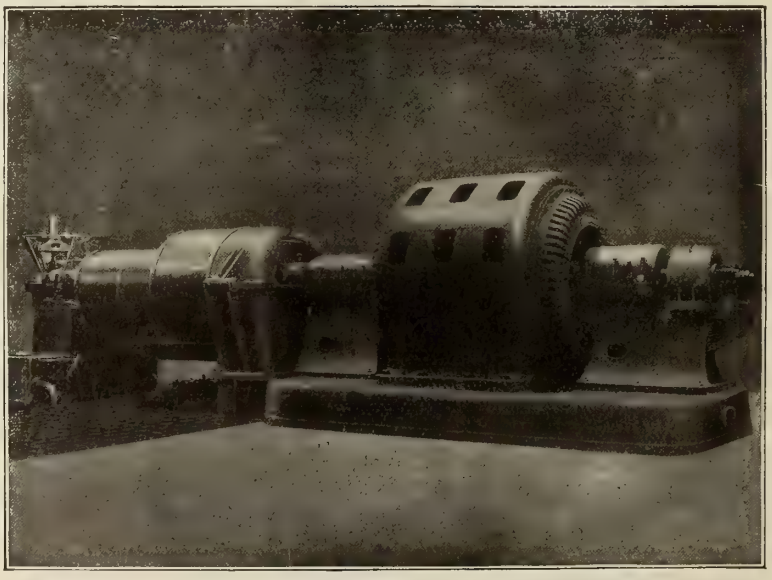
ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.
And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.
Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

BRUCE PEEBLES & CO., LTD.

WAR OFFICE, ADMIRALTY AND INDIA OFFICE CONTRACTORS

Illustration shows a Peebles 2,000 K W. 3 phase 6,600 volt 4 pole Steam Turbo Alternator



Mannfacturers of Electrical Apparatus for all conditions of service.

VANDELEUR & NICHOLS

CANADIAN REPRESENTATIVES - DINEEN BUILDING, TORONTO

JEFFREY COAL TIPPLES

Are built of wood or steel construction in capacities to suit necessary requirements in handling mine coal.



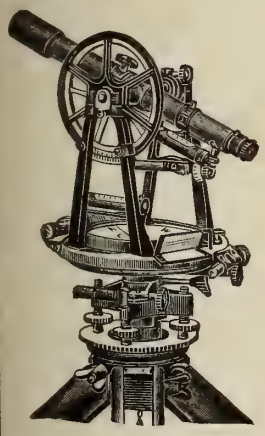
Our broad experience in the design and construction of Coal Tipples enables us to combine the latest and most dependable methods obtaining in Tipple practice. Descriptive Bulletin X 22 mailed on request.

JUNE 15.

We design, build and install Coal Mine Equipments complete. Bulletins "X 15, 17 and 18" describe modern machinery for Mines. Specify Editions "X".

THE JEFFREY MANUFACTURING CO.,
COLUMBUS, OHIO.

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Bldg., Temperance Street



C. L. Berger & Sons
37 WILLIAMS STREET
BOSTON, - MASS.

SPECIALTIES :
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

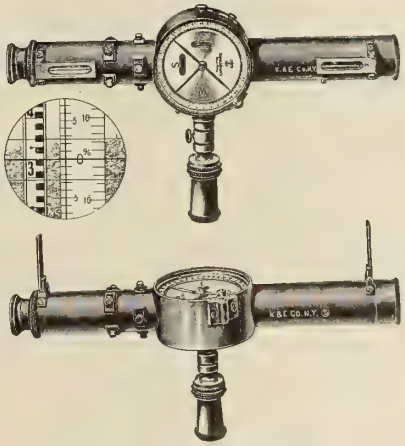
Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196

An Ideal Instrument
For Preliminary Surveying



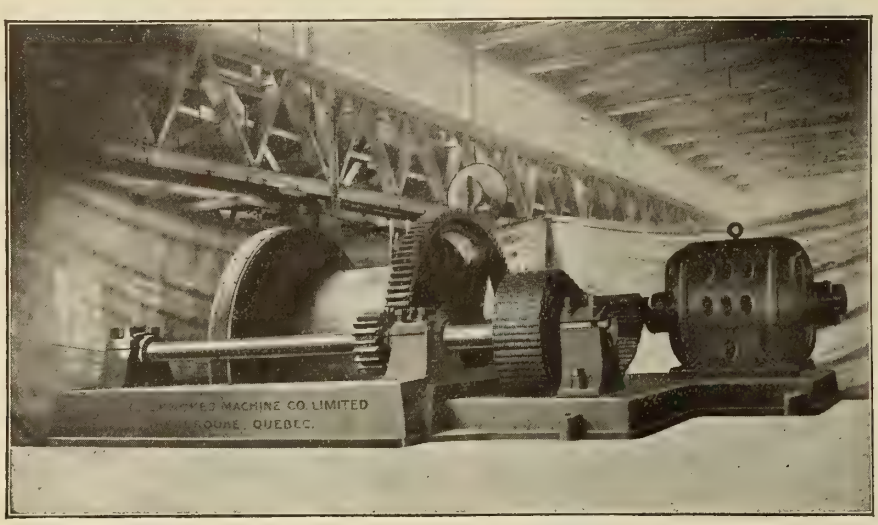
THE STADIA HAND TRANSIT

The Stadia Hand Transit gives more accurate and quicker results than any similar portable instrument. It is thoroughly well made and will meet the requirements of those who are engaged on preliminary work, or on the sub-division of larger surveys made with a regular transit.

In measuring vertical angles, the sighted point and both scale readings (slopes and degrees) appear together in the field of view (see cut.) Compass bearings can be taken by use of the telescope on level ground or by the folding sights on sloping ground.

Send for complete (550-page) Catalogue.

KEUFFEL & ESSER CO.
MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes



OUR Hoists are compact in design, of heavy construction and sightly in appearance.

We now build electric driven hoisting machines having silent chain drives from the motor.

In all sizes, for every service.

FOR FURTHER PARTICULARS WRITE US

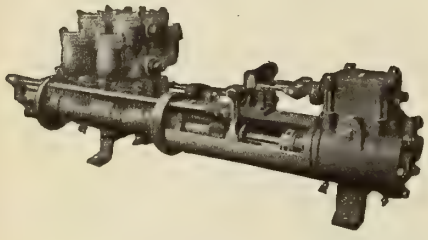
The Jenckes Machine Company, Limited

Mining Machinery, Pulp Mill Machinery, Steam and Water Power Plants

SALES OFFICES:

Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver

WORKS, SHERBROOKE, QUE. and ST. CATHARINES, ONT.



STEAM AND POWER PUMPS

PLUNGER PUMPS

For any service up to a water pressure of 300 pounds.

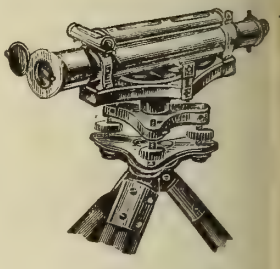
PACKED PISTON PUMPS

AUTOMATIC FEED PUMPS AND RECEIVERS. COMPOUND DUPLEX PUMPS. INDEPENDENT JET CONDENSERS. CENTRIFUGAL PUMPS. STEAM & OIL SEPARATORS.

THE SMART-TURNER MACHINE CO. LIMITED
HAMILTON - CANADA

DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue



PEACOCK BROS.

68 BEAVER HALL HILL, - MONTREAL

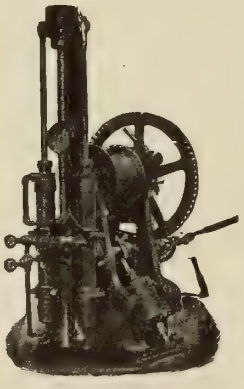
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN
HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, June 15, 1910 No. 12

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 353
(a) Clubs, Societies and an Editor 353
(b) Quebec Mining Law Amendments 354
(c) Progress and Procrastination 354
(d) That Timmins Sample Car 354
(e) The Hair-Trigger Critic 355
(f) Porcupine 355
(g) Nova Scotian Mining Examinations 355
(h) Editorial Notes 355
Hoisting by Electricity 355
A Suggestion in "Quartering-Down" Large Samples, by H. E. T. Haultain 356
A Note on the Sampling of the Porcupine Ore Bodies, by H. E. T. Haultain 357
Some Notes on the Philosophy of Sampling, by H. E. T. Haultain 358
The Amendment to the Criminal Code 360
The Porcupine Gold Area, by W. E. H. Carter 361
Our European Letter 366
Rescue Apparatus in Coal Mines 369
Safety Chambers in French Mines 370
Programme of the Mines Branch 371
Northern Quebec 371
Tool Steel Direct from the Ore in an Electric Furnace, by Alfred Stansfield 372
Personal and General 375
Special Correspondence 375
General Mining News 380
Mining News of the World 380
Company Notes 382
Statistics and Returns 382

CLUBS, SOCIETIES, AND AN EDITOR.

Again has our young contemporary, "The Mining Magazine," opened a vexed question. In its issue for May, Mr. F. Lynwood Garrison takes the editor, Mr. T. A. Rickard, to task for making caustic remarks about the Mining and Metallurgical Society of America, which society is a close corporation, composed exclusively of professional men. Mr. Garrison, not without heat, advances the argument that since the Society was organized to promote reforms advocated editorially by Mr. Rickard, therefore Mr. Rickard, who is a prominent member of the Society himself, is unfair and inconsistent in commenting adversely upon such an "altruistic organization." "Moreover," says Mr. Garrison, "you would not venture to do such a thing of [sic] any social club in which you are a member, and it is hard to see much difference in propriety as regards the Mining and Metallurgical Society."

To these strictures Mr. Rickard replies in an editorial. First he points out that there is a great gulf fixed between a social club and an engineering association. The Mining and Metallurgical Society he had criticized because it adopted the exclusiveness of a social club. For the one, "carefully prescribed qualifications as to occupation, experience, and skill" are the essentials. For the other it is merely necessary that the candidate be "congenial to those already in the club." Mr. Rickard further sums up his position thus: "Any society arrogating national or international scope, any society claiming to include all the properly qualified practitioners, any society assuming the function of professional classification, is in the position of . . . a public functionary bound to act in accordance with prescribed rules, not a private person free to give vent to his own idiosyncrasies."

To this well expressed dictum we subscribe. The whole discussion has arisen because of several misconceptions. The Mining and Metallurgical Society of America was created to perform a function that could not be performed by that excellent institution, the American Institute of Mining Engineers. Like our own Canadian Mining Institute, the American Institute exists to represent primarily the industry of mining. Our own choice of name has been more fortunate. But in all important respects the two bodies are analogous. Both are heterogeneous aggregations of persons directly and indirecly interested in mining. The Canadian body is probably the more effective, as it concerns itself in legislation. But each is controlled by professional men of the highest rank. Both have rejected definitely any proposals tending towards exclusiveness. The usefulness of each is believed to depend upon well regulated inclusiveness.

On the other hand, the Mining and Metallurgical Society purports to represent the profession. This it cannot do so long as admission to membership is denied to any man whose qualifications meet the Society's requirements. Like a University, it can deny its degree to no fit person.

In one direction in particular, the Mining and Metallurgical Society appears to have got on the wrong trail. Members, we believe, are not permitted to advertise the fact that they are members. This defeats the very purpose of the organization and removes the only effective means of discipline. The organizers overlooked the patent fact that, as the engineer looks to the public for his living, so his standing is dependent upon what the public thinks of him. In other words, the Society must not become a Star Chamber. It should and must strive not only to regulate the profession, but to secure the sympathy and assistance of the nation.

One word in closing. Mr. Garrison in his letter refers to the Society as being an altruistic organization. This is piffling. No professional body is altruistic . Altruism is a colourless something that can perhaps be postulated of religious retreats. The Mining and Metallurgical Society is a body organized to protect the profession of mining engineering. Its prime object, therefore, is self-preservation. Its chief danger is priggery.

QUEBEC MINING LAW AMENDMENTS.

A new spirit has been infused into the administration of mining affairs in the Province of Quebec. Close on the heels of the departure of the Chibougamau Commission comes the announcement that certain changes have been made in the mining laws. The object of these changes is to make the way easy for the prospector and the miner. The mining laws of Quebec have long needed attention. They are now being altered and amended so as to render them a help and not a hindrance to the pioneer and investor. In this respect Ontario, burdened with equivocal, cumbrous, and most involved legislation, falls far behind Quebec. Comparisons may be odious, but they have too often been made at Quebec's expense.

The amendments referred to are six in number. We shall glance at them one by one.

By the new provisions all building materials, clays, limestone, peat, ochres, sands, etc., found on private lands belong to the owner of the surface rights. Under the old regulations, the mining rights for these substances had to be acquired from the Crown. This amendment inures to the benefit of the farmer, if to anyone at all.

In future all sums paid on mining licenses (which are practically yearly leases of mining rights) shall be deducted from the price when mining claims are acquired from the Crown by purchase. This is distinctly beneficial to the mining man.

Formerly a period of four months was allowed between the staking out of a claim and the taking out of the mining license or the consummation of the purchase. By the late amendments this period is now extended to six months.

Penalties for tampering with stakes was punishable by a fine of $25, or one month imprisonment. The fine is now placed at $200, and the alternative imprisonment at six months.

Under the old regulations the deposits of iron sands in the lower St. Lawrence region were purchasable at the rate of $10 per acre. The Lieutenant-Governor-in-Council is now authorized to reduce this price to four dollars per acre should he deem it advisable.

The last point of change is one relating to municipal taxation of mines and mining plants. In the year 1900, a law was passed exempting all mines and mining plants from municipal taxation for a period of ten years. This measure expires in July of this year. It is now replaced by an amendment exempting the mine itself and the underground plant, but providing that the surface plants, mills, buildings, etc., are taxable by the municipalities.

We believe that there is little to find fault with in these amendments. But there is much to commend in the obvious intention of the Quebec authorities.

PROGRESS AND PROCRASTINATION.

On another page will be found notice of the programme of the Federal Mines Branch for the coming season. We are pleased to find that a British expert has been invited to visit Canada and consult with the Government with regard to the regulation of the manufacture and storage of explosives. No delay should occur in taking up this most necessary investigation.

Other timely investigations are to be undertaken. Amongst these are such questions as the utilization of peat, the treatment of iron pyrite, the production of spelter and zinc oxide, the magnetic concentration of iron ores, etc., etc.

These activities will bring results. It is regrettable, however, that one most urgent problem has been overlooked. In an editorial in our last issue we pointed out that the Hon. Mr. Templeman promised last session to give attention to the matter of life salvage in coal mines. On the programme just issued we see no reference to this. Again it is necessary to exhume the humiliating fact that an officer of the United States Geological Survey had to be called in to instruct the miners of Nanaimo in the use of breathing apparatus. By all means let somebody move.

For the information of all interested, we publish on another page a review of the action taken by other governments.

THAT TIMMINS SAMPLE CAR.

One thing that has contributed to what may be a much exaggerated rating of Porcupine is the Timmins sample incident. In a recent editorial we referred briefly to this. Since writing that editorial we have received what appears to be more authentic information. Some of this we are not at liberty to use. But we are quite free to

refer to the fact that serious doubts have been expressed by several engineers as to the representative character of the Timmins sample.

Now, whatever the actual facts may be, the Messrs. Timmins are in nowise bound to make public the history of that sample unless it is their intention to interest the public in their enterprise. In this event they have no right to expect the public to consider their statements unless those statements are backed by a full technical record of the sample.

On the other hand, if the Messrs. Timmins intend to develop their property without selling shares to the public, they have every right to suppress particulars. But, until those particulars are published, all that can be accepted is that a car-load of rich ore has been mined in Porcupine.

. . . . . .

No good object can be served by shutting our eyes to facts. Porcupine is decidedly *not* a proved district. Development has been and will be slow. The prices asked for undeveloped prospects are preposterous. Frequently the elements of a decent gamble are lacking. As against these facts, however, it must be remembered that rich ore has been found on several claims. How extensive the enrichment is in each case is known by no one. Only careful, competent engineering can determine this.

Owners of claims, anxious to sell quickly and at the top of the market, may resent plain speech. But exaggeration is precisely what has before now killed gold mining in Ontario. The CANADIAN MINING JOURNAL will rejoice exceedingly if Porcupine becomes a successful mining region. But whatever grounds we may have for *hope*, we have not yet a sufficient basis for *belief*.

THE HAIR-TRIGGER CRITIC.

Having passed through Egypt on his way to the "desired metropolis," Mr. T. Roosevelt finds himself impelled to inform the British nation that it is not doing its full duty by that country of historic trouble. As a critic, Mr. Roosevelt falls into the hair-trigger class. Sub-conscious cerebration provided him with his criticisms long before he saw Egypt. Egypt furnished local colour. The fact is that it is Great Britain's misfortune not to have conformed to Mr. Roosevelt's own methods.

Mining centres ever and anon are touched up by the same species of critic. The hair-trigger critic is often desperately in earnest and unquestionably honest. But either he is incapable of seeing beneath the surface, or else he is temperamentally incapable of taking sufficient pains to inform himself on both sides of his subject. The worst of him is that he may frequently become the innocent mouthpiece of extreme partisans.

PORCUPINE.

Porcupine is so much discussed at present that we feel no compunction in assigning it a large amount of space. We would request our readers to ponder carefully the articles contributed by Mr. Haultain. They are characteristically vigorous and timely. Dwellers in Porcupine will do well to take them to heart.

The general article by Mr. W. E. H. Carter is intended as a provisional estimate of the camp. Mr. Carter's judgment is worthy of respect. In addition to his professional experience he occupied for some years the position of Inspector of Mines for Ontario. Consequently, he has an intimate knowledge of gold mining in this province.

NOVA SCOTIAN MINING EXAMINATIONS.

We have been credibly informed that grave abuses exist in the system of examining candidates for coal miners' certificates in Nova Scotia. It is needless to give particulars. We hope that no time will be lost in clearing up what appears to be a distressing condition.

EDITORIAL NOTES.

Our readers will find matter of extraordinary interest in our current London letter. The notes concerning the Maikop oil field, and the discussion of coal dust explosions are outstanding features.

In Canada, gold coins are legal tender for a payment of any amount; silver coins for an amount not more than ten dollars; and bronze coins for an amount not exceeding 25 cents. British gold coins are legal tender, as are, also, subject to certain restrictions, United States gold coins.

The initial number of "Canadian Finance," an independent investment, trade, banking, and insurance journal, has just reached us. "Canadian Finance" is published in Winnipeg under the editorship of Mr. S. R. Tarr. Its object is to serve western interests no less than those of the east. Hence it should be of especial service to thousands of eastern investors. We wish it all success.

Nova Scotian coal operators, as the "Maritime Mining Record" points out, must face the problem of finding a market for slack coal. To our mind the best solution is that of utilizing the slack for generating power at the mine. There are growing markets for power within easy distance of most of the larger mining centres.

The method of measuring ore reserves in terms of the square fathom instead of in tons has been adopted by the Wernher-Beit mines. The change is looked upon favourably by other operators. Why the "fathom" should be chosen instead of the "yard" or, better, the "metre," it is hard to conceive.

HOISTING BY ELECTRICITY.

Where sufficient electrical supply exists and where there is provision to prevent entire stoppage in case of the failure of the power supply, hoisting by electricity is worthy of the consideration of mine managers. At a German mine, where electrical hoisting exists, over 3,000 tons of coal are raised in 16 hours' winding, with an average of 40 hoists per hour.

A SUGGESTION ON "QUARTERING-DOWN" LARGE SAMPLES.

By H. E. T. HAULTAIN.*

I.

(Editor's Note.—These articles were written at the request of the CANADIAN MINING JOURNAL. Mr. Haultain has just returned from a visit to Porcupine. In the articles he outlines his personal opinions in the hope that they will prove suggestive to workers in Porcupine.)

The term "quartering-down" doubtless comes from the ancient and time-honoured method of "coning and quartering," where the ore was carefully shovelled into a cone-shaped heap, carefully flattened out into a pie shape, and as a pie, quartered by two cuts at right angles. Two opposite quarters being discarded, the other two were again carefully coned, flattened and quartered, and this was repeated until a sufficiently small sample remained. This is an elaborate process for mixing and halving and if carried out with care, gives a small sample ready for the assay office, which will truly represent a car-load.



Fig. 1.

The assayer on receiving the sample, which may weigh perhaps 10 pounds, proceeds to crush it to a sand and mixing it thoroughly does the "quartering-down" by means of a riffle-sampler, which divides the sample into eighths or twelfths, preserving alternate eighths and discarding others, and by repeating this he finally retains a sample weighing only a few ounces, but which so accurately represents the original carload as to be the regular basis of sale between miner and smelter. In each case the "quartering-down" is really a halving.

A necessary element of both the coning method and the riffle method is the preliminary mixing, and this is more important where the sample is cut only into quarters than with the riffle sampler where it is cut into a larger number of fractional parts. Brunton, in his presidential address to the A. I. M. E., hsowed that even with the elaborate ritual of the coning method it was easily possible to get false results due to improper mixing. But even where we accept the method as being entirely reliable we are justified in seeking a method less cumbersome; we want something quicker and simpler.

A continuous acting set of riffles, such as the well-known "Jones" sampler, where the sample can be passed through in a continuous stream, or in intermittent shovelfuls, does away with the elaborate mixing, is simple and really fool-proof. Figures 1 and 1A show a very simple form of the riffles adapted for use with the shovel. The discarded material remains in the wheel-barrow and is wheeled away to the dump. In the photo the individual riffles are one inch wide and two inches deep. I have used riffles in this form up to four inches wide, but have of late preferred for large samples a still simpler form of apparatus. Fig. 2 shows a diagrammatical model.



Fig. 1A.

It is simply a plate supported on edge, which splits the thrown shovelful roughly into halves and keeps them separate. The scientific philosophy of this is sound, as is also the horse-sense. What is lacking is the psychological effect of the ritual of the coning and quartering. This method requires no elaborate mixing for instead of dividing into only four parts and accepting two of them, we divide our sample into a hundred or a thousand parts (shovelfuls) and then split each of these parts into halves while they are freely falling in the air. Where there is much work to be done I prefer the form shown in Fig. 3, which is from a photo of a diagrammatical model. The edge is covered with an inverted trough or roof which serves to place the sample away

from the separating plate to make it easier for shovelling, or sends it straight into a wheel-barrow or car. Two splitting edges are used and the sample is shovelled from one to the other and back again, and so on until it is cut down to the required size. Unless the ore has been previously crushed the larger pieces of the sample

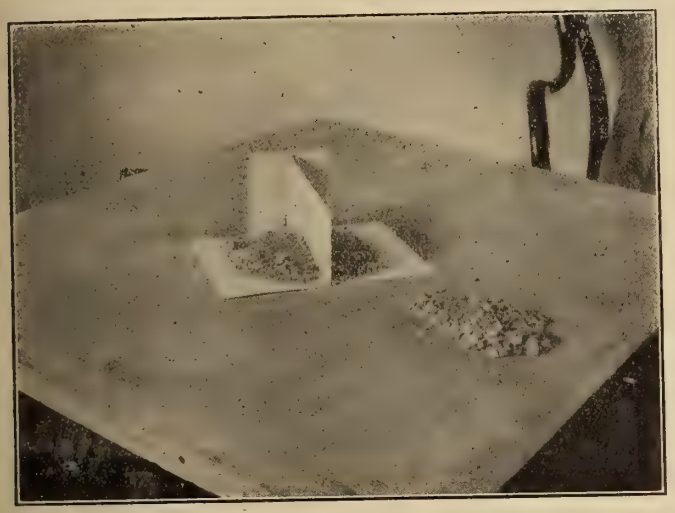


Fig 2.

should, of course, be broken up between each halving. When the sample is down to 25 pounds no piece should be larger than one-quarter inch in diameter. For gold ores showing visible gold freely, the ore should be still finer; a 25-pound sample should be able to pass an 8-mesh screen, and should go to the assay office preferably without a further cut.

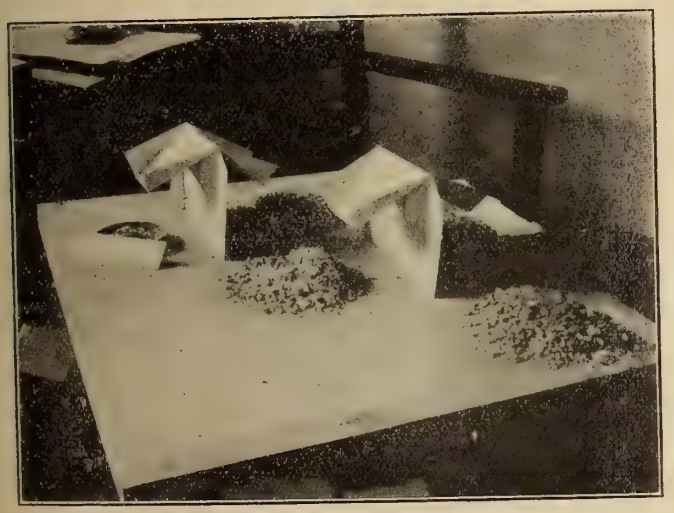


Fig. 3.

The "roof" may be a piece of sheet steel, 3 feet by 6 feet, bent to shape, and should be high enough to admit a wheel-barrow or car under one side. The other side should drop its ore onto a piece of sheet steel, 4 feet by 8 feet, and if the samples are large, a frame or pen of boards 3 feet by 7 feet may be placed upon this to prevent the ore scattering.

*Professor of Mining, University of Toronto.

A NOTE ON THE SAMPLING OF THE PORCUPINE ORE BODIES.

By H. E. T. Haultain.

II.

Porcupine is the most important new district in Ontario to-day. We all want to know what the various bodies of quartz and schist will average when it comes to milling them. It is plainly evident that there is plenty of gold-bearing quartz up there, but it is not yet evident how much of it contains pay values, though we do know that some of it is bonanza ore. Upon the determination of the probable value of the quartz depends the making of some very heavy payments in the near future, and for the purpose of making reliable estimates much work is being done at large expense. Most of the work is systematic and elaborate, the very reverse of that which characterized the early years of Larder Lake. Not only is the surface being exposed by extended stripping and trenching, but shafts and drifts and cross-cuts to explore the bodies at depth are being systematically planned and executed. It is quite true that in some cases shafts have been commenced before sufficient surface work had been done, but it is equally true that some of the surface showings fully justified the expense of underground work without further delay. All this expense is for what purpose? To boom stock? I am glad to say that I do not think so, and to my mind, this is the best symptom in mining in Ontario to-day. This work is true exploration; it is for the purpose of examining the ore bodies and the first thing and the main thing in the examination of an ore body is the sampling, and Porcupine is going to give some trouble with its sampling. So much so is this going to be the case that some people will not be satisfied till they have elaborate "mill-runs" or perhaps "smelter-tests." As a firm believer in the possibilities of sampling and also in the common "horse sense" of sampling, I submit a note or two in regard to the evident troubles. In the first place the quartz is going to be remarkably "spotty," not only spotty inch by inch, but spotty round by round. There are going to be hand specimens and "tie-pins" frequently associated with barren quartz as their immediate neighbour, and there are going to be fairly large blocks of barren or nearly barren quartz followed by equally large blocks of bonanza ore. The gold itself is all the way from fine flour gold to coarse and very coarse, though I saw very little of what might be termed "nuggetty" gold. Incidentally it is worth noting that the gold is certainly "where you find it" up there. It is in the quartz and in the schist, in the seams and in the solid, with the sulphides and in the white, so-called "bull quartz." It is with the fine sulphides and with the coarse cube pyrites. It is with galena and with zinc blende. And also it can equally well be absent from each and all of these associations.

But to come back to the sampling. Can these ore bodies with their very erratic values be sampled? They certainly can be sampled in such a way that the results will be very far from a true guide no matter whether the samples are taken with a prospect pick or run through a mill, but I think they can also be sampled very satisfactorily by adapting general sampling methods to the special conditions, and I have no doubt that sooner or later transfers will be made on the basis of sampling and that careful managers will control their output and report their reserves based on sampling just as is done in all other respectable gold camps.

The values vary greatly from inch to inch across the veins—this calls for increased care in the taking of the

individual samples, and despite this care it will result in greater variations from the probable mean value and consequently calls for more frequent samplings. The values vary greatly foot by foot along the vein. This calls for more frequent samplings. We must never forget that not only do we want to know the general average value, but we also need to study the vagaries of the ore body, wherever visible, that we may better interpret and estimate the unseen. That is the main difference called for—more frequent samplings, added to greater care in the sampling; greater care to more successfully eliminate partiality of motive and partiality of method, and more frequent samplings to permit of the greater chances of error "evening up." There is another aid to accuracy and that is to take larger samples. I don't mean to change our methods altogether and substitute the blasting down of samples of several tons weight for the sample carefully taken by hammer and moil. I mean that the sample should be increased in pounds, not tons, that where we took a 10-pound sample in copper ores we should take a 50-pound sample in Porcupine. But the taking of the larger sample should never for one moment permit us to relax our care in the taking. It is hard to persuade the ordinary man that the erratic results of individual samples do not make all care seem foolishness. They say, If with all your care your results are each very different from the true average why are you so careful? Samples taken at haphazard will not vary to any greater extent. The answer is that other things being equal chances will even up; with great care exercised in each sample to get the right proportions, etc., the errors will balance when many samples are taken. This is true philosophy, it is also horse-sense and everyday experience.

I think it might be very good policy occasionally to satisfy oneself by taking a large sample by blasting down several tons, breaking it up small with hammers and carefully quartering it down, remembering always to break the larger pieces before each quartering, so that we would wind up with, say, 25 pounds of material that would pass a 4-mesh, or, better still, an 8-mesh screen, and sending this 25 pounds to the assay office to be assayed.

Particularly in taking surface samples where the ore has not been shattered by blasting it would be well to jar up the surface by a row of holes 18 inches to 2 feet deep, followed by the taking of a fairly large sample, say one hundred pounds for each five feet of sampling, but let there be no relaxing in the painstaking care of the sampling because of that 100 pounds instead of 10 pounds.

Frequent samples taken in this way will give a very reliable idea of the true values. A few samples, no matter how they are taken or of what size, cannot represent truly the erratic ore bodies in Porcupine.

Personally, I should have very much the greater preference for a system of sampling that "quartered down" every round of muck as it was brought to surface. The extra cost of doing this, that is, the cost above added to the cost of the underground workings, would be small in comparison and the results would be something to swear by. The bucket could discharge over a splitting board, one-half could go direct in a car to the dump, the other half could be broken up with hammers and cut down on sheet steel plates.

Porcupine ores will be new for many assayers. Their final sample should be much larger than usual, they must be keenly alert for metallics, they should crush their final sample through 150-mesh, certainly through 120. They should not work with less than one assay ton and should make their assays in duplicate and triplicate. They should also take duplicate samples of the sample brought to them to check their own methods of quartering and care of metallics. The bucking board must be a good one, free from holes, and the man who bucks the samples will need especial training and overseeing. There are more errors made in breaking down samples than in assaying.

Given proper care and these common-sense precautions, reliable results can be obtained and the only added value of the mill test will be a psychological ore. But there is nothing that will obviate the necessity of skilful care if the results are to be reliable, and skilful care means the expenditure of money, much more money than one is accustomed to see spent on such apparently simple things as sampling and assaying. If the sampling and assaying are not done with elaborate care, costing money, the result will be a poor guide; it will be worse, it will misguide. Mill-tests and long-distance shipments of big samples cost money. My idea of the situation is that money spent on proper sampling and assaying will give very much more information in regard to the values of the ore bodies than the same money spent on mill-tests, but to attempt to sample and assay Porcupine ores in a casual way would be a travesty on scientific methods and on horse-sense.

SOME NOTES ON THE PHILOSOPHY OF SAMPLING.

By H. E. T. Haultain.

III.

A sample is a part to show the quality of the whole. Sampling is the obtaining of that part. In mining work we have the sampling of ore in place, and the sampling of broken ore. The sampling of an ore body, i. e., ore in place, is an art requiring knowledge, experience, skill, and the exercise of relentless care; the best method of procedure varies with the local conditions. The sampling of broken ore is largely a matter of procedure so simple as to be termed mechanical, or else is entirely the work of machinery. It is impossible to eliminate skill from the sampling of ore in place, if the result is to be reliable. The greater the experience and skill of the sampler the more reliable will be the result. On the other hand with the sampling of broken ore, the more that skill is eliminated, and the more mechanical and fool-proof the procedure, provided it is on correct lines, the more reliable will be the result. The reason for this is that the sampling of a body of ore in place is an imperfect method at its best, because only a small part of the ore can be seen and handled, whereas with broken ore the entire quantity can be passed through the process or apparatus. The result of sampling ore in place is an approximation and the skill and experience of the sampler is called into play, first in the obtaining of the samples, and, secondly, in interpreting the results. The sampling of a body of ore in place results in a series of samples, probably of very different value, no one of which may represent the average value of the ore, but which when taken together and properly interpreted will result in a reliable estimate. The sampling of a quantity of broken ore may result in one small sample which is so close and sure an approximation that it will represent the total quantity as accurately as our modern sensitive scales will weigh it. But this small sample will consist of a very large number of pieces or particles of ore, no one of which may represent the average value of the lot, some of which may be many thousands of times as rich as others, but when

taken together (without further interpretation) will accurately represent the original quantity. (The series of samples which represent the body of ore in place may be considered as having a similarity to the particles of ore which go to make up the final sample of a quantity of broken ore.)

The Sampling of Broken Ore.

What is the first essential feature required in the result of the sampling of a quantity of broken ore? Surely the answer is accuracy, and the second feature, fully as important as the first, is that we should know that the result is accurate. There is little use in the result being accurate if we have our doubts about it.

To assure accuracy we must have impartiality of motive in the man and impartiality of method in the procedure. Many think that it is only necessary to have impartiality of motive and will consider a grab sample taken with eyes shut a fair sample. They will say that if you tear a sheet of paper into a score of scraps and throw these into the air over the pile of broken ore then pieces of ore taken where each scrap of paper fell will constitute a fair sample. This eliminates the partiality of motive, but the method is still partial in that it takes samples only from the surface, or perhaps from only a small area of the surface, of the pile. Others will tell you that a large sample is a fair sample and the only fair sample, that there is some special virtue in a two-ton sample sent through a "mill-test." With the value of the "mill-test" I have dealt in a previous article.* The value of the large sample depends on the way it is taken, just as does the small sample. There may be a partiality of method which will completely upset the accuracy of the large sample, and it is generally much easier to protect the small sample from salting than the large sample.

But impartiality of motive and impartiality of method alone are not sufficient to insure an accurate sample; one thing more is necessary. The sample must contain a sufficiently large number of separate particles. If we had 900 one-ounce pieces of quartz and 100 one-ounce pieces of galena mixed together we should have a mixture containing 10 per cent. galena. If the pieces were uniform in weight, then nine pieces of quartz and one piece of galena would be a representative sample of the lot. Fewer than ten one-ounce pieces could not possibly be a representative sample. Nor would there be much chance of getting one and only one piece of galena in a sample of ten pieces by any method of cutting down, no matter how impartial our motives and our methods might be. This extreme care emphasizes the fact that chance or probability plays a large part in sampling, but other things being equal chance evens up in the long run. We must not only have at least ten pieces in our final sample to permit of the mathematical possibility of its representing the 10 per cent. mixture, but we must have a very much larger number to even up the chances no matter how impartial our methods. How many pieces should constitute a minimum sample is not easy to define even by higher mathematics, but it is not difficult to err on the right side if we take the precaution to crush the samples before cutting. One pound of ore crushed to pass a 30-mesh screen will contain many millions of separate particles, and with all ordinary ores, if this is halved by any reasonably impartial method the chances will even up so completely that the most careful assay cannot detect a difference in the value of the two halves. But should the ore contain particles of gold so large that they will barely pass the 30-mesh we have an extreme case calling for special treatment. The assayer recognizes this and where metallics are present screens them out and treats them separately. In a $20-ore one particle of gold in the sample will call for an equivalent of 30,000 particles of barren quartz, each weighing as much as the gold particle, or of more than 200,000 particles of similar size. For this reason the assayer should use a finer screen for gold ores than for other kinds and should watch most carefully for metallics.

In finely crushed gold ores the value of individual particles will vary from nothing up to $600,000 per ton. In coarse particles the values will not run so high, consequently it is not necessary to have so many particles in the large sample of coarsely-crushed ore as in the small sample of finely-crushed ore.

To sum up: Experience based on the work connected with the sale of many millions of tons of gold-bearing ores shows that a car load of ore may be truly represented by a small sample. Where no metallics are present three ounces of 120-mesh material may truly represent the carload of 50 tons.

To get this result impartiality of motive, impartiality of method and sufficiently fine crushing is all that is necessary. The process is generally a series of halvings of the ore, one-half being rejected and the other half again halved and so on. As the sample is reduced in quantity the individual particles are reduced in size by repeated crushings. In regard to the fineness of crushing Richards gives this table:

Size, Inches Cube or Mesh.	Weight of Sample, Pounds.
2 inch	10,000
1 inch	2,000
½ inch	400
¼ inch	200
⅛ inch	75
10 mesh	25
50 mesh	1

Where metallics are present the limiting size of the sample depends upon the coarseness of the metallic particles. In the extreme case of some of the Cobalt ores the metallics are removed before the first cut in the car load is made, and this may be necessary in some phenomenal nuggetty gold ores.

But with the majority of gold ores it is not necessary to attempt to separate the metallics until the sample is reduced to one pound in weight. The criterion is not mathematical deduction, but practical experiment.

If our methods have been correct and yet duplicate samples fail to check sufficiently closely the remedy lies in larger final samples, but it would be a phenomenal gold ore, indeed, of which a car load could not be represented by a few pounds.

Sampling Ore in Place.

In sampling a body of ore blocked out in a mine at best we have only access to certain "faces," the "sides" (more truly edges) of a block of ore exposed by shafts, tunnels, etc. We may be able to see four sides or edges of the block and our ordinary sampling methods with moil and hammer may then perhaps reach as much as 2 per cent. of the ore and the value of the 98 per cent. unseen must be based on the results obtained by sampling the 2 per cent. No rules will govern here. The peculiarities of the ore body must be interpreted by the judgment and experience of the man. In regard to the sampling of the exposed faces, however, the underlying philosophy is similar to that of sampling broken ore.

---

*CANADIAN MINING JOURNAL, Jan. 1st, 1909.

Theoretically the surest way would be to take a slice of uniform thickness from all the exposed face and pass it through the procedure for sampling broken ore. This would give us an entirely true result as far as the average value of the whole face was concerned, but if the face were of varying width and varying value it would still leave us ignorant concerning these variations of value and it is largely on the proper interpretation of these variations that we base our estimate of the unseen ore. If we cut up our slice along the exposed face into sections and sample each section separately, we get information concerning the variations and the shorter the length of each section, within reasonable limits, the more complete our information. Sometimes this can be done, for example, by sampling each round of muck as it comes from shaft or tunnel, otherwise it very seldom is practicable. As a substitute the next best course is to take out small short sections at intervals, and in practice this comes down to cutting a "channel" with hammer and moil. In this we get very far away from the simple, fool-proof procedure of sampling broken ore. The dangers resulting from partiality of motive and partiality of method are seriously magnified. There can be and often is wholly unconscious partiality of motive. A mine foreman knowing his ore intimately and deeply interested in his mine can rarely take impartial samples. Impartiality of method is assailed by the varying degrees of hardness or brittleness of the ore, and less consciously but perhaps more dangerously by sudden variations in apparent value. This sampling of ore faces by hammer and anvil (which is certainly the best method as well as the standard method) calls for experience, sound judgment, skill, care, patience, persistence, more than any other operation that falls to the lot of the engineer. Given all these, given complete impartiality of motive and of method, our final result must be gauged by the weight of the chance. Just as a few particles cannot safely make a representative sample of a lot of broken ore, so a very few sections of an ore face cannot safely represent the whole ore face. I think we can sanely say that one sample taken across a small section of an ore face by itself means nothing. It is only in association with others that it has its value. One sample may be very far from the average value, each sample is probably more or less so, but in many samples the "chances even up" and our average will be more surely correct the more frequent the sampling. This, then, is the mechanical side of the question, as it was with sampling broken ore. There must be many samples of a face, as there must be many particles in the sample of broken ore. But in sampling broken ore we erred easily on the safe side by sufficient crushing. In sampling ore in place we can never get too many samplings. On the same line of reasoning our individual samplings should not be too small. With very evenly valued, disseminated ore small samples may be all right, but the more the ore is spotty the larger should be the sample and also the more frequent.

Increasing the size of the sample is only to be used as an added guard. Many seem to think that the large sample in itself carries the evidence of impartiality.

It is probably the reverse. The large sample may suffer from partiality of method through an excess of the more easily broken part of the ore, or from partiality of motive from being taken by blasting from a richer (or poorer) part of the ore body. There may easily be specimen car loads as well as hand specimens. *Frequency of sampling is of much greater importance than increase in the size of the sample.*

In conclusion, there is no royal road to the sampling of ore in place, as there is no mechanical road. Impartiality of motive and of method are the first essentials but to these must be added all the human attributes included in experience, skill and care, and to all this must be added frequency of sampling to appease the Goddess of Chance. The one exception to this, the only approach to the mechanical and the fool-proof, is to sample by suitable halving methods all the muck as it comes from each round blasted in shaft or tunnel or cross-cut.

THE AMENDMENT TO THE CRIMINAL CODE.

Following is the text of recent amendment to the Criminal Code. It relates to ore-stealing:—

An Act to Amend the Criminal Code.

(Assented to 4th May, 1910.)

His Majesty, by and with the advice and consent of the Senate and House of Commons of Canada, enacts as follows:—

1. The Criminal Code, chapter 146 of the Revised Statutes, 1906, is amended by inserting the following section immediately after section 424:—

"424a. Everyone is guilty of an indictable offence and liable to two years' imprisonment who, having in his possession, or upon his premises, with his knowledge, any rock, ore, mineral, stone, or quartz of a value of not less than twenty-five cents per pound, or in the case of mica of a value not less than seven cents per pound, or any partly melted, partly treated or partly manufactured gold or silver which there is reasonable ground to suspect has been dealt with contrary to the provisions of paragraph (b) or (c) of section 424, is unable or refuses to account satisfactorily for or prove his right to the possession of the same.

"2. If in any proceeding under this section any question arises as to the value of any rock, ore, mineral, stone or quartz, the judge, magistrate, justice or other officer before whom the proceeding is pending may order such assay or assays, test or tests, to be made as may be deemed requisite for determining such value.

"3. No action or prosecution for a violation of this section shall be commenced or undertaken in any part of Canada unless or until an order has been passed by the Governor in Council declaring this section to be in force in such part of Canada. Any such order may be amended, revoked or renewed from time to time in whole or in part by any subsequent order in council.

"4. No prosecution shall be had under this section unless it had been initiated on the information or complaint of a manager or director of a mining company or on the information or complaint of some one thereunto authorized by a mining company or a manager or director thereof, or by or with the authority of the attorney-general of the province in which the offence is alleged to have been committed, or by the owner or part owner of a mine who deposes under oath that he believes that rock, ore, or other substance similar to some of those mentioned in this section has been stolen or wrongfully taken from the mine."

The use of steel square timber sets is estimated to reduce the timber cost per ton of coal mined in certain anthracite regions from 7.7 cents to 5.7 cents per ton.

THE PORCUPINE GOLD AREA.

By W. E. H. Carter.

Having heard many favourable reports of this recently-opened-up district the writer determined to see for himself what the new discoveries of gold amounted to. The trip was made about the middle of May and nearly two weeks were spent in looking over the properties on which the most important finds to date had been made. I am glad to be able to say that the showings of gold-bearing quartz on some of these properties justify the earlier information given out, and promise to develop into important paying mines.



Crossing Bar at Mouth of Frederickhouse River.



Shuniah Hotel, Pottsville.



Crossing Frederickhouse Lake.



Vein on Dome.

Several articles have already appeared in the Canadian Mining Journal on this new mining camp, which give some information of the geology of the area and the veins, the topography and general character of the surface, and also of the routes by which access is gained, so that there is little left to note in these connections.

With regard to the geology it is of interest to know that Dr. W. G. Miller, Provincial Geologist, is now on the spot with three parties, all of them actively engaged gathering data for a geological map of the townships of Whitney and Tisdale, in which the most important finds of gold have been made, and of probably a portion of the country adjacent round about these. It is hoped to have this information ready for distribution before the first of August, and it will be of value in clearing up much of surmise as to character and relation of the rocks and veins of the area.

In hilly, rocky countries the casual traveller or prospector might easily form some correct conclusions for himself, but not so here where the surface of the land is flat and for the most part covered with clay and sand with a top dressing of wet swamp and dense spruce forest. The rock exposures throughout are widely scattered and then usually only low ridges of quite limited area well covered with moss and timber.

When the first general survey of this country was made by the writer for the Provincial Bureau of Mines in 1898, exploration was confined to the rivers and lakes and the country for a mile or so back therefrom

on either side, from the height of land at Night Hawk Lake and Porcupine Lake to tide-water at James Bay and, although all these creeks and lakes that are now the scene of mining activity were then surveyed and mapped, so few rocks were observed (all apparently of Huronian Age) that the whole area from this point north for a good many miles, was considered as belonging to that geological period. With the present more detailed examination by prospecting, it appears that while there are large areas of Huronian in the shape of dark greywacke schist, the Keewatin green schists are



Vein on one of the Dome Claims.

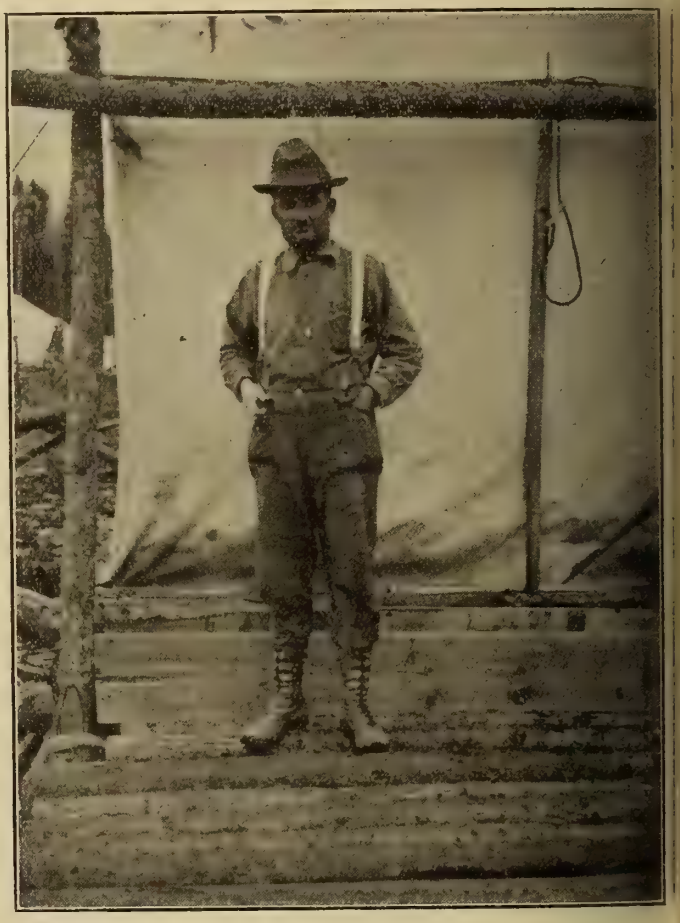


Typical Outcrop on low wet Ground.

also well represented. These two appear the most frequently and contain the present important veins. Other reported rocks consist of quartzites, some basic eruptives and conglomerate.

The veins are lenticular in character and irregular in width. In one case the quartz covers an area of approximately 100 feet by 100 feet, with some country rock intermixed, but this is exceptionally large. Most of them range from 5 to 10 feet, with occasional still greater expansions. The few that have been stripped for any length maintain, generally, a uniform strike for that distance, over 500 feet in one case and 300 feet in many others. There does not appear to be any one favoured direction nor do they necessarily run with the formation.

The veins are of solid white and, in a few cases, blue quartz and are ideally free milling. The quartz itself contains only a very small proportion of metallic sulphides, probably under 1 per cent. and that mainly iron pyrites, but also specks of galena, blende and chalcopyrite. It is tough to drill, but crushes readily. The walls close to the vein and also the inclusions of the same country rock in the quartz between the walls are on the other hand very highly mineralized with iron pyrites in crystal form, and as much of this will have to be milled with the quartz, the percentage of sulphides will be thereby somewhat increased. No weathering and oxidation has taken place beyond a few inches to a foot below the surface in the veins.



Wilson, Discoverer of the Dome.

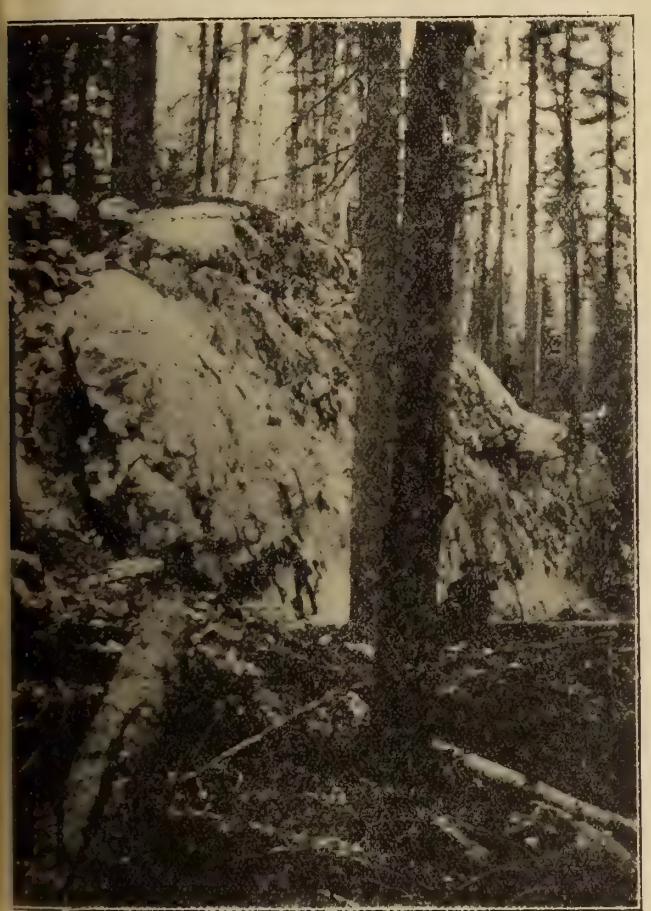
The first important discovery of gold is said to have been made in the southern portion of the township of Tisdale on the Wilson-Edwards claims, or, as they are now called, the Dome Mines. This was quickly followed by others in the same neighbourhood. The time was about the middle of last summer, and the rush of prospectors which followed has resulted since in the complete staking of the country for a number of miles in every direction. These same pioneers are now migrating still farther west beyond the Mattagami River, which lies a short distance to the west of Tisdale Township. Naturally, considering the distance from source of supplies and the long winter, but little development work has been as yet accomplished on any of the claims, and not until the end of the summer or later, with active stripping and other mining operations, will it be possible to form an idea of the extent of the pay ore

ea in the countless claims outlying the best finds of t day.

The most striking feature of the field is the great mber of quartz veins being found. Almost every day ring the spring months new ones were uncovered, t only on hitherto untouched claims, but on those der active development, where already many had en laid bare. One wonders where it will end. Ordirily such a condition of affairs causes fear that the ld will be found too widely distributed in small quanies and, consequently, insufficiently concentrated in y one vein or group of veins to produce pay ore. Such s been the history of more than one gold-bearing field Ontario.

tions in the best of the veins. This remains to be determined in the course of development by systematic sampling and assaying, little of which had as yet been undertaken.

On this particular group of claims a shaft was being sunk, then 60 feet deep, across the whole width of about 15 feet of the vein. Judging from the dump rock therefrom the quartz is remarkably rich, possibly $200 per ton for the whole dump. Say, however, that it only averages $100 per ton, the three hundred tons or so now in the pile represent $30,000. If this can be repeated for even a short distance of vein at the same depth the values mount up into extraordinary figures. Adding to this the fact that there are, with almost no explorat-



Another View of Outcrop on Timmins' Claims.



Trenching in Swampy Country. (Foley-O'Brien lease.)

However, this time there appears little doubt that the ception has been found. There is a group of claims ar the southwest corner of Tisdale township which robably hold the record in the camp for number of ins at short distances apart, and in every one of them ld can readily be seen in many places. Knowing the ld areas of Ontario so well, where it has been typical find large scattered nuggets of gold, and then rough the remainder of the vein practically nothing, was of particular interest to be unable to find, here anywhere in the camp, such specimens. On the conary the gold is finely disseminated, even in the richest mples. This is the most encouraging feature of the ins, for it indicates the likelihood of a better distrition of values throughout the quartz in those places here none can be seen.

Doubtless there will be pay shoots and barren portory work done, a dozen or more quartz outcroppings on various other parts of the property, some of which have equally good surface showings, one may arrive at some conception of the possibilities. The veins were never less than 2 or 3 feet wide, and from that up to 15 and 20 feet, roughly averaging, as then uncovered, probably 6 to 8 feet wide.

Without as yet actually knowing the gold content of these several veins it is not likely that as mined they will average any such figure as that of the ore from the above mentioned shaft. But with such apparent quantity a much less average value per ton will suffice to make of them a most profitable mine.

There are several other properties, usually in each case a group of claims on which it has not been so easy to strip the surface and, therefore, less is known about them as yet. Much the same conditions prevail on all

of these, however, as regards number of veins, but as to the quantity of gold they contain not so much is as yet known.

From what was seen it is not too much to expect that the area will produce several paying gold properties, one of which, at least, will be remarkable for the amount of gold taken out.

These better properties have not been acquired by the present owners, or optionees, for a song. Far from it Prices paid were abnormally high. In almost any other field they would be considered not only prohibitive, but absurd. Most of the claims with showings of auriferous quartz not yet sold are held at such high prices (considering that practically nothing in the way of prospecting and development has been done on them) that investors have held back and will no doubt continue to do so until they can see a chance for their money.



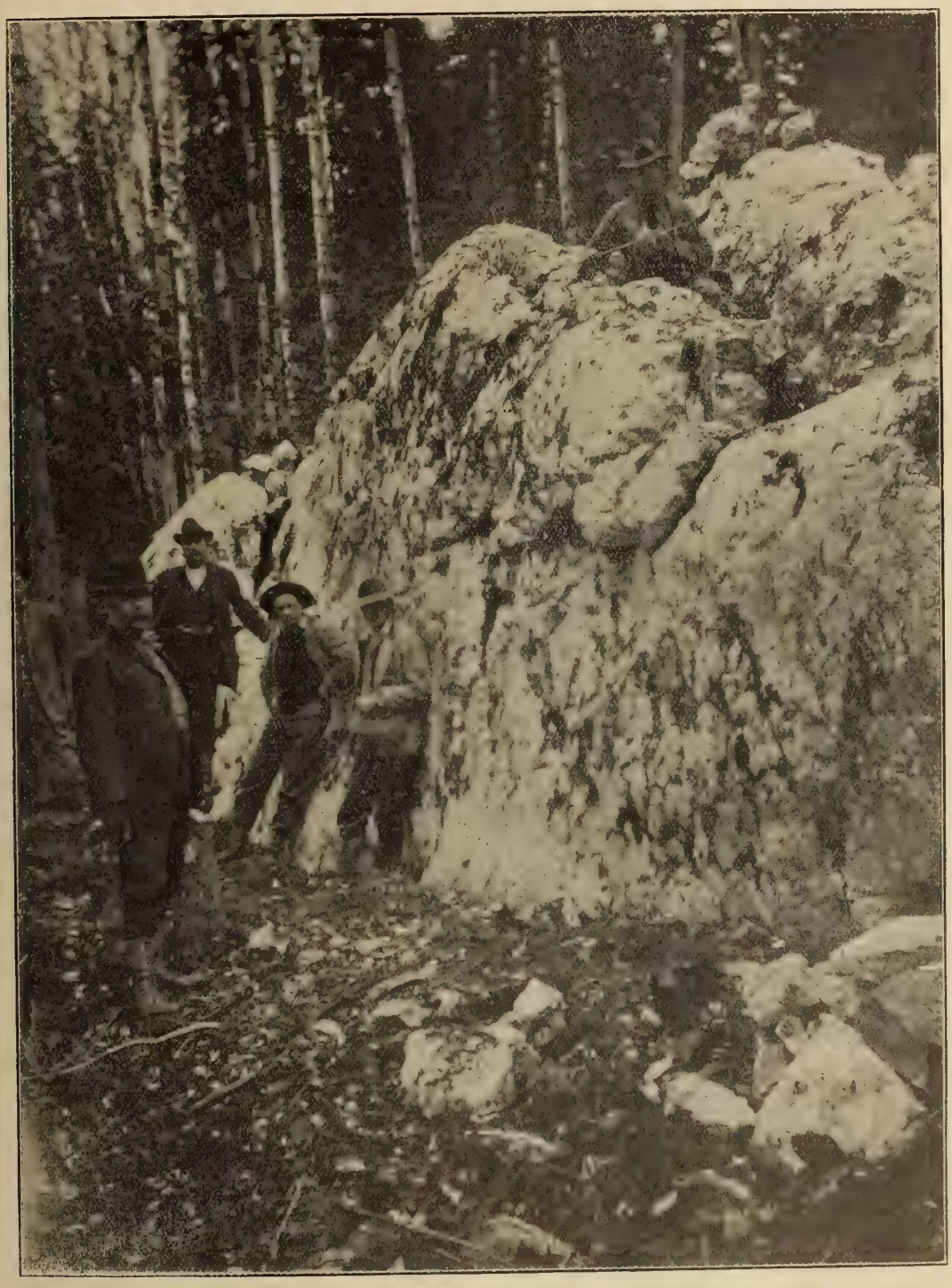
Vein on Porcupine Gold Mining Company's Property. (Flynn's Option.)

The best showings to date are confined to the southern half of the township of Tisdale with an extension into the northeast quarter. There were reports of finds of gold in the outlying areas, but no work of account had been done on them.

In justification of the high price the prospector or other owner asks a comparatively small sum down will

ıne to work, but the latter is generally insufficient. It difficult to get in supplies and men and requires more me and money for this rush development than in more ccessible regions.

The high prices paid in the silver camps to the south ave without doubt upset all idea of reasonable values investors from visiting the camp, and for the same reason the public has not yet realized its importance. On the whole this is not a bad condition. The trip to-day is very hard for one not accustomed to the bush, as he must walk more than twenty miles, half of which is through swampy country on a winter road. If the



An Outcrop on Timmins' Claims.

ınd terms. As a result the public have stood away to a serious extent. This fact the claim owners have not as yet realized. They may too late. It is better to make sure of a reasonable sum, particularly when the buyer is expected to make all the discoveries and assume all the chances, than to hold out for a fortune and lose all.

The difficulty of access to it has kept many possible rumoured line of transportation in from Bisco on the C. P. R. via the Mattagami River materializes as outlined, one will be able to reach the camp by steamers and over portages by automobile. It would be well worth the trip to enjoy the scenery along this route.

The present route is from Kelso on the T. & N. O. Railway, past Frederickhouse Lake and Night Hawk

Lake, about twenty miles of walking and fifteen by gasoline launch. The trip is made in a day, with arrangements for the passenger already well organized. Not so, however, for freight, which it is very difficult to get in at all, and then at a cost of $6.00 per hundred from steel to Porcupine. Some improvement in this may, however, be expected as the summer progresses.

camps to the south. Miners receive $2.75 to $3.00 p day, with 25 cents per day added for shaft work; hel ers about 25 cents less, and surface men $2.50, all cle The demand was greater than the supply at the ti of my visit, particularly for foreign labour which is t most suitable for trenching operations.

A kind of telephone line has been strung on tre



Timmins' Shaft. Outcrop on extreme left looks like Dump.

Towards the end of May there were about 500 men at work for the larger outfits. In addition probably half that number were scattered throughout the area doing assessment work. Prospectors were arriving in considerable numbers every day, the majority travelling to newer fields in the neighbourhood of the Mattagami River and west.

Higher wages are paid here than in the more settled from Matheson in to Porcupine and continues to a fe of the mines. Occasionally it gets out of order, bu messages may be sent right through with a fair certai ty of their arriving without much delay.

A bi-weekly mail service takes letters only, but a improvement is expected shortly whereby all classes c mail will be carried more regularly and more frequen ly.

OUR EUROPEAN LETTER.

RUBBER AND OIL DISTRACT INVESTORS' ATTENTION FROM MINES. THE TROUBLES OF MAIKOP. NEW TRINIDAD AND CANADIAN OIL FLOTATIONS IN LONDON. THE CUMBERLAND MINING DISASTER. COAL DUST EXPLOSIONS AND IGNITION BY ELECTRIC FLASHES. EARTHED VERSUS INSULATED NEUTRALS IN COLLIERY INSTALLATIONS. SOUTH WALES COLLIERIES UNITING. BIG ENGLISH TIN MINE SHAFT. PURE AIR FOR RAND WORKERS.

Exclusive correspondence to the "Canadian Mining Journal.

London, May 18th, 1910.

Mining shares on the London Stock Exchange continue to rank as second favourites to rubber and oil. Despite this reports from the mining fields speak o progress almost everywhere. The Rand, helped by in creasing labour supplies, has maintained its phenomen al prosperity. One giant company, for example, Ran Mines, has paid its shareholders a total dividend of 35 per cent. for last year. Many new stamps are to star crushing during the next few months. Sensational dis coveries of great promise continue to be made in Rho desia. In West Africa developments are favourable i the extreme, and there are very far from being an signs of waning prosperity in Australia.

Still the attention of the investor is for the momen given elsewhere although in connection with the Mai kop oilfield the market shows some signs of sufferin from the absence of any definite news of an encourag ing character. Six months ago a spouter was tapped which gave out such a quantity of oil that it becam

necessary to stop the flow in order to prevent the surrounding area from being devastated. Even as it was, the rivers in the district were polluted and a large quantity of fish destroyed.

The present difficulty is not to discover other similar deposits but to avoid any step which would bring about a repetition of last year's experience. In other words, a good many spouters could be tapped at very short notice if required, but preparations for storing the oil are not yet complete.

The damage wrought by the spouter already referred to, was a very serious matter for the owners, as the Russian Government came down upon them for compensation, and I understand that the original proprietors of the property were ruined as a consequence. It may be taken, therefore, that the absence of any news regarding further discoveries of oil is due not to the inability of the officials at Maikop to announce further discoveries, but is attributable to the necessity of first of all installing a sufficient storage plant to cope with the supply.

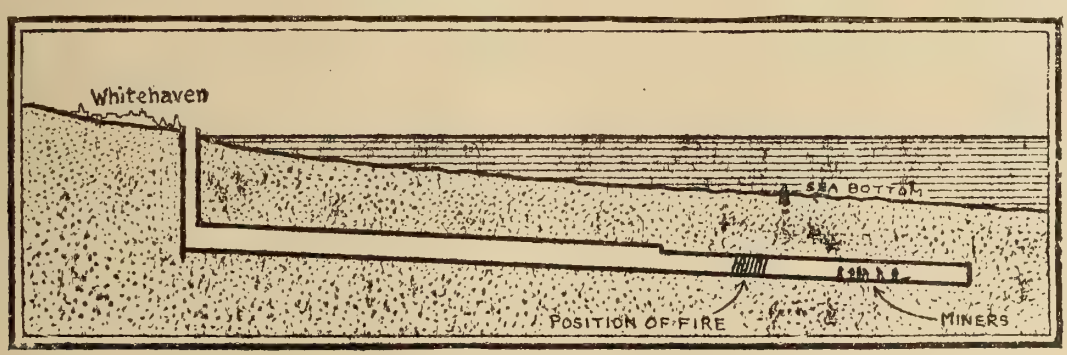
At present the only storage accommodation afforded those companies which have already tapped spouters, is that of the ambaars, or uncovered pits. Now, under Russian mining law, the storage of large quantities of oil in this way is absolutely illegal. Thus, pending the completion of iron reservoirs—the only comparatively safe means of storing oil—the companies which have achieved the preliminary success of finding oil are compelled to keep their wells capped. For the present actual production is limited to one company—the Black Sea Oilfields, which is getting all the oil it requires for the purposes of its local refinery from a small 2-inch pipe tapping No. 2 well, which is, of course, capped.

Meanwhile, it must not be assumed that work at Maikop is at a standstill. Boring operations are proceeding at an energetic pace, and I understand that by the end of the year the number of wells on the field will be not less than eighty. By that time, if not before, the establishment of iron reservoirs will be well advanced, and the first pipe line—that connecting the field with the railway which communicates with Touapse Port, will be laid. Thus, within, say, another nine months, Maikop should have begun to settle down in earnest as a big oil-producing district, and for geographical reasons, if for no other, it is not unlikely to beat Baku as an exporter, though the older field will still, probably, remain the chief supplier of oil to the native consumer.

As regards the Trinidad field, a district to which several recent flotations have directed attention, documents exist which appear to indicate that the deposits are of exceptional value as regards both quantity and quality. The oil is of several grades—that is to say, here is a large deposit suitable for fuel purposes and others of lighter quality. Some of the largest oil consumers in the world are making business arrangements in connection with the Trinidad field, and the outlook for companies operating or about to operate in this district is regarded with every confidence by those concerned. The present set-back in the share market is not taken seriously, but merely as a temporary matter, attributable to the excessive activity recently noticeable, and a recovery is anticipated before very long. Several important propositions have still to make their appearance, and may be expected during the next few weeks.

Canada also has made her appearance with several oil companies, the biggest being the Canadian Oil Producing & Refining Company, which has a total authorized capital of $625,000, and has been formed to acquire oil lands at Petrolia, Ontario, and elsewhere. It has emphasized its claims as "an oil-producing company with ample plant in the British colony—a growing concern."

Although the Cumberland mining disaster was probably due to another cause, it has revived discussion of the subject of coal-dust explosions in mines. It may, therefore, be useful to draw attention to certain facts relating to such explosions. In the first place, the dust must be raised into a cloud before it will explode; when in bulk it is not dangerous. A blown-out shot will, of course, do this, and no doubt under certain conditions the exhaust from air-drills or other mechanical disturbance would be sufficient to stir up a dangerous cloud, and in any case the advance wave preceding the flame of an explosion will stir the dust up. Once stirred up it can be directly ignited by an ordinary naked light as well as by the flame from an explosive.



Also there is good reason to believe that it is possible, although not generally likely, for the dust to be fired by the momentary rise in temperature caused by the passing of an intense sound-wave such as that from a shot. No stone-dust zone would form a barrier against this last. As regards the suppression of coal-dust explosions, isolating with stone-dust is most strongly favoured at present. Watering is perhaps the simplest method, but, apart from health considerations, it is liable in some ground to increase the risks of falls of roof, and these kill eight times as many as coal-dust and gas explosions together. The efficacy of stone-dust isolation seems fairly proved, provided the conditions are right, for it must be remembered that the explosion flame from a coal-dust zone can be projected several hundred feet into the stone-dust zone. In any case isolation only restricts the magnitude of the explosion and does not ensure that those outside the explosion zone shall not be cut off from safety, as at Whitehaven.

A paper by Dr. Thornton and Mr. Bowden on the ignition of coal-dust by electric flashes was read at

Newcastle recently, which is interesting at the present time in view of the fears expressed as to the safety of electricity in coal mines. The experiments showed that dry coal dust in bulk was a non-conductor of electricity, but that when made into a paste with water it was liable to cause a short-circuiting flash if placed between electrodes. If a flash was produced—as by opening a switch—in a cloud of dust an explosion was produced. The character of the dust-cloud and the strength and voltage of the current broken affected the readiness with which the dust ignited, and at medium voltages direct current appeared to be more dangerous than alternating.

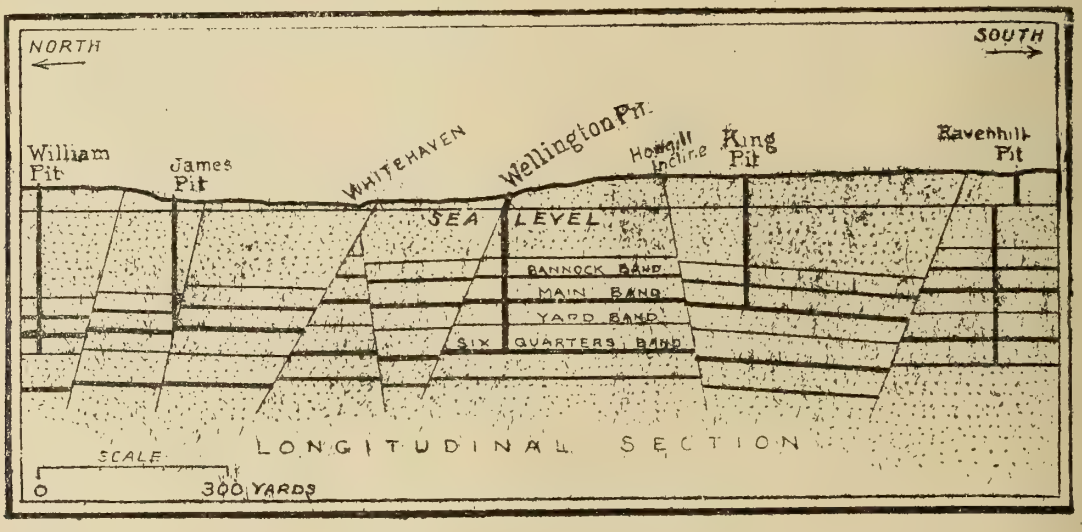
In view of the conclusive experiments on coal-dust explosions produced by the discharge of a cannon, as carried out at Altofts, the results obtained by Messrs. Thornton and Bowden were to be expected. It would, however, be unwise to jump to the conclusion that electricity in mines is a very dangerous thing. It is all a question of the immediate local conditions, and these are rarely such as to encourage an explosion of coal-dust. Indeed, it has been stated that no serious explosion has been produced electrically, and certainly the danger from shock has been much more in evidence. Of course, it is desirable to sift the whole question thoroughly with a view to safety, but the use of electricity in mines promises to do so much to improve conditions for the miners themselves, and also to effect economies in working, that it would be regrettable if ill-considered restrictive regulations were introduced.

Great interest has been aroused by the paper read by Wellesley Wood on "Earthed versus Insulated Neutrals in Colliery Installations." Mr. Wood disclaimed any sympathy with the present scare in regard to the use of electricity in mines, but urged the necessity of considering how accidents could and might occur. He said that the number that actually did occur was extraordinarily small considering the present widespread use of electricity and the insufficient electrical staff employed in many collieries.

His lecture was mainly upon the question whether a three-phase colliery installation should work with an earthed or with an insulated neutral. Not only are there a number of supporters of both systems, but there are also a number of long standing examples of each system at work both on high and medium pressures and with current taken in some cases from a supply company, and in others from their own generating plant.

He summarized the advantages of earthed insulators as follows: (1) Maximum potential to earth of any phase limited to 58 per cent. of line voltage; (2) leakage to earth probably resulted in isolation of the damaged circuit; (3) leakage tripping devices could be used, which switched off the supply when an earth occurred on one phase, reducing danger of shock and explosion. The advantages of the insulated neutral were: (1) Danger of shock and explosion was reduced, as contact with earth and one phase did not complete the circuit; (2) an earth on one phase did not cause an interruption of supply; (3) stress on insulation under normal circumstances was less, and the liability of flashing to metallic casings was considerably reduced; (4) only two-strip coils instead of three, were required to protect each circuit where an automatic switch was installed.

South Wales colliery shares have been strengthening lately and it is generally anticipated that 1910 will show better results than 1909. Numerous rumours are afloat respecting amalgamations of various Welsh coal undertakings. One absorption scheme which has gone through will leave the combined undertaking able to produce about one million tons of coal per annum.



England's famous tin mine—the Dolcoath—has now its new shaft completed. This is 3,000 feet deep, vertical from the surface, is lined throughout its entire length with 9-inch brick, and is 17 feet 9 inches in diameter, inside measurements. It is the finest piece of work of its kind in the west of England.

Pure and invigorating air supply to workers has now become a practically accepted condition of Rand mining. The excellent installation of the East Rand Proprietary Mines has been followed by the adoption of fans at the Cinderella Deep and Village Deep properties. At the Cinderella Deep a Capell fan, an appliance which, among others of various makes, has been known for years in England, was erected during the past year. It has a discharge capacity of 50,000 feet of air per minute, and was adapted to the existing scheme of ventilation by natural means. Since the installation of the artificial ventilation the temperature in the mine has appreciably fallen, and the atmosphere is probably purer than in the case of nine out of every ten outcrop mines along the reef.

The efficiency of both white and native underground employees is said to be exceptionally high, thus indubitably proving that the depth of the mine has no effect on the ability of the men to get through a normal amount of work without undue exertion. Mr. Girdler-Brown, the manager, has, in view of his surroundings, made a particular study of the question of the possibilities of deep level mining, especially since the installation of the ventilating fan, and he is absolutely confident that the probable limit which was put forward a year or two ago, of about 7,000 feet vertical depth, for practicable mining operations, is a good deal short of the mark, and that, with the addition of subsidiary ventilation fans at lower depths, it will be possible to pursue mining operations without abnormal difficulty at a vertical depth of at least 10,000 feet.

RESCUE APPARATUS IN COAL MINES.

(Reprinted from the Weekly Times, Engineering Supplement, May 27th.)

The recent terrible colliery accident at Whitehaven, causing the loss of 136 lives, has drawn attention to the tardy recognition of the necessity for providing breathing apparatus immediately available for rescue work. On this occasion a delay of 30 hours occurred before the arrival of rescue apparatus, and there is reason to believe that, had this been at once available, the fire which followed the explosion might have been reached and extinguished, and many lives saved. It is true that except with a recollection of the fact that the employment of breathing apparatus with a view of saving life after colliery disasters has been hampered by the constantly recurring element of delay, the record of its success up to the present can hardly be looked upon as encouraging. It is manifest, however, that the system has not, on this account, received as yet a fair trial. The success of a rescue party, like that of a fire brigade, depends upon the speed with which the apparatus can be brought to bear upon its object, and the Whitehaven disaster will not have been all of evil if it has the result of converting colliery owners generally to the view that, to be of service, there must be a rescue station within easy reach of, and trained men at, each colliery.

The first report, issued on May 30, 1907, of the Royal Commission on Mines, which was appointed in 1906, dealt exclusively with breathing appliances, and the Commissioners stated that, after fully considering the results of experience in this country and abroad, they were of opinion that the question was ripe for further development, and demanded the serious attention of the industry, though they came to the conclusion that sufficient advance had not up to that time been made in Great Britain to justify a recommendation making the provision of breathing appliances compulsory. Mine owners were, however, urged to take steps toward their introduction.

In their second report, issued in July, 1909, the Commissioners became more emphatic. They said: "We have come to the conclusion that the provision and use of breathing apparatus should be general throughout the country and that every mine should either be provided with a properly trained brigade of its own, which appears to us the best arrangement, or have the right to call for a sufficient number of equipped and trained men from a rescue station." But in spite of this expression of opinion the question is still left entirely to the industry, the State neither requiring the provision of rescue apparatus nor facilitating its introduction at the mines. Still a certain amount has been done. Three central rescue stations have been organized and equipped in Yorkshire at Altofts, Tankersley, and Wath-on-Dearne respectively; one has been provided in Lancashire at Atherton, and one at Newcastle-on-Tyne in connection with Messrs. Armstrong, Whitworth & Company's Elswick works, available for Northumberland and Durham. A scheme has been projected in South Wales to embrace 13 stations, one of which has been erected at Aberaman and another at Crumlin; a central station is to be erected at Cowdenbeath for the Fifeshire and Clackmannan coalfields; and a central station is being organized in conjunction with the experimental mine at Birmingham University. The expenses of these stations are borne entirely by the coal owners, without any assistance from the State. The Home Office, however, has arranged for a conference with colliery owners next month, with the object of seeing how ambulance work and rescue appliances can be improved and systematized.

That greater progress has been made in some foreign countries is indicated by a summary of the situation by Mr. Henry Briggs, which appears in the "Colliery Managers' Pocket-book" for 1910, and gives particulars of the attitude assumed by the various Governments in regard to the provision of breathing apparatus.

In the United States of America it appears that the subject has been taken up, officially by the Mine Accidents Division of the Technology Branch of the United States Geological Survey, four stations having been erected, while nine others are contemplated, and privately by large corporations, as the Frick Coke Company and others. Compulsory legislation is in the hands of the individual States, but no general movement towards it appears to have been made. In Canada no compulsory legislation has been passed. The Dominion Coal Company has established a large and successful station.

In Germany the utility of breathing appliances is widely recognized. In the Dortmund district over 690 and in the Breslau district 673 sets were ready for use at the beginning of 1908. In the inspection district of Breslau, Upper Silesia, by a regulation dated January 18, 1900, at least two apparatus must be provided for every mine working true coal or lignite, the Government engineer being empowered to order an increase in the number if need be, while the managements of the mines are made responsible for the upkeep of the apparatus, and are also obliged to see that a sufficient number (not specified) of trained miners are always available to use it. In the inspection district of Bonn, Saarbrucken, and Aix-la-Chapelle, by a regulation dated May 1, 1907, two apparatus have to be provided for every mine working, and must be kept at the mine, or at a station from which they are quickly available; while the managements are again held responsible for their upkeep. In Alsace-Lorraine similar instructions were issued in May, 1905. In the Kingdom of Saxony, by a regulation made in January, 1901, breathing apparatus and electric lamps (no number specified) must be kept at all collieries. Several neighbouring mines may affiliate, under the approval of the administration, to form a central station wherein to keep the apparatus.

In Austria, the regulations, made in June, 1908, for the Brux district of Bohemia, require respiratory apparatus to be provided at every mine, and to be kept in good order in a depot in the immediate vicinity of the pits. Only the Draeger, Meyer (Westphalia), Giersberg (new type), and Pneumatogen apparatus are permitted, though apparatus of new design, or improvements on old designs, can be used on authorization being obtained from the head mining office of the district (Berghauptmann-

schaft.) Permitted apparatus are divided into two classes. Those of Class I. must allow of work being accomplished with them for a period of one and a half hours; those of Class II. for at least one hour. Precise regulations are issued fixing the number of apparatus and accessories which must be maintained in working order in different classes of mines and also detailing the equipment of the rescue stations and the organization of the men who are to use the appliances.

In France, since April, 1907, it is obligatory to provide breathing apparatus at all mines which employ more than 100 persons underground in the largest shift. In gassy mines which are in connection with a central rescue station the number of appliances at each mine may be reduced to two; otherwise the number must be at least two for the first 200 underground workmen on the largest shift, plus one for every 200 men above the first 200. No mine, however, is required to keep more than six appliances. In each non-gassy mine two apparatus have to be provided. The number of appliances at a central station is determined on the same system, having regard to the largest pit of the group, providing that there be not less than one apparatus per 1,000 underground workmen in all the affiliated mines; but no station need contain more than 20 sets. The central station must be able to furnish at least ten trained rescuers, or as many rescuers as there are apparatus in the station. The apparatus at the mines must be kept in depots within easy reach, and under the charge of authorized persons; and the number of trained rescuers in connection with each depot must be at least double that of the apparatus kept there, and must never be less than eight. They should be distributed as equally as possible among the shifts, and live as near as possible to the mine, and at least one-quarter of all underground employees should b eable to use breathing apparatus to assist the trained rescuers.

In Belgium, since June, 1908, rescue depots have to be provided at all collieries classed in the second or third class of fiery mines, the number of appliances in each depot being one for every 200 underground emplooyes, providing there are not fewer than five appliances at a depot; but there is no need to provide more than ten at any mine. The apparatus must allow of the wearer stopping at least one and a half hours in an irrespirable atmosphere. Each depot must be provided with the stores necessary to ensure the possibility of keeping all the apparatus therein at work for at least 48 hours. At least four workmen must be trained as rescuers for every apparatus provided, these men to be distributed among the shifts, to live near the mine, and to exercise periodically. The Ministry may authorize the formation of a central rescue station for neighbouring mines. The number of apparatus at such a station must be one for every 200 underground workmen at the affiliated mines, but must never be less than ten, though it never need be more than twenty.

In Holland the number of apparatus to be provided at a mine must be at least 2 per cent. of the number of men in the largest underground shift; 50 per cent. of these apparatus must be of the "diving helmet" type, air being blown in through a tube. The number of trained rescuers is left to the discretion of the owners.

In Russia since March, 1907, a rescue corps has to be provided at every colliery. In every mine affiliated with a central rescue organization the number of rescuers must be at least 4 per cent. of the largest shift. For every four trained rescuers there must be at least one breathing apparatus and one electric lamp, but at each mine there must not be fewer than three complete apparatus. In mines not affiliated with a central statio the number of rescuers comprising a corps is determine in the same way, providing that there are not less than si such men. For every three members at least two breath ing apparatus and two electric lamps must be provided At mines in which there are fewer than 50 men at wor the corps may consist of only three men with two ap paratus and lamps, providing, first, that the inspector' approval is obtained, and, secondly, that such a mine i within 5,250 feet of a mine having a normal sized corps if connected by telephone, or within 3,500 feet, if not s connected.

SAFETY CHAMBERS IN FRENCH MINES.

The use of safety chambers is not very common i French mines. Such chambers consist of galleries, gen erally "blind," the entrances of which are provided wit an air lock and in which is stored compressed air at suc a pressure as to prevent the inflow of deleterious gases

The value of such chambers has just been practicall proved by the Compagnie des Charbonnages of Singles in the centre of France, whose experience seems likel to commend their adoption to other companies which u to the present have been holding back. The works a Singles consist of a main shaft 288 metres deep, fro the bottom of which runs a cross gallery 388 metres long About two-thirds of the distance along this gallery a sec ondary shaft has been sunk to 312 metres. The sinkin was effected by compressed air, and as the working con tained firedamp safety explosives were employed. Th safety chamber was placed at the end of the cross gal lery. Recently, as a result of firing a number of shot in the mine, there was rapid and extensive liberation o carbonic acid, sufficient to fill the two shafts and th gallery. During the time the shots were being fired, th men were ordered to shut themselves up in the safet chamber. Five of them, who did not obey the order were suffocated by the gas and could not be saved, bu the others, who did take refuge in the chamber, remain ed safe and sound.

Such chambers are of value in all mines which are sub ject to sudden outbursts of irrespirable gases, and it may be presumed that, in consequence of this accident at Singles and of the report of the Government inspector, their employment will become more frequent in French mines.

The petroliferous areas of Newfoundland are at tracting much attention. A company, the Newfound land Oil (Parent) Development Syndicate, Limited, has been formed in London, Eng., to acquire and exploit claims aggregating 119,680 acres in extent. The Gov ernment of Newfoundland has more or less pledged itself to exempt such enterprises from payment of im port duties on all necessary plant, material, and ma chinery.

Within the last ten years considerable prospecting has been done in the Silurian schists on the northwest coast. At Parson's Pond oil was struck at 1,200 feet and at 2,160 feet. A considerable quantity was shipped to St. John's. Fuller details will be found in the Canadian Mining Journal for September 15, 1909.

The only available records of shipments of molyb denite from Canada date back to 1902 and 1903. In the former year Mr. John Webber, of Toronto, shipped 6,500 pounds of ore from the township of Laxton, Victoria County, Ont.; and in 1903 Mr. A. Chisholm shipped from Sheffield Township, Addington County, about 85 tons of ore.

PROGRAMME OF THE MINES BRANCH.

The work of the Mines Branch of the Department of Mines for the ensuing season has been arranged as follows:—

The fuel testing plant in Ottawa is to be operated, under the direction of Mr. B. F. Haanel, for the purpose of experimentation and demonstration. A second producer, suitable for lignite and bituminous coal, is to be installed at the plant.

The Government peat bog at Alfred is to be operated for a period of about three months to demonstrate the latest process of manufacturing air dried peat. Several thousand tons will be produced during the present season. Part of the peat fuel produced will be shipped to Ottawa for use in the peat-gas producer plant now installed, and part will be sold in the neighbourhood for domestic use. The operation of the plant at the bog, which is open to public inspection, is under the direction of Mr. A. Anrep. The bog can easily be reached from Caledonia Springs, or from Alfred, on the Canadian Pacific Railway.

A cordial invitation is issued by the Mines Branch of the Department of Mines to all who are interested in the development of a peat fuel industry to visit the fuel testing plant in Ottawa, or the peat plant at Alfred.

The investigation of peat bogs in Canada, to ascertain their extent and to determine the quality and quantity of peat available, will be continued by Mr. A. Anrep, after the operating plant at Alfred is closed down for the season.

The iron ore deposits in the vicinity of Bathurst, N.B., will be investigated and additional magnetic surveys made by Mr. Einar Lindeman. Mr. Lindeman will also visit the magnetic sand areas on the north shore of the St. Lawrence.

The iron ore deposits of the Nictaux-Torbrook basin in Nova Scotia will be surveyed magnetically by Mr. Howells Frechette.

The investigation of the copper resources of Canada will be continued by Dr. A. W. G. Wilson. This season's work will be carried on in Ontario and in the Maritime Provinces.

Commercial processes for utilizing the sulphur content of pyrite ores are to be investigated with the object of preparing a special bulletin on the subject. Pyrite burning is of special importance at the present time with respect both to the sulphite pulp industry and to the preparation of mineral fertilizers. This work is to be undertaken by Dr. A. W. G. Wilson in the autumn.

The investigation of the molybdenum deposits of Canada will be continued by Dr. T. L. Walker for the purpose of completing and publishing a monograph on the subject.

A special report on the building and ornamental stones of Ontario is to be prepared by Dr. Wm. A. Parks. This report is to be the first of a series of monographs on the building materials of Canada.

A second edition of the monograph on mica for which there is a constant demand, is to be prepared by Mr. Hugh de Schmidt.

An ore dressing plant for experimental investigation into methods of concentrating certain iron ores, is to be installed at the testing plant in Ottawa by Mr. G. C. Mackenzie.

Plants where explosives are manufactured and stored in Canada are to be visited by Mr. Joseph G. S. Hudson.

An invitation has been issued through the Home Secretary of Great Britain to Captain A. P. H. Desborough, to visit Canada to consult with the Government with regard to the regulation of the manufacture and storage of explosives and with respect to the establishment of an explosive testing station.

Officers of the Division of Mineral Resources and Statistics will visit mining districts in various parts of the Dominion for the purpose of collecting statistics of mineral production and of securing information of general interest relating to the mining industry, including a record of new and recent developments, and data as to character of ores and products, prices, markets, and demand for various mineral products.

Mr. F. W. Harbord, London, England, is to investigate and report on recently invented processes in Europe for the production of spelter and zinc oxide.

Experts are to be engaged to investigate and experiment for the purpose of attempting to develop a process or processes for the utilization of the zinc ores of Canada in the production of zinc and zinc products in Canada.

A special expert is to be engaged to investigate metallurgical problems of economic importance. The plant of the School of Mines at Kingston has been placed at the service of the Mines Branch for this purpose.

NORTHERN QUEBEC.

The attention of prospectors is being drawn to the northern part of the Province of Quebec, adjacent to the Ontario boundary line. There are present, in this part of the province, important developments of Huronian rocks, such as those in which are found the large ore deposits of Ontario, and it is not unlikely that such finds as have been made in Cobalt, in Porcupine and in Larder Lake, may be duplicated on the Quebec side.

Realizing the importance of critically examining and mapping such areas, the Bureau of Mines of the Province of Quebec is sending a party into the country to the east of Lake Temiskaming, to map out, in great geological detail, parts of the Townships of Fabre, Duhamel and Laverlochêre. At the same time a careful examination will be made of all the workings, prospects and discoveries which have been made in the region. It is the intention to publish maps on a large scale, of one-half and one-quarter mile to the inch, which will be sufficient to show accurately the outline and the outcrops of the rocks. These maps will accompany a report which will have special bearing on the mining economies of the region.

Mr. Robert Harvie will be in charge of the party. Mr. Harvie is a mining geologist who has had several years' experience in the field, and whose training specially fits him for the work with which he has been entrusted. He is a graduate of McGill University and is at present instructor in mineralogy at Harvard University.

The rate of the growth of pig iron production in various leading countries is astounding. In the last forty years Great Britain's annual production has seen an increase of 66 per cent.; that of France has grown 147 per cent.; while the industries of Germany and of the United States have increased 740 per cent. and 830 per cent. respectively. In 1869 the order of producers was: Great Britain, United States, Germany, France.

To-day Great Britain has slipped to third place, and the present order is: United States, Germany, Great Britain, France.

Not less than 80 per cent. of the fluorspar produced is consumed in the manufacture of steel, chiefly in the basic open-hearth branch.

TOOL STEEL DIRECT FROM THE ORE IN AN ELECTRIC FURNACE.

By Alfred Stansfield, D.Sc., Montreal.

(Paper read before the Canadian Mining Institute, Annual Meeting, Toronto, 1910.)

At the Eighth Annual General Meeting of this Institute, which was held in Quebec in 1906, Mr. J. W. Evans, then of Deseronto, gave an interesting account of some laboratory experiments which he had carried out during the previous two years on the production of tool steel directly from the ore in the electric furnace.[1]

Mr. Evans had been obliged to construct with his own hands the 1 1-2 kw. electric generator he used for these experiments—thus proving his ability and determination—while he demonstrated his audacity by basing a large electric furnace industry, in the Provinces of Ontario and Quebec, upon the results of his laboratory tests in which one ounce of ore was smelted at a time to yield a button of steel.

The experiments made at that time showed (1) that from a sulphurous ore, containing 1 per cent. of sulphur, low carbon steels could be obtained having 0.05 per cent. to 0.07 per cent. of carbon and 0.08 per cent. to 0.17 per cent. of sulphur, and (2) that from a titaniferous ore containing 45 per cent. of iron and 7.6 per cent. of titanium a steel could be obtained with less than 1 per cent. of carbon and with the titanium varying from 0 to 1 per cent. The whole of the titanium could readily be removed by using enough lime in the charge, but it was desired to retain some titanium in the steel, on account of its valuable properties, and this could be done by using less lime. Lowering the amount of lime in the charge had, however, the attendant result of causing more silicon to enter the metal; the silicon ranging from 0.05 per cent. to 2.31 per cent. in the steel obtained. Some samples of electric furnace tool steel were shown which had proved satisfactory in small machine tools; they contained one-half per cent. of titanium.

The writer, at the next meeting of the Institute, criticised these experiments on the ground that so small an amount of metal might be more perfectly refined than would be possible in a larger furnace working more continuously, and showed this to be the case, experimentally, in regard to the removal of sulphur from sulphurous ores.[2]

Since the date of his paper, Mr. Evans has been enlarging his electric furnace plant and has directed his experiments mainly to the production of tool steel from magnetite ores containing titanium and traces of vanadium. The writer had the opportunity last summer of inspecting Mr. Evans' plant and assisting in his smelting operations, and considered that an account of these might be of interest to the members of the Institute, although, owing chiefly to Mr. Evans' ill-health, the data now available are by no means as full as could be desired, and this communication can only be regarded as a preliminary note.

Mr. Evans' plant, last September, consisted of a small cylindrical furnace about 18 inches high and 14 inches in diameter, having a pair of lateral electrodes and supplied with electric current at 110 volts from a transformer of about 20 kilowatts capacity. A rheostat was used to regulate the current, and it was necessary to keep the latter below 200 amperes. In general, it was only possible to utilize some 6 or 8 kilowatts in the furnace.

Figure 1 is a section of the furnace and shows the original brick lining, B, eroded by the action of the slag in the furnace, and a lining, L, rammed into the cavity before each operation of the furnace. M is the melted steel in the furnace, S the slag and C the partly reduced but unmelted charge of ore, charcoal and limestone. The electrodes, E, are 1 inch square graphite rods provided with holders for supplying the current and capable of being inclined more or less during the operation of the furnace. The openings through which the electrodes entered were closed as far as possible with an asbestos mixture, and a couple of bricks served as a cover for the furnace.

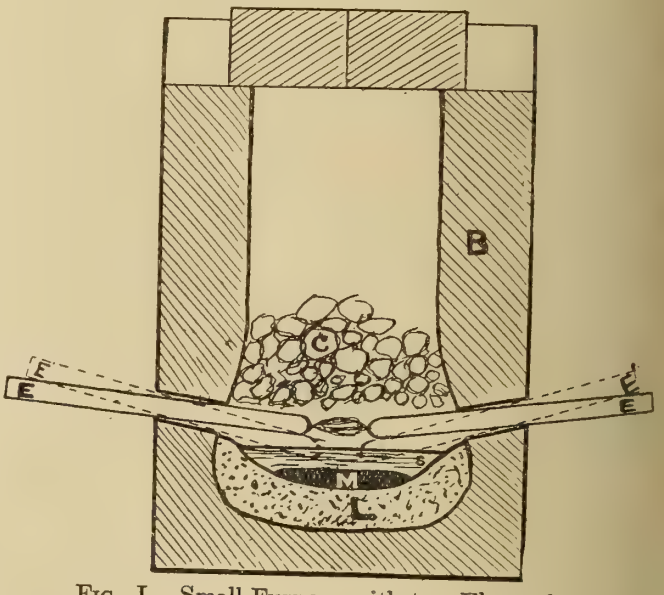


FIG. I. Small Furnace with two Electrodes.

The peculiar feature of the smelting practice in this furnace consists in the way in which the electrodes are manipulated. In the early part of each smelting run an arc is established between them, as in the Stassano furnace, and the heat of the arc is utilized for reducing the iron ore to metal and melting the metal and slag. The electrodes are shown in this position at EE. When the slag has filled up the furnace so as to immerse the ends of the electrodes, or by purposely depressing the electrodes, as shown at E, E, the arc is stopped and the current flows from one electrode to the other through the molten slag and metal. Mr. Evans found the latter method of heating to be more satisfactory and considered it essential for the refining of the steel.

The behaviour of the furnace was somewhat peculiar in this particular:—When running with the arc between the electrodes EE, the resistance was very low, so that the electrodes had to be drawn widely apart and even then a current of 200 amperes was produced with a voltage of only 30 or 40. Immediately the electrodes were dipped into the slag at E, E, and the arc broken, the resistance was increased so that 60 volts only produced a current of 100 amperes or less. This condition was unstable, and there was always the possibility of an arc

forming between the electrodes above the slag, and this would immediately cause a great increase in the current. As the immersion of the electrodes in the slag led to a heavy loss of electrodes, the attempt was made to keep them just above the slag and to maintain a short arc between each electrode and the molten slag. Owing to the high resistance of the slag, this was found to be impossible, but a later type of furnace has been found to work very satisfactorily in this way.

The ore treated was a magnetite from the Orton mine in Hastings County, Ontario, and contained:—

Iron	51.45 per cent.
Sulphur	trace
Titanium	7.50 per cent.
Nickel	0.12 per cent.
Vanadium	trace

For smelting on a small scale it was found desirable to crush the ore, the charcoal used to reduce it and the limestone used as flux. These powders were mixed together, briquetted with the aid of molasses and water and baked before smelting, a typical charge being:—

Ore	100 ounces.
Limestone	20 ounces.
Charcoal	18 ounces.
Molasses	10 ounces.
Water	16 ounces.

Starting with a hot furnace and using between 5 and 6 kilowatts, the operation would be completed within the hour and would produce about 3 pounds of steel.

The steel was tapped from the furnace without any addition of ferro manganese or other deoxidizer and always gave a perfectly sound and tough ingot. Mr. Evans has obtained in this way many ingots of steel, which have proved to be a very good quality of tool steel. Unfortunately at the time of the writer's visit the lining material had become contaminated with a little plaster of Paris, and, in consequence, the steel was found to contain over 0.10 per cent. of sulphur, which impaired its forging quality, though it made good tools. The presence of sulphur in the furnace lining was not discovered until it was too late to obtain a fresh supply. One sample of steel, from which good lathe tools were made, contained:—

Carbon	1.25 p.c.	Phosphorus	0.051 p.c.
Silicon	1.06 p.c.	Titanium	Nil
Sulphur	0.124 p.c.	Vanadium	Nil

Mr. Evans has found that the steel produced by the direct reduction of this titaniferous magnetite in the electric furnace has peculiarly valuable qualities as a tool steel. He attributes these to the titanium and perhaps also to the nickel and vanadium in the ore. Non-titaniferous magnetites, from the Rankin mine, did not yield sound steel when smelted in Mr. Evans' electric furnace.

He has submitted samples of his steel to various steel experts, obtaining very satisfactory reports, and a piece of his steel made into a lathe tool and tested at McGill was found to be decidedly better than the Firth tool steel. The tool was tested just as received from Mr. Evans. It was ground when necessary but not retempered. The tools were usually cut from the ingots—not forged—but a knife has been forged from some of this steel.

In connection with these facts it should be noted that in operating a small furnace it is not practicable to take a sample of the steel from the furnace and make a quick chemical test of it, as would be done with a larger furnace, and that, in consequence, the composition of the steel could not be adjusted in the furnace and the analysis of the resulting steel will not in general be as good as it could easily be made when working on a larger scale. It should also be noted that no ferro-manganese or other additions have been made to any of the steel obtained up to the present. It is, therefore, quite likely that when working on a larger scale, steel can be produced of even better quality than has so far been obtained, and it is certain that the steel can be obtained of practically constant composition.

At the meeting, a number of tools were shown which had been made from steel produced in the Evans furnace. Several of these tools were made from a bar of steel which analyzed:—

Carbon	0.91 p.c.	Titanium	trace
Sulphur	Nil	Vanadium	Nil

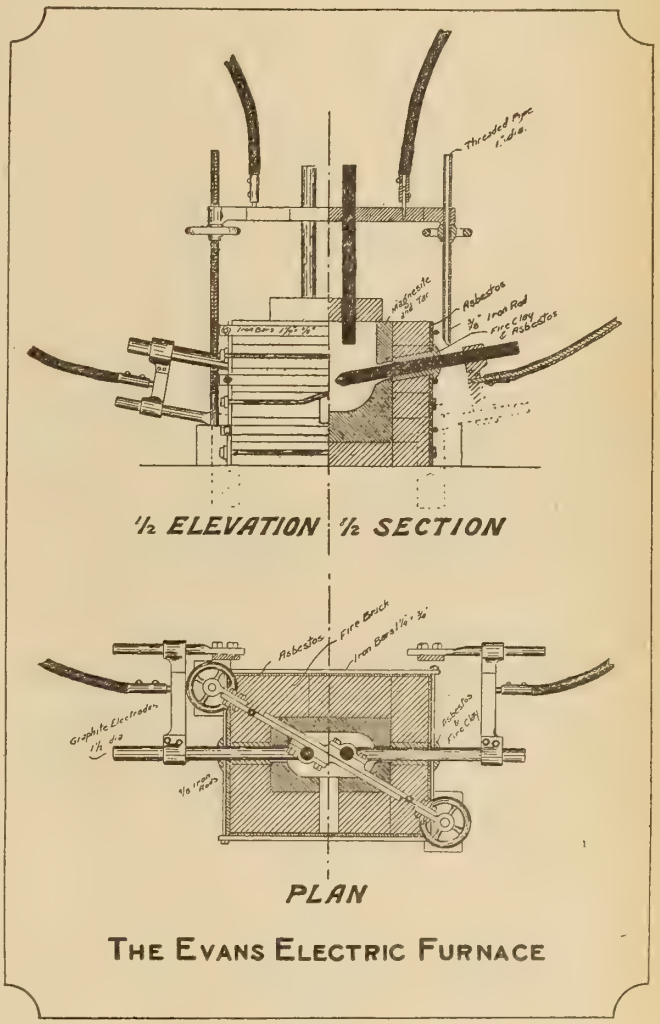


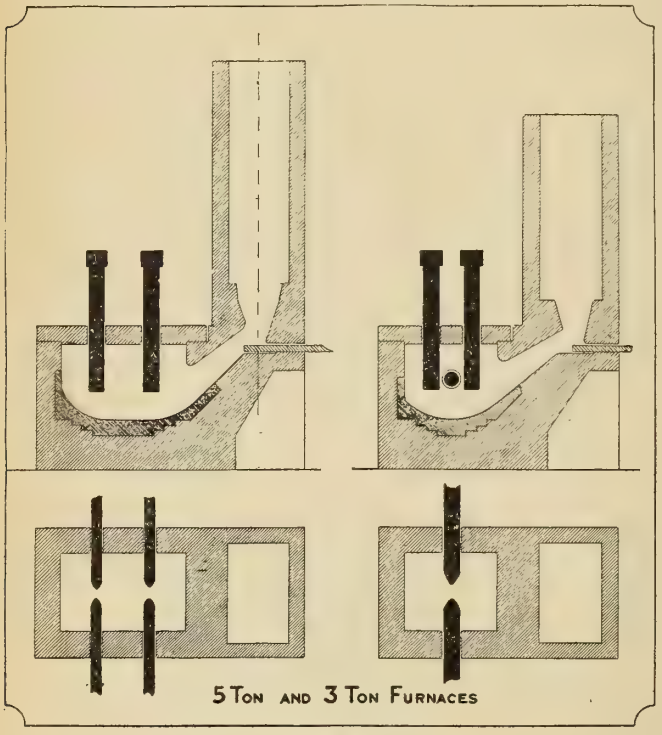
FIG. II.

Mr. Evans has quite an extensive workshop in which he constructs his furnaces, crushes the ore and fluxes, and tests the steel he obtains. Views of this are given in the accompanying photographs.

If it is admitted that a good tool steel can be made directly from the ore in the electric furnace, the most important remaining question is whether the cost of the process will be low enough to render it commercially practicable. With this object in view the writer made careful observations of the consumption of charcoal, limestone, electrical energy and electrodes in Mr. Evans' experiments, and the results of these observations may be stated as follows:—

1 lb. of tool steel reduced in the small electric furnace required
2.1 lbs of magnetite ore from the Orton mine.
0.4 lbs. of limestone.
0.4 lbs. of charcoal (including carbon in binding material).
0.08 lbs. of electrodes (Acheson graphite electrodes at 12c. a lb.).
3.0 kilowatt hours.

Most of these figures could undoubtedly be reduced in the case of a larger furnace, and it will be safe to state that a furnace making one ton or upwards of steel in 24 hours would not require more than 0.35 lbs. of charcoal and 2 kilowatt hours per pound of steel, while the electrode losses could certainly be reduced to not more than half the above figure, or say 0.03 pounds per pound of steel. Taking the electrical horse-power year at $20, the cost of 2 kilowatt hours would be 0.62 cents, and the electrodes would cost 0.36 cents, or a total cost for ore, charcoal, limestone, electric power and electrodes of



Figs. III and IV.

about 2 cents per pound of steel. The electrode losses in the test runs were greatly increased by the practice of allowing the ends of the electrodes to dip into the slag in the furnace. If, as is the case in the larger furnaces, the electrodes do not enter the slag, but are merely employed for producing an arc, the losses should be very much less. The rate of loss must also be proportional, more or less, to the surface of the electrode, and as the surface of the electrode, or at least the hottest part of the electrode, becomes proportionately less in larger furnaces, there is no doubt that a decided improvement will be shown in this particular.

Independent information with regard to the cost of running such a furnace on a somewhat larger scale can be obtained from the published test of the Stassano furnace in Italy made by Dr. Goldschmidt, in 1903.[3] The test was made on quite a small furnace of about 80 kilowatts, turning out 70 pounds of mild steel in two hours, smelted directly from pure hematite ores. One pound of steel required:—

1.63 lb. hematite ore.
0.20 lb. limestone.
0.26 lb. charcoal.
0.20 lb. carbonaceous additions.
0.012 lb. electrodes.
1.44 kilowatt hours.

These figures confirm what has been stated above with regard to the probable cost of the Evans process on a working scale and show that even better results may be expected.

The cost of labour, management, etc., will vary so much with the locality and particularly with the scale on which the plant is constructed that it does not seem worth while to attempt to estimate them. It may be mentioned, however, that Dr. Goldschmidt, in the report already referred to, states that in a plant of 5,000 h.p., located in Italy, producing 30 tons of steel in 24 hours, from rich hematite ores, the total cost of the steel, including ore, power, electrodes, labour, maintenance, etc., but not apparently interest or depreciation, would be very close to 1 cent per pound.

In connection with the above figures it should not be forgotten that the best tool steel is not rolled from the ingot but is drawn down under the hammer to obtain the finished bar. The cost of this process would have to be considered in determining the cost of production of the steel bars.

In Mr. Evans' experimental furnace only two electrodes were employed, and these could be placed nearly horizontal, or could be inclined at an angle in order to enter the slag. On the large scale it is intended to attain the same results by having two pairs of electrodes; one pair being vertical and the other nearly horizontal. This arrangement, which is shown in figures 2, 3 and 4, enables the horizontal electrodes to be used, as in the Stassano furnace, for the purpose of melting the charge, while the vertical electrodes can then be substituted and used as in the Heroult furnace for heating the molten charge during the finishing stages of the process.

Figures 2 and 3 show furnaces of this kind which Mr. Evans has constructed. The lateral electrodes are slightly inclined so that the arc may be near the charge while the openings through which the electrodes enter may be well above the slag level. The vertical electrodes pass through the roof of the furnace, and their holders are insulated from each other but are bolted together for greater strength. In this way the two electrodes are regulated together. In these furnaces it is necessary to withdraw the lateral electrodes before the vertical pair can be lowered into position, but in a larger furnace the electrodes could be placed so as not to interfere with each other, as in the right hand drawing in Figure 4.

With the furnaces shown in Figures 1, 2 and 3, the ore is introduced directly into the body of the furnace, as is also the case with the Stassano furnace. In the latest designs, see Figure 4, Mr. Evans is adopting a suggestion of the writer and adding a tower, in which the ore is heated, and partly reduced before it enters the electric furnace itself, and this modification should effect a considerable saving of electrical energy and even of charcoal and electrodes.

When promising this paper for the Toronto meeting, the writer expected to be able to make further tests with Mr. Evans' furnace in order to obtain more exact data for the cost of operation, and to have a supply of steel for a full set of chemical and mechanical tests. Mr. Evans' unfortunate illness prevented these tests and the writer was therefore unable to present as complete an

account as he would have liked of this interesting process.

Mr. Evans has acquired the Orton iron mine, in Hastings County, and informs the writer that more than 2,000,000 tons of titaniferous iron ore has been proved there by the diamond drill. The core shows the ore body to be 60 feet wide at 280 feet below the surface. The last analysis of the ore gave:—
60.84 p.c. iron, 7.5 p.c. titanium, 0.11 p.c. vanadium.
There is a quantity of limestone on the property, an abundance of wood for charcoal, and power can be brought from Campbellford at a reasonable figure.

The process of making steel in the electric furnace from titaniferous magnetites, which was inaugurated on such a small scale four years ago, should prove of great value in Canada, where these ores, charcoal and water power are all available, and where tool steel is at present imported.

[1] J. W. Evans, Jour. Can. Min. Inst., Vol. IX., 1906, p. 128.
[2] A. Stansfield, Jour. Can. Min. Inst., Vol. X., 1907, p. 129.
[3] Electro-chemical Industry, 1903, Vol. I., p. 247.

PERSONAL AND GENERAL.

Mr. J. B. Tyrrell has returned from a professional visit to Quebec.

Mr. Martin Nordegg leaves for Alberta and British Columbia on June 30th.

Mr. J. B. Tyrrell has been elected a fellow of the Royal Society of Canada.

Mr. T. J. Vaughan-Rhys has assumed management of the Portland Wonder mine.

Mr. H. P. Davis passed through Toronto on his way to New York, on Friday, June 10th.

Mr. Frederic Keffer, of Greenwood, B.C., was in Colorado, U.S.A., during the early part of May.

Dr. J. Bonsall Porter, of McGill University, will shortly leave Montreal on a visit to Europe.

Mr. Fred. Pearson, of Halifax, N.S., is in Venezuela arranging to obtain control of large iron deposits.

Mr. W. S. Lecky has been elected an associate member of the Institution of Mining and Metallurgy.

Mr. W. M. Brewer, of Victoria, B.C., recently went north on one of his periodical visits to southeast Alaska.

Mr. Alexander H. Smith, consulting engineer for Porcupine Goldfields, Limited, has returned to Porcupine after a brief visit to Toronto.

Mr. O. N. Scott, general manager of the Cobalt Provincial Mine, was in Toronto recently. Mr. Scott reports most satisfactory progress.

Major, the Hon. J. E. P. Vereker, Kenora, has returned from a trip to Gold Rock. He reports considerable mining activity in the Manitou region.

Mr. Charles Levick, representing Swift, Levick & Company, Sheffield, Eng., passed through Toronto during May on an extended business tour through Canada.

Mr. A. T. Graham, formerly connected with the Red Cliff (Portland Canal) mine, has been placed in charge of the MacDonald-Pearson and Lydden-Bunting groups on Glacier Creek.

Mr. A. G. Larson, superintendent of the Le Roi mine at Rossland, B.C., was lately at the Ikeda Bay mine, Moresby Island, of the Queen Charlotte group, in the capacity of consulting engineer.

Mr. Lawrence Adams, late vice-president and general manager of the Guanajuato Amalgamated, is leaving for Montana and California in connection with mining properties in which he is interested.

The Hon. Mr. Templeman and Mr. R. W. Brock, Director of the Geological Survey, have returned to Ottawa from New York, Washington and Philadelphia, at which cities they inspected various museums.

Mr. W. Murdoch Wiley, of New York City, accompanied by Mr. R. B. Lamb, mining engineer, of 15 Broad Street, New York City, has left for Montana to examine the Ohio-Keating mine. They will also make mine investigations in Idaho and California."

Mr. W. Anderson, civil and mining engineer, of Vancouver, has gone to Peru to report upon a hydro-electric power scheme for the Cerro de Pasco Mining Company, of which Mr. A. B. W. Hodges, late of the Granby Company, is general manager.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—The Dominion Coal Company's output for May will be approximately 297,000 tons, comparing with 316,000 tons in May of last year. The output for 1910 to the end of May is 1,195,000 tons, against 1,273,000 tons in 1909, so that the difference between the two periods amounts to only about 78,000 tons in favour of last year. The Lingan collieries have put out a fairly large amount of coal during May, amounting to over 13,000 tons. No. 12 colliery is now producing over 500 tons daily, and on several occasions has almost reached 600 tons. The output for June will probably be about 340,000 tons. In June, 1909, the output was 355,000 tons, but it is hardly likely that this figure will be reached, as last year the men were working steadily, expecting the coming strike.

The Sydney & Louisburg Railway, which up till recently was owned by the Dominion Coal Company and operated as a part of their works, has been incorporated under its own charter as a separate corporation. Some modifications of the hitherto established routine of this railway will no doubt take place under the rearrangement.

The Whitehaven Disaster.

The catastrophe at Whitehaven has an especial interest for Cape Breton readers, because the conditions under which coal-mining is conducted at the Wellington Colliery are similar to those under which much of our Cape Breton coal will have to be won. The colliery stands close to the edge of the cliff, and the workings extend to a distance of five miles out under the sea. About three and a half miles out, there is a large friction haulage plant actuated by an endless rope from the shaft. The main haulage transmission shaft serves five ropes, which branch out along as many roads extending into the further workings. The origin of the disaster is not fully cleared up. It is supposed to have arisen through an explosion in one of the branch haulage roads beyond the main friction gear, but the fate of the entombed men appears to have been sealed by a fire at this point which was fed by the wood around the haulage gear and the dust and oil that naturally accumulated in such a place. Two men only managed to get past the friction gear, and all the remaining men, 130 in number, must have been quickly suffocated by the fumes from the burning wood and oil. A desparate fight was made to subdue the flames, but after progressing

some 140 yards and getting within 80 yards of the supposed seat of the fire, the rescue parties were driven back. An hour before midnight two men from the Mining Engineering Company of Sheffield, equipped with "Shamrock" apparatus, descended the mine, but were only able to get within 130 yards of the fire, when they had to beat a hurried retreat. Their helmets and cylinders were too hot to touch. Such courage is magnificent, but there is no due advantage to be gained by sending men into such danger. Rescue apparatus has many possibilities, but it will not aid men to do the impossible. Other rescue parties afterwards arrived from Normanton and Hanley, but they could do nothing, and the intake was bricked up. Many indignant protests were made against the management for their action in sealing off the burning section and the entombed men, but all those competent to judge express the opinion that nothing else could be done. Whitehaven is six hours' journey from Sheffield, and the Mining Engineering Company's men started within two hours from the time they received news of the fire. From the short account contained in the letter received by your correspondent it cannot be stated that the rescue apparatus would have been of more avail had it been immediately on the spot, as owing to the fire being so far "in-bye" it appears to have gathered violence unnoticed by those on the intake side of the friction gear. Certain it is, however, that it would not have been any more difficult for the rescue parties had apparatus been available at the commencement of the fight, as without such protection they fought the fire for hours before being compelled to leave the entombed men to their fate. This disaster again emphasizes a point which has often been made in the JOURNAL, namely, that if oxygen rescue apparatus is to be of any use in mine disasters, it should be treated as an auxiliary to the underground fire brigade, should be immediately available, with a sufficient number of trained men to make effective use of it, and to relieve one another rapidly. Two men, with all the courage and skill in the world, are impotent in face of a mine fire that has had time to gather strength. In planning the extensive haulage ways which some day will convey the submarine coal which lies off the shores of Cape Breton this disaster should be borne in mind. It would seem that the entire avoidance of inflammable material in the construction of the elaborate haulage plants which will be necessary would be advisable, and the substitution of concrete for wood should be enforced strictly.

After the foregoing had been written the "Colliery Guardian" of the 19th May came to hand, containing an editorial article on the Whitehaven fire. The conclusions reached by this authoritative journal, with access to more exact sources of information than those possessed by your correspondent, are so strikingly corroborative that it will be well to quote them. Speaking of the hostility aroused by the decision of the management to brick up the intake, the "Guardian" remarks: "The real test of moral bravery on such occasions is to know when to desist from futile attempts to rescue; whenever a colliery explosion occurs there is always a multitude of willing volunteers ready to run the greatest hazards, but it requires bravery of a higher order to close the shafts against them." In connection with the magnificent bravery shown by Thorne and Littlewood, the Mining Engineering Company's men, and the usefulness of rescue apparatus in such cases, the article goes on to say: "From the details, however, that are before us at this stage it is a reasonable conclusion to form that had breathing appliances been on the spot at the time of the explosion instead of thirty hours later, lives might have been saved; the chief justification for this belief exists in the fact that two men, after persistent efforts, managed to traverse the fire area from the workings, and left beyond several workmen who were then in full possession of their faculties. The moral is that, to be of service, there must be a rescue station within easy reach of, and trained men at, each colliery. One of the few happy results of the Whitehaven disaster may be to convert colliery owners to this view, not only in Cumberland, but in some other districts."

There is not as yet a single breathing appliance on the mainland of Nova Scotia. Surely there is no need to point a further moral.

The Barometer and Mine Explosions.

Commenting on the recent disastrous mine explosion at Whitehaven, England, elsewhere referred to in this letter, the "Montreal Gazette" touched upon the statement that was given considerable currency by the cabled newspaper reports that the explosion was coincident with a high barometer, the approach of which had been predicted in the newspapers by what in known as a "colliery warning." The "Gazette" expressed the opinion that in the future the colliery manager would pay "the same careful attention to his colliery manager would pay "the same careful attention to his barometer as the master of a vessel does to his compass." The comment is a little *naive*, as under the Coal Mines Regulation Act in England, every coal mine must be provided with two barometers, one at the mouth and the other at the foot of the shaft. The reading must be daily taken and recorded by a responsible official—usually the underground manager. The "Gazette" is, however, not wholly to be blamed for the importance it attaches to the "colliery warning," for many people even in England itself are not aware that the "warning" is not an official announcement. The "Colliery Guardian" of London recently poked fun at the expense of these solemn "warnings." They have appeared regularly in all the English newspapers for some years past, and forecast an approaching change in the atmospheric pressure which will cause disturbance in the equilibrium of the mine gases. Where large wastes or "goafs" exist it is well known that a change in the barometric pressure may force out accumulations of dangerous gases into the workings, or conversely a diminution of the pressure may liberate gases which are confined in cavities, but bodies of gas of this nature are much more sensitive to changes in atmospheric pressure than any barometer ever invented. The result of a change of pressure will be felt in the mine long before any published "warning" can be given circulation. The "colliery warning" which appears in the newspapers is generally read long after the atmospheric change has passed and gone, and in mining circles these announcements are regarded as an elaborate joke. The Meteorological Bureau disclaims all knowledge of these "warnings," and the Government know nothing about them, so that their origin, like the birth of Jeames, "is wropt in mystery."

ONTARIO.

Cobalt.—At the Hudson Bay a new vein has been discovered on the 100 foot level, to the south of the shaft. It is about an inch and a half wide and carries high values in silver.

Another important ore shoot has been located on the Lawson property, on the No. 11 vein. From the shaft a drift was run on the vein at a depth of 50 feet, and high grade ore was encountered. Some work was done from the 75 foot level, but at that depth the values in the vein were low. Now that the property is no longer handicapped for lack of power, work will be carried on much more rapidly, and all the veins will be opened up.

Several engineers for the Dominion Government are in the district, making examinations of the different lakes and rivers, with a view to conserving the great bodies of water that are wasted every spring. Practically all this section drains into the Ottawa River, and in the spring the water is much higher than is necessary, while in the fall the water gets so low as to prove a serious handicap. On account of the heavy snow-fall the lakes and rivers rise to great heights after the break-up. Lake Temiskaming, the largest body of water in the district, usually rises about fourteen feet, and every spring this great supply goes to waste. It is the intention of the Government to build a series of dams, at the points where they will hold back the greatest amounts, and by letting out the water as it is needed, thus regulate the flow in the lower Ottawa. Some of these dams are now under construction, and work will be commenced on others in the near future. The possibilities for the generation of power that these dams will afford are practically un-

limited, and although they will not likely be used for some time on account of the small market, due to the sparsely settled conditions of the country, they will always be a vast reservoir for future needs.

A new vein carrying high-grade ore has been found on the Nova Scotia property. The ore body, which was opened up by underground exploration, varies in width up to five inches, and consists of calcite and native silver. Now that the difficulties between the Peterson Lake and this company have been settled, the Peterson Lake lease is being worked again. The new mill is in operation, but has been working such a short time that it is impossible to state how the process will turn out. The ore is treated by straight cyanidation, which is a decided departure from the majority of plants in the district.

The Standard Cobalt Mines, which is the operating company of the Cobalt Central, is in the hands of a receiver, with liabilities amounting to about $50,000. The company controls over 700 acres of ground, only a small portion of which, however, has been prospected. The mine and mill are on the Big Pete claim on Diabase Mountain, and although the ground has not been very well developed, several good veins have been found. As a general thing the ore is found in small stringers over a width of about eighteen feet, but on the fourth level there is one vein showing in the bottom of the drift that will average about three inches in width, and that can be traced for several hundred feet. The mill has a capacity of 100 tons a day, and there are several months' supply of mill rock broken in the mine. The mill also treats considerable custom ores from the surrounding mines. During the last few months a sharp fight for control has been waged by a minority interest among the shareholders, headed by J. S. Bradley, a New York broker. In the meantime the financial affairs of the company steadily grew worse, although the property made more or less regular shipments of ore to the smelter.

After many delays and disappointments, the Cobalt Hydraulic Company has at last started the big plant at Ragged Chutes, and as a consequence a good many more mines have shut down their compressors and are operating with the new power. The pressure at the mines is about 120 pounds, but the reducing valves cut this to about 100 pounds. After the water was turned into the shafts, but before the air was allowed into the pipes, the automatic blow-off that operates through the tail shaft, formed a regular geyser hundreds of feet high that was one of the most remarkable sights ever seen in this country. This plant is the largest natural air compressor in the world and has an estimated capacity of about 5,000 horse-power. The air is transmitted from the plant through nine miles of twenty-inch pipe. From the end of this line a twelve-inch loop encircles the camp, and the air is drawn off in smaller pipes to the various mines. One great advantage of this air is its remarkable freedom from moisture, due to being compressed at a constant low temperature. Since consumers have started using it, however, it has developed that the miners find some difficulty in keeping candles alight, and the effects of dynamite smoke after blasting are also said to be more serious than formerly. The inventor claims that this is due to the oxygen being absorbed by the asphalt with which the pipes are coated, and that this feature will shortly disappear. The Mines Power Company is now running steadily, supplying air and electricity, and will shortly have the fourth compressor in the Brady Lake sub-station in operation. This will give practically one spare compressor in case of an accident happening to any of the four. The three at present installed handle the load easily, but without having very much to spare. The Cobalt Power Company will shortly have all its generators installed, and will then have no difficulty in handling the load. With these three companies operating, Cobalt will be in a very enviable position with regard to power, as the supply is ample and the price is very low compared with the previous cost when generated by steam. On the face of it, the supply seems much greater than the demand, and it is not outside the bounds of possibility that an amalgamation of some sort may take place in the future.

At the Temiskaming Mine a new vein of exceptionally high grade ore has been discovered on the 400 foot level. No. 2 vein on this level is also making good ore, the vein being in some places eight inches wide of ore that will run about 4,000 ounces to the ton. The mill is handling up to 100 tons a day and is stated to be producing about $1,000 worth of concentrates every twenty-four hours. From the time it commenced operating until the end of May the mill treated 2,218 tons of ore, having an average assay of 33 ounces, and produced 59,400 ounces of silver. The main shaft is being sunk to a depth of 500 feet, and when this level is reached it will be the deepest working in the camp.

Surface prospecting on the Nipissing property has already this season yielded excellent results, and five new veins carrying high grade ore have already been found. Three of these varying in width from one to two inches and running parallel about thirty feet apart, were discovered in the vicinity of No. 49 shaft. These will be opened up from tunnel No. 28, the end of which is between two and three hundred feet away. The last discovery was made in the Keewatin area in the vicinity of Cart Lake, where som geood silver was found. This territory had been partly prospected before, but a more careful examination of the ground resulted in the discovery. This company is finding that running the trenches 100 feet apart is not working close enough, and now the ground is being cut up with trenches about fifty feet distant from one another. The management is convinced, however, that even with this careful method of doing the work many veins escape their notice. As a consequence they will experiment with washing off all the overburden on some portions of the property. A couple of large pumps are now being installed, and it is expected will be operating shortly. The disposal of the tailings will present serious difficulties, but it is believed that the ground will be worked in sections, and that when one part has been washed and thoroughly examined the overburden from the ground above will be washed down on it. This method will make absolutely certain that no veins showing on the surface escape notice. The cost will be high and the work will take a long time, but the results will undoubtedly be large.

It is stated that the production of the Buffalo for their fiscal year amounted approximately to 1,500,000 ounces. The reserves have been considerably augmented by the extension of the territory to the west, where it was not expected to find ore. In drifting on the vein to the west, a roll in the underlying Keewatin was cut, and the values gave out entirely. Some time afterwards work was again started in the drift, which shortly passed into the conglomerate. With the change of formation the values came back as high as formerly, and now the drift has been pushed several hundred feet more and the heading is still in good ore. It is understood that the cyanide plant is not as great a commercial success as it was expected to be, and that it may be shut down before long. Results from the concentrating plant are, however, very satisfactory, and it is thought that if a little closer saving were made on the slime-tables the cyanide plant could be done away with.

Another high grade vein has been struck on the Cobalt Provincial, which was formerly owned by the Government. The discovery was made in the bottom of the new shaft, where there is from four to five inches of ore carrying high values in silver. This was at a depth of 120 feet and is believed to be a different vein than the one cut at a depth of 80 feet in the shaft.

The opening up of the third level of the Coniagas is giving much better results than was anticipated by the management. Work is now being carried on at a depth of 225 feet, and a few days ago the cross-cut opened up the No. 2 vein. It is considerably wider and more consistent than on the second level, and the values are fully as high. This is the first of the known veins to be located on the third level, but it is expected that the No. 6 vein will be cut in a few days. The management has been prevented from running the new addition of thirty stamps on account of an insufficient supply of water. A new pump is being installed, however, and this defect will be remedied very shortly.

The new plant for sampling the high and low grade ores of Cobalt is now practically completed and will be receiving consign-

ments in a few days. All the ore when it is received is crushed in a ball mill, and from the fines four separate and distinct samples are taken. This ensures a thorough check on the assays. The metallics from the ball mill are melted down separately and the resulting product shipped as fine silver bullion. One of the great advantages of the plant will be the possibilities it offers to grade the values of the ores to meet the requirements of the smelters. Several of the smelters pay a certain percentage of the silver contents, depending on the assay of the ore, and this usually varies one-half of one per cent. for each five hundred or thousand ounces to the ton. The sampler has several storage bins where the ore may be held in order to change the grade if required. Arrangements have also been made with some of the smelters to accept the sample as taken at the Cobalt plant, and this will do away with the necessity of having a representative at the point where the ore is treated.

Diamond drilling on the Foster property has resulted in the discovery of a vein carrying values at a depth of 400 feet. It is not known how high the returns from the assays were, but they were encouraging enough to determine on further exploratory work with a shot drill. This drill has been ordered and will be here almost any time.

The management of the cobalt smelter at Copper Cliff has decided to increase the capacity of the plant to 800 tons a month. This was the first smelter in Canada to treat Cobalt ores, and for the year 1909 they treated practically half of the high grade output of the camp. From the time it started in 1905 till the end of 1909 it treated 13,616 tons of ore and produced 22,633,430 ounces of silver. They also produce refined arsenic, but the shipper receives no payment for this. The cobalt and nickel are collected in the form of a speiss, which also contains considerable silver, and this is sent to the States for treatment. The company also intends to put up a silver refinery, and when this is completed they will be able to pay for the ores in a much shorter time than is now possible. At the Deloro smelter an oxide plant has been built that treats the speiss and produces commercial cobalt oxide and recovers practically all the values in the ores. As the supply of cobalt has been steadily increasing the last few years, this company has been carrying on some interesting experiments, with a view to extending the uses to which it is put and thus increasing the demand. One result of these experiments has been the production of several pigments in different colours. This plant also produces refined white arsenic.

Since the advent of the new power a decided improvement has taken place in the Savage property. No. 4 vein has been cut in a cross-cut from No. 3 vein and shows a good width of high grade ore. Before this the ore reserves on the property were estimated at three-quarters of a million ounces, and if this vein proves up well on the lower level they will be considerably increased. The shaft is to be sunk another 75 feet and a new level opened up. At the present time the stopes and drifts are full of ore, but with the small sorting plant in operation this will soon be cleared up and underground development can proceed. New camp buildings are also to be erected.

BRITISH COLUMBIA.

As the spring advances there is much activity in the mining districts, especially in those in which little can be done during the winter. With the melting of the snow prospectors are busy again, and numbers of them are already afield, preparing to take full advantage of the whole time in which prospecting can be done to advantage. There has been quite a rush of men to the North—to Queen Charlotte Islands, the Skeena country, and especially to the Portland Canal district. Much excitement has prevailed in the British Columbia coast cities relative to reported finds of high-grade ore on several mineral claims in the vicinity of Portland Canal, and much is expected from that district. As yet, though, substantial development work has been restricted to only a few properties, so that the question of tonnage of ore available has still to be dealt with. The prospects are generally regarded as most hopeful. Probably some of the so-called mining companies are mere promoting schemes, but there is no doubt several other organizations are genuine and their main object, bona fide mining.

Coal Mining Prospects Good.

The outlook for coal is more promising, perhaps, than for any other mineral being mined in the province. This applies to all the districts in which coal has been developed, and as well to several others in which coal measures believed to contain workable seams of coal have also been found. In Southeast Kootenay there are, beside the well-known and productive coal mines of the Crow's Nest Pass, Hosmer, and Corbin companies, respectively, large quantities of coal of excellent quality in the upper Elk River country, while other fields, though as yet not nearly so well prospected as those of the upper Elk, are known to occur in the Flathead and contiguous districts comprising the extreme southeastern part of the province. A six-foot seam of coal is being developed near Midway, in the Boundary district. In the Similkameen and Nicola Valley districts, now to some extent provided with railway transportation facilities, coal is being produced on a commercial scale, in small measure near Princeton, Similkameen, and to the extent of from 800 to 1,000 tons a day at Nicola Valley mines. One company has been formed to develop coal lands north of Kamloops, in a part of the country soon to be made accessible by the construction of the extension through British Columbia of the Canadian Northern Railway, which system is well established in the adjoining province of Alberta. In different parts of the very large area of country north and south of the route of the Grand Trunk Pacific Railway—in Northern Cariboo and in several widely-separated parts of the big Skeena country, coal has been found, and the construction of railways is being awaited to provide necessary transportation facilities so that coal may be mined and sent to whatever market shall be found for it. It is claimed by experienced coal prospectors that a large and productive field will be opened on Graham Island of the Queen Charlotte group, and if this be done the value of this fuel supply will be great, chiefly on account of the comparative nearness of the coal seams to tidewater, the good quality of the coal, and the convenience it will be to steamers engaged in the northern British Columbia and southeastern Alaska coast trade, which is yearly expanding and becoming of considerably increased importance. Then there are the newer developments on Vancouver and adjacent islands, some of which are already adding an appreciably large tonnage to the output of the British Columbia coast coal mines. Beside the big mines that have been productive for many years—the Western Fuel Company's and Dunsmuir collieries—there is the Pacific Coast Coal Company's South Wellington mine, now an established producer with a fairly large tonnage, and two or three small mines, with as yet but a small production. Then there are other coal properties being developed in the northern part of Vancouver Island, beside some on two or three of the smaller islands close by. The foregoing information is incomplete, but it will serve to indicate in a general way that there is ample warrant for the claim that the coal-mining industry of British Columbia is in a flourishing condition and that its expansion will be considerable in the near future.

In the Kootenay Districts.

It has been reported that the Consolidated Mining & Smelting Company of Canada, Limited, is negotiating for the purchase of the North Star mine, in Fort Steele mining division, East Kootenay. Years ago this mine was the most productive silver-lead property in British Columbia, but its output during recent years has not been large, although it has been operated at a profit. It is managed by Mr. Neil McL. Curran. The group contains six mineral claims and fractions, having a total area of about 300 acres, situated within two miles of Kimberley, the northern terminus of a branch of the C. P. R. Company's Crow's Nest line. The mine has been extensively developed and, according to the published report of one of the officials of the

Mines Branch of the Dominion Department of Mines, has produced a large tonnage of silver-lead ore, averaging, approximately, 30 ounces silver per ton, and 40 per cent. lead. The quantity shipped up to 1906, inclusive, was 69,500 tons. In 1907, the output was 3,094 tons, having an average lead content of 20 per cent., and of silver 15 ounces per ton. The 1908 returns are not now available to the writer, but in 1909, nearly 3,000 tons was shipped, this containing approximately 39,000 ounces of silver and 711,000 pounds lead. The bulk of the ore shipped contained an excess of iron in oxidized form, and very little sulphur, consequently, the smelting charge on it was low. Mining costs were stated several years ago as having been $2.33 per ton of ore mined. A former manager described the ore-bodies as being basins of ore, lying flat, and having a maximum thickness of about 70 feet. During recent years, though, the ore shoots mined have generally been small and disconnected. An important discovery of ore was reported a short time ago. The power equipment of the mine includes three 60 h.p. boilers, one large and two small hoists, a 5-drill air compressor, and a diamond drill. An aerial tramway, one mile in length, connects the mine with ore bunkers on the C. P. R. line near Kimberley.

The season in the Slocan mining camp has opened auspiciously, for there is much work in progress, more is to be undertaken, and the railway from Kaslo to Sandon will hereafter be operated right through, after having been closed beyond McGuigan for a comparatively long time. All the zinc concentrate made at the Whitewater mill during the winter has been shipped to the United States, the silver-lead product going to the Consolidated Company's works at Trail, B.C. Near the end of the cold weather season shortness of the water supply necessitated closing this mill for a few weeks, but it will soon be running again. Meanwhile, new ground has been explored in the Whitewater Deep mine, and a contract has been let for putting up an incline raise from the breast of the 2,000-foot adit tunnel driven last year, by the Deep Mine, Limited, from the railway level. When the raise shall be up, 150-foot cross-cuts, driven to prospect for ore before continuing to raise toward the old workings at about 500 feet above the deep-level adit. Zinc ore is again being shipped from the Lucky Jim mine, now that the weather is favourable for the railway company handling it without difficulty. The erection at Kaslo of a mill for concentrating the second-grade ore from the Lucky Jim is promised. Progress at the Rambler-Cariboo continues to be satisfactory and the outlook for a profitable year is promising. The annual general meeting of shareholders in the Rambler-Cariboo Mines, Limited, has been called for June 14th, at Kaslo. Byron N. White, managing director of the company owning the Slocan Star group, has gone to Sandon from Spokane, Washington. The operation of both mine and mill on a similar comparatively large scale to that in progress before the Star vs. White lateral rights litigation led to the closing of both several years ago, is now looked for, all legal difficulties having been overcome. The Richmond-Eureka-Summit group will continue shipping ore to Trail. The Ruth-Hope group will keep its mill going and send out both silver-lead and zinc concentrates. Up Cody Creek the several mines mentioned in the last number of the Journal, are continuing to make progress. Similarly, the outlook is good for the Slocan Lake district mines.

There is little that is new to report relative to mines in Nelson mining division, conditions being much the same as described last month. A resumption of work at the Queen Victoria mine, situated a few miles west of Nelson, and which was acquired by the Consolidated Mining & Smelting Company about eighteen months ago, has been announced. In both Ymir and Sheep Creek camps there is activity, especially in the latter, developments being encouraging. The prospective sale of the Queen mine, near Salmo, has been reported; this is a gold-quartz property, having a 20-stamp mill.

Rossland mines show little change. The Le Roi is still working, but its ore production figures remain small as compared with those of most earlier years, during which it has been worked. Le Roi No. 2 maintains its output regularly. The Consolidated Company's mines are shipping a considerable quantity of ore to Trail every week. Some ore was lately shipped from the Nickle Plate, which in the busier days of Rossland camp was one of its best known mines, but has not been heard of in recent years until now. The Consolidated Company's smelter is gradually increasing its tonnage of ore treated and quantities of metal produced. Among its receipts last month was a quantity of concentrate from the Hedley Gold Mining Company's 40-stamp mill at Hedley, Similkameen. Rossland men are developing the Fife mine, a copper-gold property situated on the Boundary slope of the divide between the Columbia and Christina Lake valleys.

In the Boundary District.

The British Columbia Copper Company's mines and smeltery will be operating again before these notes shall be printed, labour troubles having been got over for the time, and sufficient men having been obtained to take the places of those who left the district when the strike took place. Mr. Paul S. Couldrey, formerly manager of the Le Roi No. 2, Limited, Rossland, and for rather more than a year superintendent of the B. C. Copper Company's Mother Lode mine, goes to Peru to take charge of a big mine there owned by the company for whom Mr. A. B. W. Hodges, late local manager for the Granby Company, is now general manager. Mr. Couldrey has been one of the hardest working, and most successful mine managers (successful as regards results of his mine development work) in this province, so his departure is much regretted. He was not given a fair deal by the English mining engineers who have the direction of Le Roi No. 2 affairs, but he has the satisfaction of knowing that his good work is appreciated by other large companies, and his services sought after.

The Granby Company lately had an examination made of some mineral claims situated in Franklin camp, up the North Fork of Kettle River, 50 miles or thereabouts, from Grand Forks. The company's 4,500-ton smeltery is at Grand Forks. There are some big ore-bodies in Franklin camp, but the value of the ore in bulk has not yet been ascertained, for railway transportation facilities have not yet been provided for this camp. Rails have been laid for a distance of 17 or 18 miles from Grand Forks, and recently it was announced that a second section, of 10 miles, of line would be constructed this summer, but a commencement with this work has not yet been made. There will still be a gap between the far end of the second section of the railway and Franklin camp mines, so that there is no immediate prospect of ore being shipped thence to a smelter. Owners of mineral claims are earnestly hoping the Dominion Geological Survey will give the camp attention during the summer, so that a map of the district and a report may be issued with as little delay as shall be practicable, for no official information relative to this part of the Boundary country has been published since Mr. Brock's account of his short visit in 1907.

Melting snow is in some measure hampering the shipment of ore from Phoenix camp mines, the surface of the ground being soft, and work above ground consequently hindred. Another disability slightly affecting the mines now that spring is well advanced is that numbers of men who work at the mines throughout the winter go into the hills prospecting or doing assessment work on their mineral claims, so there is a temporary shortage of men. Under these conditions it has been found advantageous to run only six of the eight blast furnaces at the Granby smelter, so that costs may not be made higher at the company's mines by requiring them to ship ore up to the full capacity of the eight furnaces at the smeltery. As soon as normal conditions shall prevail, it will be practicable to operate all eight blast furnaces without inconveniencing the mine officials to keep up a full supply of ore. The tonnage with six furnaces in blast is about 3,400 tons of ore per diem.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Mr. A. A. Hayward, general manager of the new scheelite mines near Moose River, Halifax County, has named the new settlement, Scheelite. New roads have been surveyed and the camp buildings are practically completed. Four shafts are being sunk. Three of these showed no scheelite on the surface, but are now in rich ore. The ore will be hauled to railway by means of a traction engine and trailer. Hugh McAskill is foreman.

Stellarton, May 30.—The executive of the Board of Mining Examiners for the province will meet in Stellarton on Wednesday, June 1st, for the purpose of preparing questions and other work preliminary to the annual examinations to be held during June, at the various examination stations throughout the province.

ONTARIO.

Ottawa.—During the last fiscal year the total bounties paid by the Government amounted to $1,808,533. The bounties on pig iron totalled $573,968, on a total production of 740,244 tons, of which 547,063 tons were made from Canadian ore. The steel bounty amounted to $695,762 on a total production of 740,390 tons. The bounty on wire rods was $538,812 for a total output of 89,802 tons.

Cobalt, May 30.—In the cross-cut northeast from the 225-foot level, the No. 2, one of the principal veins of the Coniagas, has been cut in the past week. The Coniagas veins, though small, are so regular that there was some surprise expressed when the lead was not tapped at precisely the spot expected, but it was found later. It is at the 225-foot level four inches wide of smaltite ore heavy with native silver and running several thousand ounces to the ton.

Cobalt.—With the starting of the new plant of the Trethewey Mining Company, thirteen mills are in operation in the Cobalt district. The skips from the No. 2 shaft are now running regularly up the 650-foot tramway to the Trethewey mill and the plant is working with the exception of some minor adjustments at almost full capacity.

Toronto, June 7.—A deputation of mining men waited on Hon. Frank Cochrane, Minister of Lands, Forests and Mines, representing the holders of iron ore claims in the Mattagami River region, some 80 miles north of Cochrane, to ask for an extension of time for developing their claims. Those present were Messrs. W. F. Powell, Ottawa; R. J. Flaherty, H. P. Glidden and John Martin, of Cobalt. The region has been inaccessible hitherto and it is only the last few months when attention has been attracted by the coal discoveries in the district to the west, that hope is felt that there may be an extension of the T. & N. O. Railway line there. The iron ore is recognized as valuable and needing only transportation facilities to enable machinery to be taken in and the ore brought out to the smelter. The mine owners feared that the Government might cancel their claims.

BRITISH COLUMBIA.

Vancouver.—The first gold brick from the Queen Charlotte Islands has been delivered to the Dominion assay office in this city. It was the output of the Early Bird free milling group, on the west coast of Moresby Island, and is the result of a day's run of a five-stamp mill. The value of the brick is $400. The mining property is owned by Messrs. J. McLellan and F. J. Bourne, M.E., of Cobalt, who acquired it some three years ago. There is a 100-foot shaft on the property and 250 feet of drifting. Commencing with a two-inch stringer, which has now widened to six inches, in places the vein gives exceptional values. On the surface the vein has been exposed for 250 feet.

Mr. Bourne, who has been in the city for a few days, en route east, considers the proposition a very promising one and he is very optimistic regarding the mining industry on the islands.

Creston, May 28.—An excursion party of McGill College mining students, numbering some twenty-five, in charge of Dr. J. B. Porter, Professor of Mining at McGill University, arrived in Creston at 9 o'clock on their way to Nelson. This party is making its annual tour of Canada, with a view of visiting the principal mining camps. Last year they visited mining camps in Nova Scotia and New Brunswick. Before reaching Creston on this tour they had visited Cobalt and Sudbury. They have also visited Coleman, where they stayed seven days, as well as Moyie, where they remained six days. These students, who are mostly three-term men, are being distributed among the various mining camps in British Columbia this season, where they can obtain a practical knowledge of the way the work is done. After visiting the mines at Nelson, they will proceed to Phoenix, and from there to Greenwood and Rossland. It is expected that the tour will be finished by June 2nd. By that time all of the students will have been distributed among the various mining camps. Dr. J. B. Porter, who is in charge of the party, appears to be a great favourite with the students.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

London, June 1.—Six miners were overcome by fire damp in a pit at Croy, Dumbartonshire, and were gallantly rescued by companions, one of whom collapsed during the process.

Final attempts were made on May 21st and 22nd to penetrate the workings of the mine by the return airway, but they proved absolutely impracticable. Experts were enabled by the aid of breathing apparatus to get to a point about 500 yards from the seat of the outbreak in No. 3 junction; but they were obliged to return by reason of the intense heat, after having passed through a stroke of fume gas, which was succeeded by dense smoke. In consultation with the managers afterwards they very reluctantly came to the conclusion that there was absolutely no possibility of any of the men getting past the fire and the smoke and gas in the return airway.

It is quite certain that long ago all the imprisoned miners must have succumbed to the fumes that have been carried inbye, and the quickest way of recovering the bodies will be to exclude all air. Although it is thought that the fire may have been in a measure subdued, any admission of air would kindle the slumbering embers and produce perhaps further regrettable consequences.

The fund for the relief of the sufferers has reached £23,150.

ROUMANIA.

During March the total exports of petroleum and petroleum products from Roumania amounted to 36,151 tons, as compared with 25,637 in March, 1909. In the same period the production amounted to 111,456 tons, as against 109,199 tons produced in February.

RUSSIA.

The Baku Black Sea Company has commenced the construction of the pipe line which will bring oil from the various plots

of the company to the iron tanks erected in the neighbourhood. This will be the first pipe line in the Maikop district.

Great activity is reported in the export of petroleum products from Baku. The loading of tankers and sailing boats is proceeding with great speed, and some twenty boats are waiting their turn at the wharves of Messrs. Nobel Brothers and the Caspian Society.

The Surakhany spouters are increasing in number in addition to the spouters on the properties of Benkendorff and of the Baku Petroleum Company. The well No. 5, of Messrs. Mirzoeff Brothers started spouting on the 27th March last from a depth of 1,190 feet. The yield in oil averages from 15,000 to 20,000 poods a day. On the 11th April another spouter on the field of the Baku Petroleum Company broke out from a depth of 1,568 feet, producing 200,000 poods a day. It is now nearly three months since the spouter on the Benkendorff's property broke out, having approximately produced over 5,000,000 poods of petroleum. The yield of oil averaged from the start about 300,000 poods a day. For about a month it kept at the level of 100,000 poods a day, falling finally to 35,000-40,000 poods a day.

SOUTH AFRICA.

A cablegram from Johannesburg states that during April the mines of the Rand alone (that is, excluding outside mines) crushed 1,763,104 tons. The average working expenses per ton were 17s. 6d., the profit per ton was 10s. 7d., and the aggregate profit £932,975. Below will be found similar figures for the previous three months, from which it will be observed that April shows no marked variation. The profit per ton is 3d. higher and the total profit about £19,000 more than for March.

UNITED STATES.

Seattle, Wash.—Officers of companies operating steamships to Alaska points on the Behring Sea estimate that 15,000 people will leave Seattle for Nome and St. Michaels on the early sailings, drawn by reports of rich gold discoveries in the Idatarod gold fields.

The first regular liner to leave Nome will sail from Seattle to-morrow; every berth had been sold weeks in advance. Men of wealth have been compelled to take accommodations in the steerage, and there is a waiting list at the steamship offices larger than the combined capacity of the northbound steamships. So great is the rush to the North that passengers and freight officers of the Alaska steamship lines say the movement, which amounts to a stampede, has been equalled but once in the history of the North, and that during the Klondyke rush thirteen years ago.

Bishop, Cal., June 2.—Two shifts are now at work in the property of the Bishop Creek Mining Company. The water has been lowered to the second level, which is 290 feet below the surface and the pump will be transferred from the upper station to this second level preparatory to continuing the development work at this point. A little later in the season, after most of the snow has melted and there will be less trouble from seepage water, it is probable that another hundred feet of shaft will be sunk to run a third level and further open up the ore body.

Los Angeles, May 31.—On three days of last week the Lakeview gusher was carefully measured and its flow was found to be 48,000, 49,000 and 51,000 barrels for each 24 hours. It broke out on March 21st; consequently, at the moderate estimate of only 40,000 barrels a day, it has produced up to date the enormous amount of 2,600,000 barrels of petroleum.

Montrose, Colo., May 31.—News is received here of a rich strike of vanadium ore in the Newmire district. This is a new district, and the veins now are only in process of development. A mill for the reduction of the ore is now in operation at Newmire, and the latest strike will necessitate an addition to the mill. The force of men working on the veins will be largely increased at once, and development work will be prosecuted with vigour.

Recently a consignment of this ore was sent to London, Eng., where it was to be used on trial by a big British steel manufacturing concern. The shippers were assured that if this ore proved satisfactory England would become a large consumer of western slope vanadium ore.

Cripple Creek, Colo., June 1.—The output of the mines of the Cripple Creek district for May was 57,105 tons, with gross bullion value of $1,349,502.50.

With the exception of the Golden Cycle mill, all treatment plants reported an increase, and it is understood that while heavy tonnage was shipped to the Cycle plant, the ore was bedded down for future treatment.

There has been no decrease in output, and the average value of the ore was 60 cents per ton higher. The value per ton for all grades of ore treated was $23.63, as against 23.03 in April.

Joplin, Mo.—The 200-ton concentrating plant of the Missouri Zinc and Lead Mills Company, on a 20-acre lease of the Smith ground at Cave Springs, west of Joplin, has been finished and is rounding into steady operation, early runs having showed the machinery to be working nicely.

Unlike the ore run worked by the Herald Zinc and Lead Company, to the north, the Missouri Company has mineral at 100 feet, while in the adjoining mile the ore run is worked below the 200-foot level. Both zinc and lead are found in the new mine.

MEXICO.

Mexico City, June 2.—The reduction mill of the Santa Rosa Milling & Mining Company operating the old Chinos group of mines on the Pelayo ranch, near Ayutla, State of Jalisco, will be reconstructed with a capacity of 100 tons of ore per day by the addition of new machinery received at Ameca a few days ago. The new appliances have been forwarded to the mines and are now being set up in the mill building of the company. They consist of a No. 5 Huntington ore mill, four Overstrom tables, two Woodbury tables, two Richards classifiers, two large Callow settling tanks, together with a number of smaller apparatus. The new machines will be run in connection with the old ten-stamp mill which has been on the property for several years. Steam power will be used.

Chihuahua, Mex.—The Lepanto mine at Naica is said to be shipping 2,000 tons of silver-lead ore per month.

The Rio Tinto Copper Company has accumulated 2,500,000 pounds of copper during the past year. The ore will be put through the converter when the new plant is put in operation about July 1st.

The Reina silver mine, in the Cusihuiriachic district, will soon change ownership and management, according to reports which are current here.

Pachuca, Mex.—Engineer Azan has gone to Ixmiquilpan to make a complete survey for the installation of the 5,000 horse power hydro-electric plant for which his firm holds the concession. The plant will be situated some 20 kilometers east of the town of Ixmiquilpan and Actopan, in all of which districts large denouncements of mineral lands are being constantly made.

Mexico City.—For months past there has been a serious drawback to the mining interests in the Etzatlan, Hostotipaquillo and neighbouring districts in the state of Jalisco by the failure of the electric power company, the Compania Hidroelectrica e Irrigadora to make good its proposal of supplying power for mine and mill purpose.

This delay was caused by a condition of affairs that was extremely unfortunate and worked some stress upon the mining concerns alluded to. However, all these circumstances have been overcome and construction has been actively resumed on the transmission line and is being pushed energetically and there is no doubt that by October at the latest there will be an abundance of power.

COMPANY NOTES.

VAN ROI MINING COMPANY, LIMITED.

The following cable was received at the London office from the company's managers at Rossland:

"Mill Report for Month of April: Total amount crushed, 3,269 tons, yielding 140 tons lead concentrates, assaying 210.7 ounces silver, 62.6 per cent. lead, 10.8 per cent. zinc; and 100 tons zinc concentrates, assaying 74.2 ounces silver, 3.4 per cent. lead and 43.9 per cent. zinc. Total approximate value $19,834 (£4,089). Mill ran 568 hours.

"Estimated expenditure for corresponding period, including mining, milling, developing, and other expenses, $17,000 (£4,505).

"No. 4 Level (main vein driven eastward 45 feet). Raise east of main stope successful—are now stoping in.

"No. 4 Level (continuation of Footwall Fork) south vein, west part: width 3 feet, 19 ounces silver, 9 per cent. lead, 9½ per cent. zinc. East part: width 2 feet, 7½ ounces silver, 4½ per cent. lead, 5¼ per cent. zinc.

"Crosscut to south vein following Diamond Drill Hole No. 4. Crosscut has reached reef."

INTERNATIONAL NICKEL DIVIDEND.

The International Nickel Company has declared an extra dividend of 25 per cent. on the common stock, payable July 15 to stockholders of record June 6.

At a special meeting of the directors it was resolved that this extra dividend be paid out of the surplus earnings of the company for the period from April 1st, 1906, to March 1st, 1910, after the payment of the full dividend of 6 per cent. on the preferred stock in each and every year of such period, and the dividends heretofore declared and paid on the common stock during the fiscal year ended March 31st, 1910.

The company offers to its stockholders pro rata for subscription at par $2,670,000 of common stock heretofore unissued as follows: Each stockholder of record of common or preferred stock at close of business on June 6th, may subscribe for new common stock to the extent of 15 per cent. of his holdings of each class of stock.

Since April 1st, 1906, the company has earned after charges on account of bond interest, sinking fund, depreciation and dividends on common and preferred stock, $2,855,339 annually. Of this $487,977 has been declared in common dividends, leaving available $2,367,361 in the surplus account.

The Dominion Steel & Coal Corporation has issued the following circular to Steel and Coal shareholders:

"The proposed issue of stock of this corporation in exchange for the common stock of the Coal Company and Steel Company has now been arranged. The new stock has been listed on the Toronto, Montreal and Boston Stock Exchanges; transfer agents and registrars have been appointed at these places, and a large number of shares have already been exchanged.

"Shareholders who intend to accept the proposed exchange are respectfully requested to deposit their stock with one of the trust companies mentioned in the form sent on 20th April, or to send the certificates direct to the National Trust Company, Limited, Toronto, who will at once send certificates for stock of the corporation in exchange.

"It is intended to close the transfer books from the 16th June to the 2nd July, and only shareholders of record at the closing of the books will be entitled to the payment of $1.00 per share, accruing on 1st July. Shareholders who are prevented by absence, etc., from exchanging their shares in time should communicate the facts to the secretary for consideration by the board.

"A meeting of the shareholders is to be held on Friday, the 17th June, for the election of directors."

The directors of the McKinley-Darragh Company have declared a three per cent. quarterly dividend for the entire ensuing year, payments to be made in July, October, January, and April. An extra dividend of two per cent. has been also declared for the July period.

This is the first time that a dividend has been declared by a Cobalt company for an entire year ahead of time.

The Calumet & Hecla Mining Company has declared a quarterly dividend of $7 a share. The last previous disbursement was $8 a share, and at this time a year ago was $8 a share. The dividend is payable June 28th to stock of record June 4th.

STATISTICS AND RETURNS

The output of the Dominion Iron & Steel Company for the fiscal year ending May 31st shows considerable improvement over that of the previous like period. Following are the comparative figures:

	Gross Tons	
	1908-09.	1909-10.
Pig Iron	248,097	255,932
Steel Ingots	273,646	302,761
Blooms	246,323	269,810
Rails	133,064	147,948
Rods	50,554	81,001

The output of the Dominion Coal Company during May was 296,000 tons.

TYEE COPPER COMPANY, VICTORIA, B.C.

The return of results of operations at the Tyee Copper Company's smelting works at Ladysmith, Vancouver Island, B.C., for the month of April, with one furnace in blast is as follows: "Furnace ran 28 2/3 days and smelted 7,492 tons, producing 625 tons of copper matte, valued at $71,000." No ore was smelted at these works in January, owing to there having been repairs and improvements in progress that month. The figures for three consecutive months to May 1st are as follows:

Month.	Days Run	Tons Smelted.	Tons Matte.	Value.
February	16	4,354	330	$48,190
March	18 1/3	4,750	270	37,000
April	28 2/3	7,492	625	71,000
Totals	63	16,596	1225	$156,190

COBALT ORE SHIPMENTS.

Shipments of ore from Cobalt Camp last week were 1,200,029 pounds, divided among nine mines. La Rose and Kerr Lake were the big shippers. Shipments for the year to date are 23,647,609 pounds, or 11,823 tons. Shipments for the week and year in pounds of ore are:

	Week ending May 28.	Since Jan. 1
Beaver		120,450
Buffalo	57,780	883,368
City of Cobalt		363,835
Chambers-Ferland	58,300	349,360
Cobalt Lake		196,000
Cobalt Townsite		68,000
Colonial		107,260
Coniagas		623,796
Crown Reserve	148,315	2,529,610
Drummond		664,200
Hargraves		41,800
Hudson Bay		123,695
Kerr Lake	304,336	3,382,337
King Edward		174,966
La Rose	380,988	5,204,199
McKinley-Darragh		1,246,599
Nipissing	56,000	4,428,541
O'Brien		648,046
Peterson Lake		270,450
Provincial (Govt.)		65,000
Right of Way	58,000	654,777
Silver Cliff		117,510
Temiskaming	80,000	501,830
Trethewey	56,300	503,950
Waldman		63,992

La Rose continues to lead the Cobalt mines in tonnage, shipping twice as much ore last week as Crown Reserve or Nipissing, the next largest shippers. Ore shipments for the week ending June 3rd were 1,166,724 pounds, or 583 tons. Total shipments from January 1st to June 3rd were 24,814,333 pounds or 12,407 tons. Shipments for the week and year in pounds of ore are:

	Week ending June 3.	Since Jan. 1.
Beaver		120,450
Buffalo		883,386
City of Cobalt		363,835
Chambers-Ferland	56,000	405,650
Cobalt Central		293,286
Cobalt Lake		196,500
Cobalt Townsite		68,000
Colonial		107,260
Coniagas	63,280	687,060
Crown Reserve	188,486	2,718,068
Drummond		664,200
Hargraves		41,800
Hudson Bay		123,695
Kerr Lake	60,380	3,442,717
King Edward		174,966
La Rose	377,390	5,582,381
McKinley	151,140	1,397,719
Nipissing	127,586	4,556,127
O'Brien		648,046
Peterson Lake		270,450
Provincial (Govt.)		65,000
Right of Way	82,500	757,257
Silver Cliff		117,510
Temiskaming	60,000	561,830
Trethewey		503,950
Waldman		63,922

B. C. ORE SHIPMENTS.

Nelson, B.C., May 30.—Appended are the details of the ore shipment and smelter receipts:

ORE SHIPMENTS.

Boundary District.

	Week. Tons.	Year. Tons.
Granby	22,518	518,458
Snowshoe	3,457	75,766
Nickle Plate	42	248
Other mines		144,050
Total	26,017	740,571

Rossland District.

Centre Star	3,121	79,911
Le Roi, No 2	965	13,503
Le Roi, No. 1	501	6,349
I. X. L.	5	46
Le Roi No. 2 (milled)	300	6,300
Other mines		229
Total	5,901	106,358

Slocan Territory.

Ste. Eugene (milled)	2,775	58,275
White Water (milled)	600	12,600
Van Roi (milled)	800	16,800
Kootenay Belle (milled)	70	1,470
Granite Poorman (milled)	250	5,250
Queen (milled)	420	8,830
Nugget (milled)	110	2,310
Sullivan	242	4,721
Ste. Eugene	224	7,000
Van Roi	32	543
Rambler	21	421
Standard	33	324
Eastmount	32	311
Queen Victoria	61	61
Yankee Girl	109	2,051
M. T. (Trail)	28	28
Silver King	56	1,423
Butta	31	267
Other mines		22,587
Total	5,894	146,277
Total shipments	36,812	993,206

Smelter Receipts.

	Week.	Year.
Granby	22,518	518,579
Consolidated Co., Trail	9,312	207,109
B. C. Copper Co. (Greenwood)		145,935
Total, tons	31,830	871,623

OPEN-HEARTH STEEL PRODUCTION IN 1909.

The American Iron and Steel Association has just compiled its statistics for the production of open-hearth steel ingots and open-hearth castings in 1909. They show that the total was

14,493,936 gross tons, against 7,836,729 tons in 1908, an increase of 6.657,207 tons, or 85 per cent. The production in 1909 was much the largest in the history of the industry and exceeded that of 1907, the next largest year, by 2,944,200 tons, or 25.4 per cent. In 1908 the production of open-hearth steel for the first time exceeded that of Bessemer steel, the totals in that year being 7,836,729 tons and 6,116,755 tons respectively. For 1909, the figures were 14,493,936 tons and 9,330,783 tons, respectively. The total production of basic open-hearth ingots and castings was 13,417,472 tons, while that of acid open-hearth ingots and castings was 1,076,464 tons.

TORONTO MARKETS.

Metals.

June 8.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 34.50 cents per lb.
Copper, casting, 13.75 cents per lb.
Electrolytic, 13.75 cents per lb.
Ingot Brass, 9 to 12½ cents per lb.

June 8.—Pig Iron.—(Quotations from Drummond McCall Co., Toronto.)
Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee No. 2, $23.00 (f.o.b. Toronto).
Midland No. 1, $22.00 (f.o.b. Toronto.)
Hamilton No. 1, $21.00 (f.o.b Hamilton).
Hamilton No. 2, $20.50 (f.o.b. Hamilton).
Clark's, $20.75 (f.o.b. Toronto).
Cleveland, $21.00 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

June 6.—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.65 to $1.70 per ton.
Foundry coke, prompt, $2.25 to $2.35 per ton.

June 6.—Tin, Straits, 33.10 cents.
Copper, Prime Lake, 13.00 cents.
Electrolytic Copper, 12.75 to 12.80 cents.
Copper Wire, 14.25 cents.
Lead, 4.40 to 4.42½ cents.
Spelter, 5.45 cents.
Sheet Zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.37½ cents.
Aluminium, 23.50 to 24.00 cents.
Nickel, 40.00 to 49.00 cents.
Platinum, ordinary, $30.00 per ounce.
Platinum, hard, $35.50 to $36.00 per ounce.
Bismuth, $1.75 per lb.
Quicksilver, $47.00 to $48.00 per 75 lb. flask.

SILVER PRICES.

	New York cents.	London pence.
May 21	53⅞	24 13/16
" 23	53⅞	24 13/16
" 24	53¾	24¾
" 25	53⅝	24 11/16
" 26	53¾	24¾
" 27	53¾	24¾
" 28	53¾	24¾
" 30	....	24 11/16
" 31	53½	24⅝
June 1	53½	24⅝
" 2	53¾	24¾
" 3	53⅝	24 11/16
" 4	53½	24⅝
" 6	53⅜	24⅝

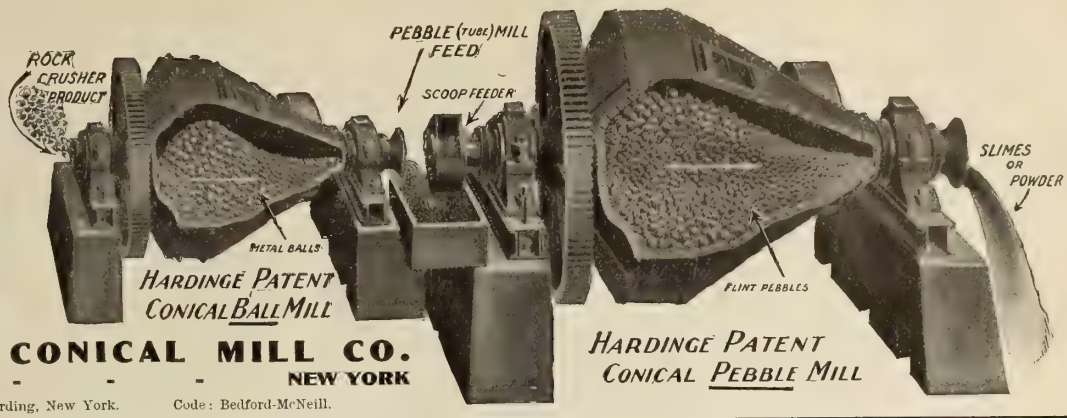
SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.	June 8th, 1910. Bid.	Ask.
Amalgamated Asbestos	21	22
Dominion Coal Company	65	66
Dominion Steel Company	65	66½
Nova Scotia Steel	83¾	84¼
Granby	39	41
Consolidated Smelting	77	80
Crow's Nest Pass	..	88
Cobalt Stocks.		
Amalgamated	.02	.05
Beaver Consolidated	.26½	.27½
Buffalo	2.25	2.60
Chambers Ferland	.22½	.25
City of Cobalt	.25	.27
Cobalt Central	.10	.10¼
Cobalt Lake	.23	.25
Coniagas	4.80	5.50
Crown Reserve	2.90	2.95
Gifford	.06½	.08
Foster	.14	.16
Green Meehan	.02¼	.03
Great Northern	.07	.09
Hudson Bay	100.00	110.00
Hargraves	.24	.25
Kerr Lake	8.25	8.50
La Rose	4.30	4.40
Little Nipissing	.16⅝	.17
McKinley-Darragh-Savage	.95	1.00
Nancy Helen	.04½	.05½
Nipissing	11.40	11.62½
Nova Scotia	.34	.37
Otisse	.04	.05
Peterson Lake	.22½	.23
Right of Way	...	...
Rochester	.17⅝	.18
Silver Leaf	.08	.08½
Silver Bar	.04½	.05½
Silver Queen	.10	.12
Temiskaming	.62¼	.62¾
Trethewey	1.24	1.25
Watts	.04	.10
Ophir	.20	.50
Wettlaufer	.80	.90
New York Curb.		
Boston Copper	18	18½
British Columbia Copper	5½	6
Butte Coalition	17⅝	18
Canadian Mines	6	6¼
Chino Copper	10⅝	11¼
Davis-Daly Copper	1 9/16	1⅞
Ely Consolidated	.54	.56
Gila Copper	5½	6½
Giroux Mining	6¾	6⅞
Goldfield Consolidated	8⅜	8½
Greene-Canadian	7¾	7⅞
Harcuvar Copper	32	33
Inspiration Copper	7	7 1/16
Miami Copper	19⅞	20
New Baltic Copper	6	8
Nevada Consolidated Copper	19¾	20
Ohio Copper	1 15/16	2
Rawhide Coalition	.24½	.25
Ray Central	2⅜	2½
Ray Consolidated	16½	17
Union Mines	1	1 3/16
Yukon Gold	4¼	4⅜

STEP REDUCTION
Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of."



HARDINGE CONICAL MILL CO.
37 Wall Street, - - - NEW YORK
Cable Address: Halharding, New York. Code: Bedford-McNeill.

NOTICE

STUDENTS EMPLOYMENT REGISTER,

The CANADIAN MINING JOURNAL has opened an employment register for students taking mining or metallurgical courses at Canadian Universities or Technical Colleges. Mine operators who wish to employ students during the summer months are requested to communicate with the Business Manager.

Students are requested to send in their names, along with brief records of experience. These will be filed and no effort will be spared on our part to place applicants in immediate communication with possible employers.

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

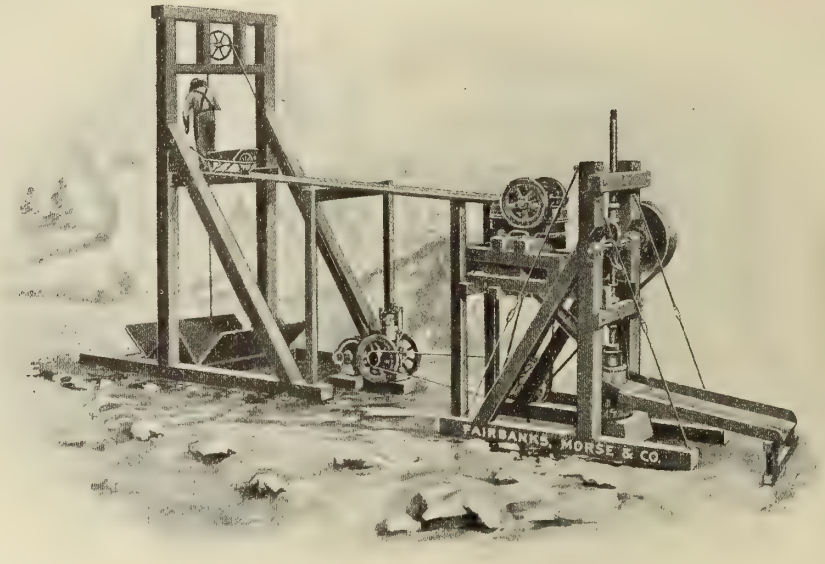
hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

J. S. CARTER, General Agent, 217 McDermott Ave. Winnipeg.

I. E. SUCKLING, General Agent, S. E. Cor. King & Yonge Sts. Toronto



PROSPECTOR'S OUTFIT—FITTED WITH

NISSEN STAMP MILL

A practical outfit for prospectors—one that is easily taken apart for transportation, and that can be used as a unit in a larger plant should your claim make good. One man is all that is required to operate the outfit. A FAIRBANKS-MORSE gasoline engine furnishes the power. Nissen Stamps are conspicuous for their large capacity and small power consumption. Descriptive pamphlets upon request.

The Canadian Fairbanks Company, Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

Montreal **Toronto** **St. John, N. B.** **Winnipeg** **Calgary** **Vancouver**

CONSTANT-HERZIG COMPANY

SUCCESSOR TO

C. L. CONSTANT COMPANY

MINING ENGINEERS AND MINE MANAGERS

ASSAYERS AND ANALYSTS

42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

ORES WANTED

Molybdenite	**Tungsten**	**Talc**
White Mica	**Barite**	**Graphite**
Zincblende	**Corundum**	**Fluorspar**
Feldspar	**Arsenical ore**	**Asbestos**
Lead	**Apatite**	**Tin**
Cinnabar	**Pyrites**	**Copper**
Sodalite	**Pink quartz**	**Beryl**
Magnesite	**Titanite**	**Rutile**

Address "SPINEL"
Canadian Mining Journal - Toronto

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,
Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada.
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. Sc.
MINING ENGINEER
24 Adelaide St., West, Toronto, Can.
Cable Abmott Phone Main 5063

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers and Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

S. F. KAVANAGH
Assayer
Mining Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors.
Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
Phone M-7515
627 Goristine Bldg., Montreal.

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

Millman Wanted
Young man with experience in milling—must have fair knowledge of machinery and of handling men. Apply stating experience and wages to G. O. G., care of
CANADIAN MINING JOURNAL
Toronto, Ont.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, ROOM 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc., and any work connected with the mining profession.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT. Works: COBALT, ONT.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.

1025. Waverley Sheet.

1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.

1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.

1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.

1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

1072. Summary Report of the operations of the Geological Survey for year 1908.

1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.

1075. Gowganda Mining Division, 1908. W. H. Collins.

1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.

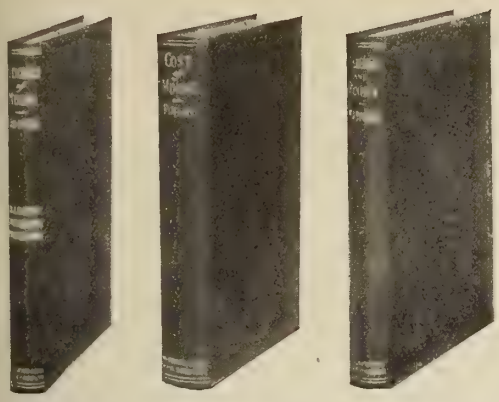
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific. profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Electrical Engineering.
   - (g) Mechanical Engineering.
   - (h) Biology and Public Health.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners

Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:

32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE

CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES

43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderat

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto
FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MINERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1 00.**

DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **$1.50** paper cover, **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of these books in his library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd. xii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M, & Co. xx
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Buyers' Directory xxx
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xx
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii

C

Canada Metal Co..... ix
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories iv
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H. xiv
Canadian Copper Co..... ...xxiv
Crow's Nest Pass Coal Co....xxix
Canadian Bronze Powder Wks.xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd..... xiv

D

Deister, Emil iv
Dominion Bridge Co.....ix
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Dominion of Canada xxix
Deister Slime Tables iv
Davis, John & Son xvi
Dessau's, S. Son vii
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co,, Ltd.....viii

E

Evans, J. W.....xix

F

Fleck, Alex., Ltd.....xii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii
Hardinge Conical Mill Co.....xvii

I

Index to Advertisers xxviii
Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C. xx
Laurie & Lamb i
Lymans, Ltd. xii
Link Belt Co.....xi
Leckie, J. Edwards xx
Ledoux & Co. xx
The Lancashire Dynamo and Motor Co., Ltd. xiv

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Morris Machine Works ix
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Morton's B, C. Drill Steel....xxix
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
McKee & McLeod Co.....v

N

Nova Scotia Steel & Coal Co..viii
Newton & Treloar xxvii
Nova Scotia, Province of....xxvi
Nissen Stamps xviii
Northern Canada Supply Co., Ltd. xiv

O

Ontario Powder Co.....vi
Orford Copper Company xxi
Ontario, Province of xx

P

Peacock Bros .....vi, vii, xv
Paterson Mfg. Co, ...ii

Q

Quebec, Province of xxv

R

Robb Engineering Co. ii
Ryckman, Kerr, MacInnes & Mahon x

S

Sullivan Machinery Co i
Standard Diamond Drill Co....xi
Stanley, W. F., & Co., Ltd.....i
Smart-Turner Machine Co., Ltd..... xv
Scott, O. N. x
School of Mining xxii
Simpson, Robert Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...i
Smith, Thos. & Wm., Ltd...xxi

T

Tyrrell, J. B.....x
Toronto University xxvi
Turner, J. J. & Sons xvii

U

United Typewriter Co., Ltd.....x

V

Vandeleur & Nichols xi

W

Waterous Engine Works Co.....
Walker Bros. v
Willmott, A. B. x
Ways Pocket Smelter Co....xxvi
Wetherill Separating Co.....xi

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,03 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land ha been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in th Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed b Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-ON-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despat
If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertis
kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co,
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
McKee & McLeod Co.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link Belt Co.
Mussens, Ltd.
Peacock Bros,

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock.
S. Flory Mfg, Co.
M. Beatty & Sons.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Chemists' & Surgeons' Supply Co.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock.
Peacock Bros.
Canadian Cleveland Drill Co,, Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Alex. Fleck, Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Lt
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis-Chalmers-Bullock.
Peacock Bros,
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

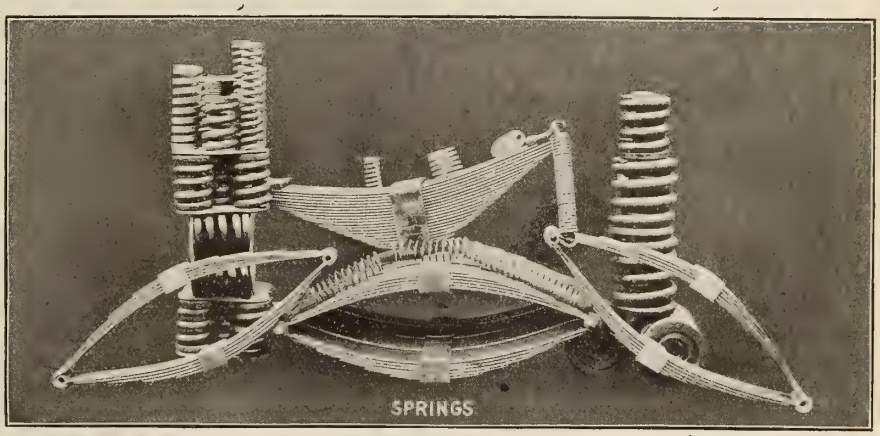
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse

Type "CCL" Induction Motors

The only wearing parts of

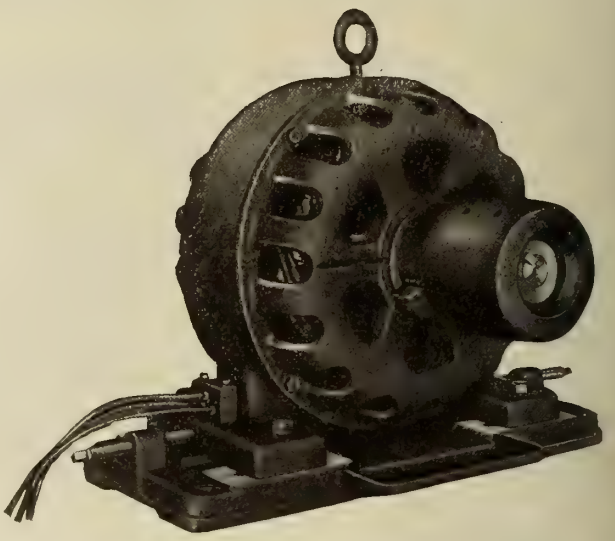
Type "C C L" Motors—the bearings

are designed and constructed to withstand years of the severest service without other attention than an occasional filling of the oil wells.

On motors above 5 horse power capacity the bearings are split, the interior of the housing forms the bearing shells which are lined with a special grade of bearing metal, the bearing housings are clamped between the halves of the bracket and are held in perfect alignment with each other by dowel pins.

On motors below 5 horse power capacity the bearing housings are cast solid with the bracket, and the bearings are bronze bushings pressed into place and pinned.

Each split bearing has two oil rings; the solid bearings one. The lower part of the housing forms an oil well from which oil is carried by the rings to the top of the shaft and distributed through grooves to all parts of the bearing, thus keeping it flooded with oil while the motor is in operation. **Ask nearest office for Circular 1118. It tells all about Type "CCL" Induction Motors.**



Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Street West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

A Ten-by-twelve Tent for $9.90

Made of 8-Ounce Duck



THIS is a photographic illustration of a special tent we have had made on a quantity-order basis. In no other way could we supply a tent of this size and quality of canvas for $9.90.

Made of 8 ounce duck, with double sewn seams and re-inforced strain points.

Used either with an outside ridge pole, or a ridge rope stretched between trees. An ideal prospector's tent with plenty of wall.

Dimensions—Height, 7 feet; Length, 12 feet;
Width, 10 feet; Height of walls, 3 feet.

Complete with guy ropes, ... **$9.90**

Poles and pegs if desired, **95c** extra

A "Black-Fly"-Proof Netting

A SPECIAL FLY NETTING with *smaller mesh* than the ordinary mosquito netting, so that it is proof against Black Flies, and all other insect pests. This netting we have had made to meet a special demand from the north country; per yard—9 cents, or piece of 24 yards for **$2.00**

36 INCHES WIDE, WHITE OR GREEN.

THE ROBERT SIMPSON COMPANY LIMITED
TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

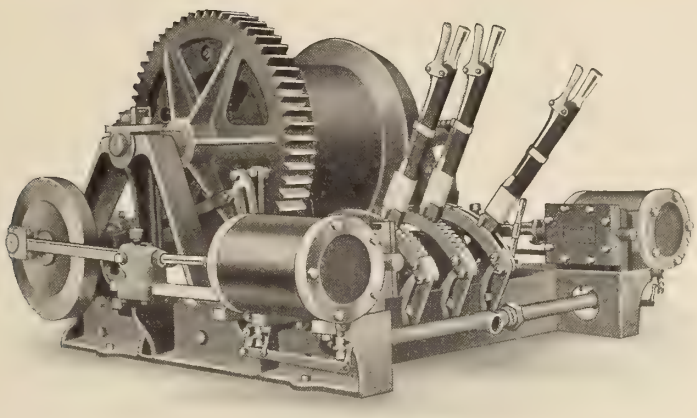
The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

JULY 1st, 1910 SINGLE COPIES, 15 CTS.

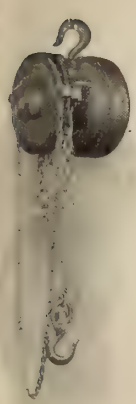
THE CANADIAN MINING JOURNAL

31 TORONTO No. 13



Small Mine Hoists in Stock

We can give prompt shipment on any size of Small Mine Hoists.
Let us quote you prices and send you full details.



Reading Chain Blocks

All capacities in stock. The most efficient, durable and convenient blocks made.

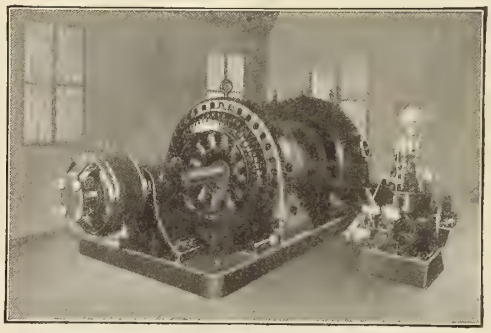
MUSSENS LIMITED

MONTREAL, 18 St. James St. | TORONTO, 73 Victoria St. | COBALT, opp. Right of Way Mine | WINNIPEG, 259-261 Stanley St. | CALGARY, Crown Bldg. | VANCOUVER Mercantile Bldg.

ELECTRIC POWER

FOR

MINING OPERATIONS

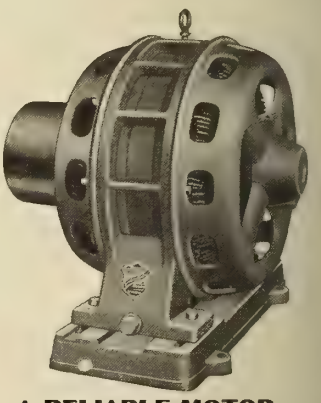


HYDRO-ELECTRIC PLANTS.

360 H.P. Water Wheel and 250 K.W. Alternator, with auxiliary apparatus, built by Allis-Chalmers-Bullock Ltd.

Electric drive is the most convenient and the easiest available power for mining operations. We are the only firm in Canada which builds complete hydro-electric plants including water wheels, generators, transformers and all auxiliary apparatus.

Our induction motors are designed to withstand hard usage and are especially suitable for driving rock crushers, stamp mills, crushing rolls, hoisting engines, tube mills, turbine pumps, jigs, vanners, etc.



A RELIABLE MOTOR.

ALLIS-CHALMERS-BULLOCK

LIMITED

WORKS - - - MONTREAL

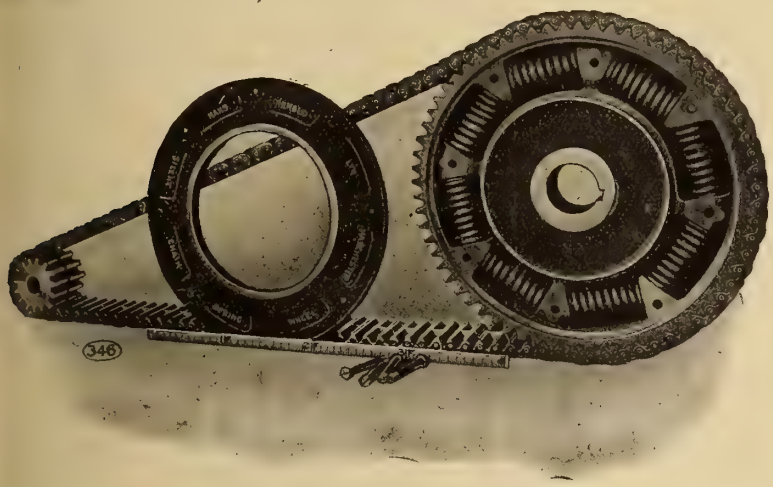
SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

Renold Patent Silent Chain

is constructed on sound, simple principles, and does not require expert knowledge to either install it or make a joint.



Spring Cushion Sprocket with Cover off.

For drives of a pulsating nature, Spring Cushion Sprockets are furnished, in which springs are interposed between the boss and the rim, thus absorbing the fluctuations of the load, preventing the shocks from being transmitted through the machinery. By their use chains are being successfully applied to drives of an extremely severe nature.

WRITE FOR PARTICULARS

JONES & GLASSCO

Sole Canadian Agents **MONTREAL**

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just because it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line. As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO. LIMITED

COBALT, ONT.
P. O. Box 310

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



CHOOSE THE RIGHT DRILL
FOR YOUR PARTICULAR CONDITIONS.

If too small, your drill holes will not be large enough or deep enough to shoot the rock economically; or your repairs will be unduly high.

If too large, labor and power will be excessive. Some valve-motions work well on heavy pressure, against hard even rock, others excel in soft or broken ground, on lower air pressure.

There is a Sullivan Drill which may be relied on to develop the highest possible efficiency and economy under any given set of working conditions.

As specialists in fitting drills to the service required, we solicit your inquiries.

ASK FOR CATALOGUE 660



Air Compressors Hammer Drills
Coal Cutters Diamond Core Drills

SULLIVAN MACHINERY CO.

CLAREMONT, N.H. **CHICAGO, ILL., U. S. A.**

BIRMINGHAM DENVER KNOXVILLE PITTSBURG COBALT, ONT. SAN FRANCISCO PARIS, FRANCE SALT LAKE
BUTTE JOPLIN NEW YORK ST. LOUIS NELSON, B. C. SPOKANE SEATTLE SYDNEY, AUS. EL PASO

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

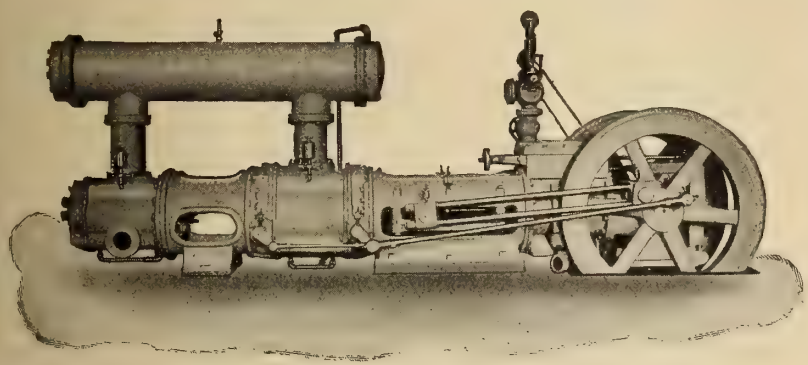
Address nearest office to-day.

THE PATERSON MANUFACTURING COMPANY, LTD.
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Straight Line, Steam Driven Compound Air Compressors

High *efficiency, simplicity* and ease of accessibility are distinct characteristics of the Class C-2 Compressor.

Corliss Inlet Valves on Low Pressure Air Cylinder, giving exceptionally large direct intake areas, practically unlimited life, quiet operation at all speeds and sustained high volumetric efficiency.



A simple direct Corliss Valve motion in which all complications have been eliminated and best efficiency obtained.

—*—

Sole Agency for B.C. Drill Steel in Cobalt Territory.

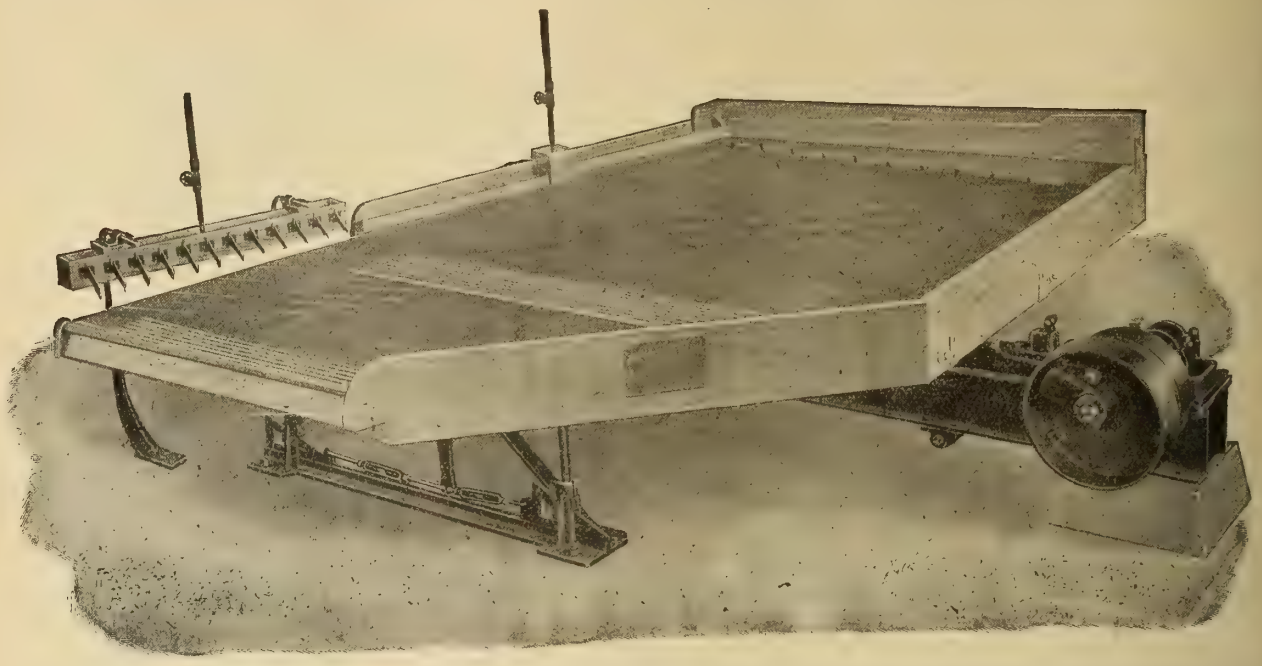
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO. COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French	Cochin-China
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

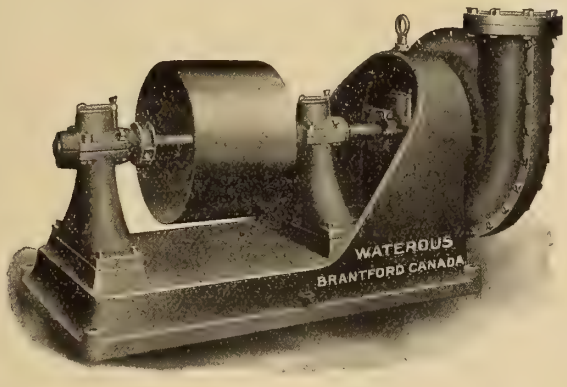
3,000 IN USE

For Mine Drainage

where compact, durable and easily operated machinery is desirable

OUR SPLIT-BASE PUMPS

will fill every requirement.



—ENGINE, MOTOR OR BELT DRIVEN—

In sizes of 4, 6, 8, 10, 12 or 14 inch opening

Write for Catalogue No. 200

The Waterous Engine Works Co., Ltd. **Brantford Canada**



If I Could Only See You

I could help you save money, oil, fuel and wear and tear on your plant.

Harris Heavy Pressure Bearing Metal

is the best for general machine bearings.

Will you write for price?

We will gladly quote and send you Booklet on Babbitt Metals Manufactured and guaranteed by

THE CANADA METAL COMPANY, LTD., TORONTO

EXPLOSIVES

Of Every Description

TRADE MARK — CURTIS'S & HARVEY LTD LONDON — DRAGON BRAND

BEST QUALITY ONLY

Blasting Powder, Compressed Pellets, Dynamite, Gelignite, Gelatine Dynamite and Blasting Gelatine.
Cheddite will not freeze or exude.

Permitted Explosives for Gaseous Mines:—
Bobbinite has the largest sale of any Permitted Explosive.
Excellite, Kolax, Curtisite, Rippite, Etc., Etc.

Only makers of the Celebrated "Diamond ◆ Grain" Black, "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders.

Manufactured by

Curtis's & Harvey, Limited

Head Office: 3, Gracechurch St., London, E.C.

THE

Bennett Fuse

Crown  **Brand**

MANUFACTURED BY

William Bennett, Sons & Co.

CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.

VICTORIA, B.C.
AND AGENCIES THROUGHOUT THE DOMINION.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS
Rutherglen, Glasgow, Scotland

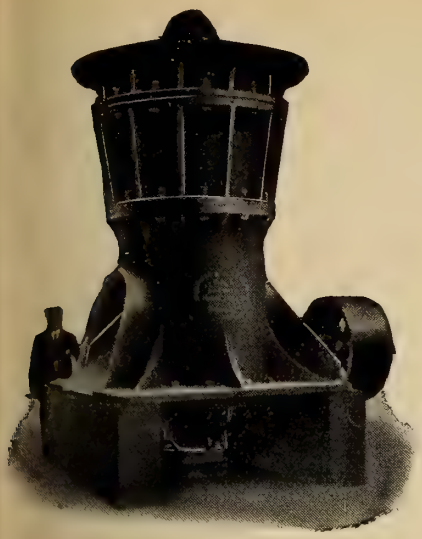
WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz:

Nova Scotia: Wm. Stairs, Son & Morrow, Limited. **New Brunswick: W. H. Thorne & Co., Limited.**
Montreal and Toronto: Drummond, McCall & Co. **Vancouver, B.C.: John Burns.** **Winnipeg: David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables: "Ropery, Rutherglen." Codes: A. B. C. (4th and 5th Editions), A.I., Liebers and Private.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

COAL MINING MACHINERY

Revolving Tipples, Screens, Picking Belts, Chutes, Car Hauls, Complete Plants Designed and Built, Mine Cars, Hoists, Pulleys, Transmission Machinery and Conveyors.

Correspondence Solicited

THE BROWN MACHINE COMPANY, Ltd.

ENGINEERS

NEW GLASGOW = NOVA SCOTIA

PURCHASING AGENTS for Mining Companies will find that they can secure the best goods and the closest prices by getting our quotations on

WIRE ROPE MINING WEBS PERFORATED METAL
HARD STEEL COAL SCREENING CHAIN, ETC.

We are operating the oldest and best equipped wire drawing and weaving mills in Canada. Our facilities are such that we can guarantee prompt shipment of standard goods from our large stocks, and can turn out special orders in record time. Write for Catalogues and quotations before placing your orders elsewhere.

THE B. GREENING WIRE COMPANY, LIMITED
HAMILTON, ONT. - - MONTREAL, QUE.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: **NEW GLASGOW, NOVA SCOTIA**

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

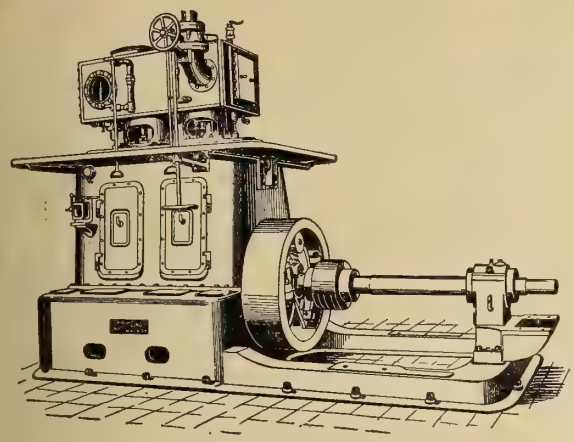
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que. R. W. Robb, Manager
Traders Bank Building, Toronto, - - Wm. McKay, "
Union Bank Building, Winnipeg, - - W. F. Porter, "
609 Grain Exchange Building, Calgary, Alta. J. F. Porter "

M. Beatty & Sons

Limited

Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,

Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,

Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

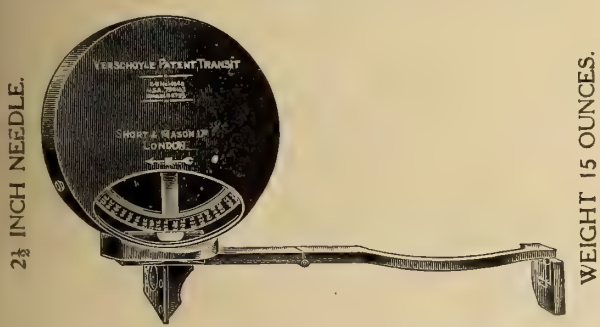
Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments

FOR

Civil, Mining Engineers & Surveyors



THE VERSCHOYLE POCKET TRANSIT

combines the useful features of the Abney Level, Prismatic Compass and Clinometer

For preliminary surveys of every description

Catalogue On Request

Eugene Dietzgen Co.

LIMITED,

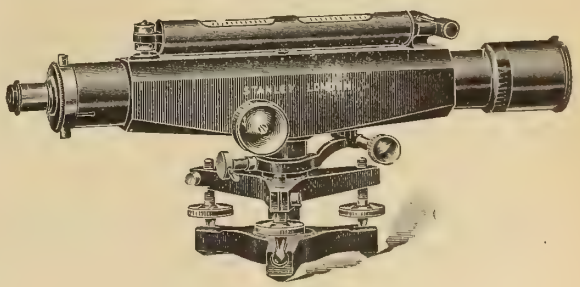
TORONTO, - 10 SHUTER STREET

STANLEY, LONDON

The largest manufacturers of

Surveying and Drawing Instruments

in the World.



New Engineer's Level

The strongest and most compact level yet made

Please send for our J 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE

STANLEY

MARK

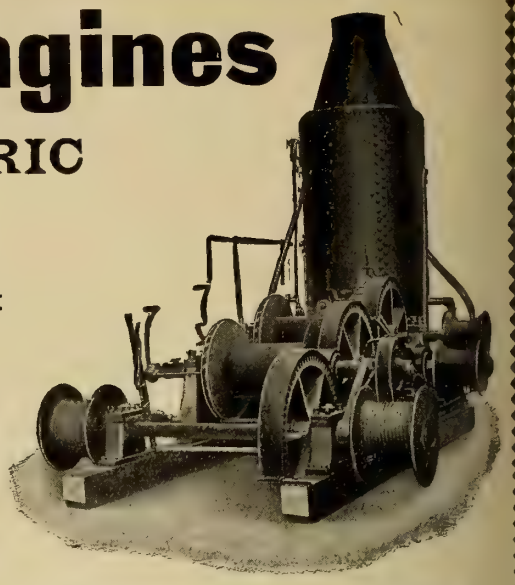
W. F. Stanley & Co., Limited

Great Turnstile, London, England

Flory Hoisting Engines

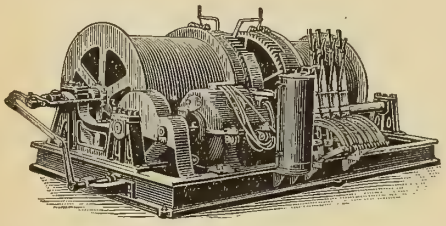
STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.



The FLORY CABLEWAY SYSTEM is Superior to any on the Market

Slate Mining and Working Machinery



SALES AGENTS:
J. MATHESON & CO., New Glasgow, Nova Scotia.
MUSSENS LIMITED, Montreal, Que.

S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.



WHERE IT'S ALWAYS COOL

Get away for the week-end for a rest, a comfortable fishing trip, or change of air and scenery.

ASK FOR A WEEK-END PAMPHLET

HAVE YOU TRIED

KAWARTHA LAKES
STONEY LAKE, ETC

Reached via Bobcaygeon, Peterboro or Lindsay — Immediate connection with C.P.R. trains.

ASK FOR ILLUSTRATED FOLDER

POINT AU BARIL
"THE FINEST SUMMER RESORT ON THE GEORGIAN BAY"

Steamer "Wanakewan" leaves C.P.R. Station wharf for Island Resorts—Immediate connection.

ASK FOR ILLUSTRATED FOLDER

MUSKOKA LAKES
BEST REACHED VIA BALA

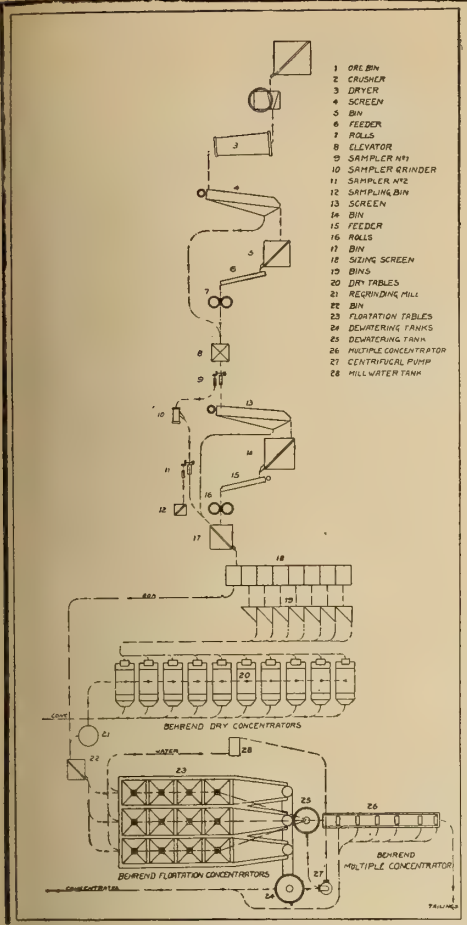
Lv. Toronto:
9:40 a.m. daily 12:15 p.m. week days
6:05 p.m. week days 10:10 p.m. daily

ASK FOR ILLUSTRATED FODER

CANADIAN PACIFIC RAILWAY

THE LINE FOR ALL VACATION SPOTS

R. L. THOMPSON - - District Passenger Agent - - TORONTO



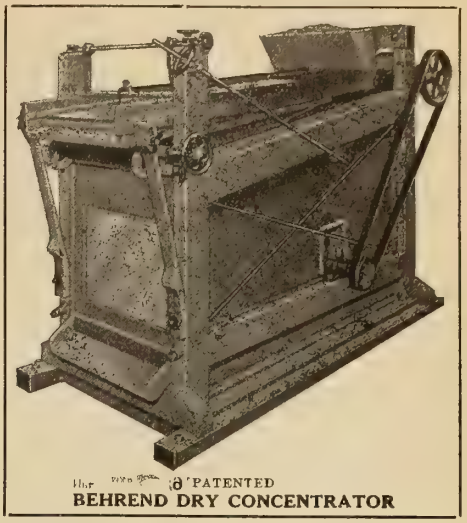
FLOW SHEET

OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM OF DRY and WET CONCENTRATION



PATENTED
BEHREND DRY CONCENTRATOR

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED

32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

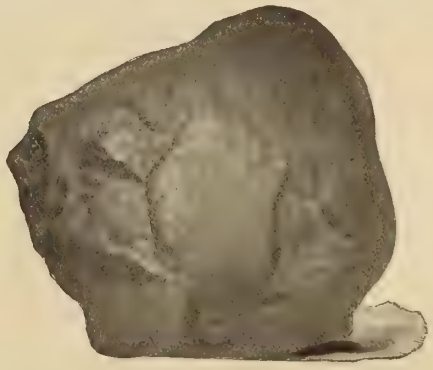
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

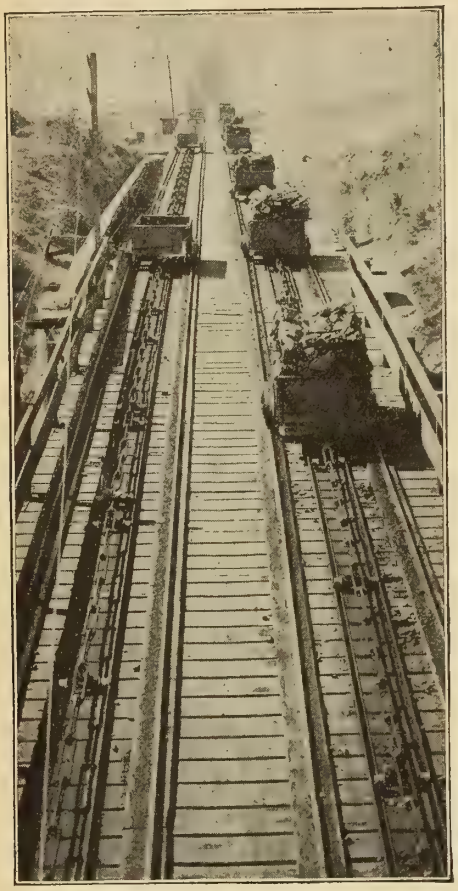
(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.



CAR HAULS

Retarding Conveyors
All kinds of Chain Conveyors
Belt Conveyors
Tipples
Coal Pockets
Power House Fueling Equipments
Ball-Bearing Turntables
Lumber and Log Hauls
Car Loaders and Unloaders
Bucket Carriers
Picking Bands
Washeries
Chutes
Hoppers, Feeders
Weigh Boxes, Crushers
Rotary, Stationary and Shaking Screens
Conveying and Power Transmission Chains
Sprocket Wheels, Small Rollers and Truck Wheels for Conveyors, Carriers and Cars

We have issued a revised edition of our Book on Coal Mine Conveyors, copies of which will be sent to any address you specify.

LINK-BELT COMPANY

PHILADELPHIA
NEW YORK
299 Broadway
SEATTLE
439-440 N.Y. Block
CHICAGO
PITTSBURGH
1501-2 Park Building
DENVER
Lindrooth, Shubart & Co.
SAN FRANCISCO, Eby Machinery Co.
INDIANAPOLIS
ST. LOUIS
Central Nat'l Bank Building
NEW ORLEANS
Wilmot Machinery Co.

The Davis Handbook of the Cobalt Silver District

Illustrated with Photographs

PRICE
Paper Cover = = $1.50
Stiff " = = = $2.00

by H. P. Davis

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = *Canadian Mining Journal* = *Toronto*

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Safest and Best Quality.

Braun Laboratory Appliances

LIST SENT FREE

UPON APPLICATION

LYMANS, Limited,
MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

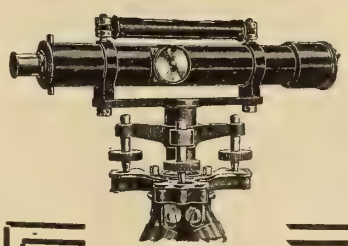
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



DUMPY (SURVEYING) LEVELS

BEST DUMPY LEVELS, with powerful telescope, having large object glass, three levelling screws, and improved locking plate. In mahogany case, and with round Tripod Stand.

The first level to be made with stage and parallel plates in one piece. Extra large centres carefully ground ensure accuracy and resist wear. This is "The Level that will last the longest."

Catalogue F. on request.

Joseph Casartelli & Son,
Scientific Instrument Makers,
43 Market Street,
Manchester, Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys, Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co, Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire-threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.
And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.
Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

Specify Distinctly  Allen's Stag Brand

"STAG" BRAND.

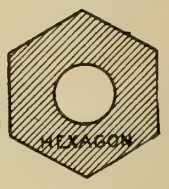


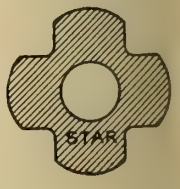


SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock





SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

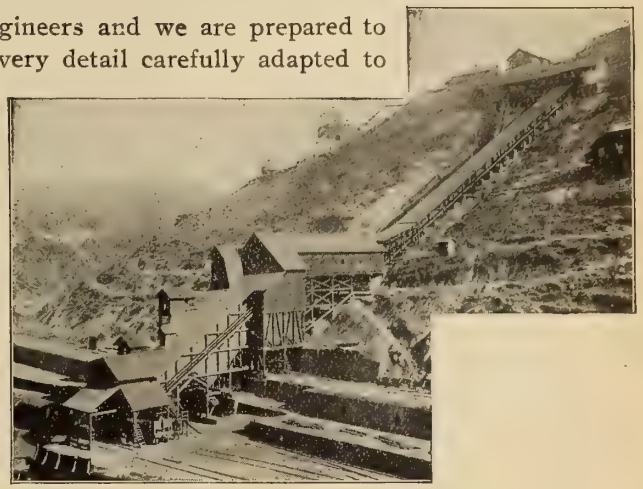
Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL

How to Increase the Efficiency of your Coal Tipple

This problem has been solved by our Expert Engineers and we are prepared to design, erect and equip Coal Tipples complete with every detail carefully adapted to meet special requirements of existing conditions.

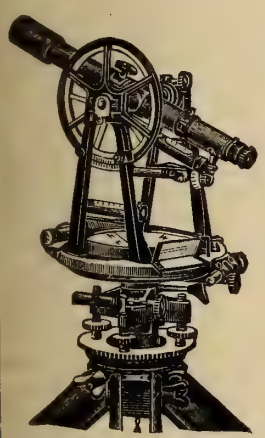


Our long experience in the design and construction of Coal Tipples enables us to combine the latest and most successful methods obtaining in tipple practice.

JEFFREY Catalog No. 22, contains Drawings and Photographs with descriptions of modern installations. Specify Edition " 22-x ".

The Jeffrey Manufacturing Company

Canadian Office and Works, Cote and Lagauchetiere Streets, Montreal
Toronto Office, Room 6, Dineen Building., Temperance Street



C. L. Berger & Sons

37 WILLIAMS STREET
BOSTON, - MASS.

SPECIALTIES :
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

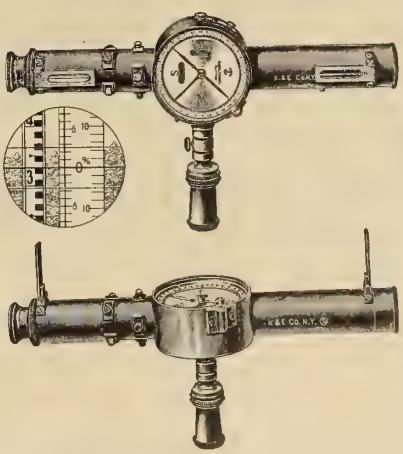
Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196

An Ideal Instrument
For Preliminary Surveying



THE STADIA HAND TRANSIT

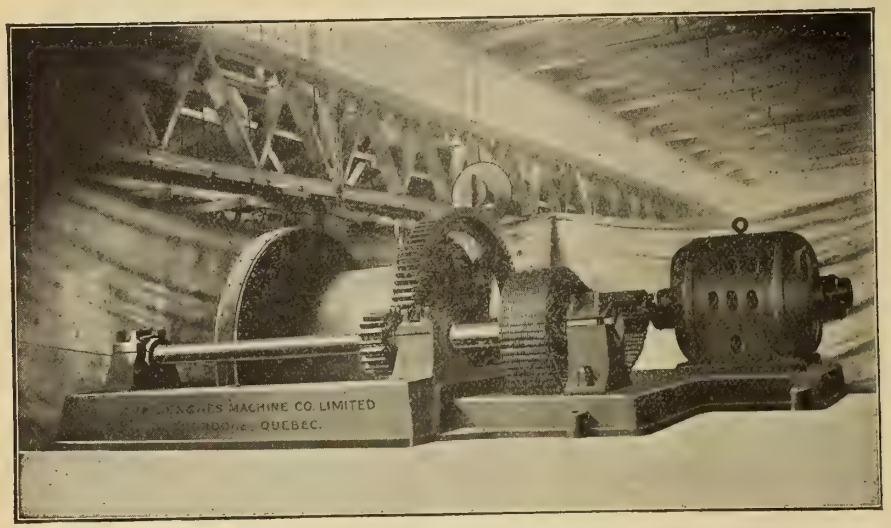
The Stadia Hand Transit gives more accurate and quicker results than any similar portable instrument. It is thoroughly well made and will meet the requirements of those who are engaged on preliminary work, or on the sub-division of larger surveys made with a regular transit.

In measuring vertical angles, the sighted point and both scale readings (slopes and degrees) appear together in the field of view (see cut) Compass bearings can be taken by use of the telescope on level ground or by the folding sights on sloping ground.

Send for complete (550-page) Catalogue.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes



OUR Hoists are compact in design, of heavy construction and sightly in appearance.

We now build electric driven hoisting machines having silent chain drives from the motor.

In all sizes, for every service.

FOR FURTHER PARTICULARS WRITE US

The Jenckes Machine Company, Limited

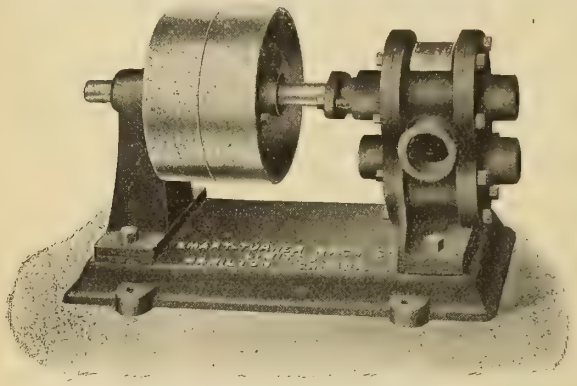
Mining Machinery, Pulp Mill Machinery, Steam and Water Power Plants

SALES OFFICES:

Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver

WORKS, SHERBROOKE, QUE. and ST. CATHARINES, ONT.

We Manufacture Power & Steam Pumps, Condensers, Engines, Boilers, Travelling Cranes, Etc. Write for our Catalogue.

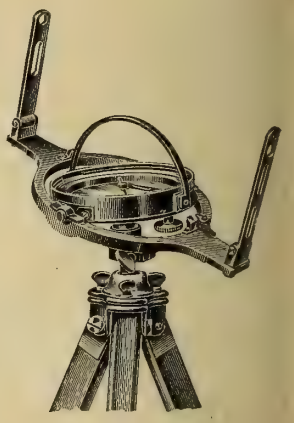


THE SMART-TURNER MACHINE CO., LIMITED,
Hamilton, - Canada.

DAVIS

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers

(Stock at Montreal)
Send for Catalogue



PEACOCK BROS.

68 BEAVER HALL HILL, - MONTREAL

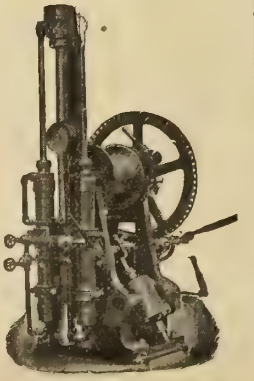
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins,
ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, July 1, 1910 No. 13

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorial 385
(a) Hastings County, Ontario 385
(b) The Compressed Air Question in Cobalt 386
(c) Let the Punishment Fit the Crime 387
(d) Concerning One Appointment 387
(e) Editorial Notes 387
Canadian Iron and Steel, by Watson Griffin 388
Electrolytic Cyanidation, by Elmer E. Carey 393
A Slocan, B.C., Pioneer, by E. Jacobs 394
The Hecla Mine Hoist 398
Mineral Output Ontario, First Quarter 1910 399
Our European Letter 400
Emergency Signaling Apparatus 402
Unique Tunneling Machine, by F. C. Perkins 403
Placer Gold in British Columbia 405
Ministerial Visit to Sulphide, Madoc, and Deloro 406
Book Reviews 407
Correspondence 408
Special Correspondence, etc 409

HASTINGS COUNTY, ONTARIO.

The steady white light of Cobalt; the intermittent glare of Gowganda, Elk Lake, and Lorrain; and the immediate glamour of Porcupine, have thrown an undeserved shadow upon other mining districts of Ontario.

Geographically, Ontario is a vast and rich empire. But the history of its older mining regions has not been written. It is recorded vaguely in the memories of men who have seen three generations come and go.

Last week's visit of the Hon. Frank Cochrane, Minister of Mines for Ontario, to various points in Hastings County, was his ministerial inspection of that district. He was accompanied by Dr. W. G. Miller, Provincial Geologist; Mr. E. T. Corkill, Inspector of Mines; and by the editor of the CANADIAN MINING JOURNAL.

It were out of place to give here an itinerary of the brief journey. Our wish is rather to seize the opportunity to allude to the wonderful variety of minerals, and the unusual number of mining opportunities that exist even in the small section of Hastings County, examined during this visit.

It has become the habit of investors to look upon the mining districts of eastern Ontario as being either dead or moribund. How far this is from the truth is easily discovered by any person who takes the trouble to see for himself. And in adducing illustrations we confine ourselves to a part of Hastings County merely because space will not permit us to do more.

Within a radius of less than thirty miles three flourishing industries are established. At Sulphide, 136 miles east of Toronto on the C. P. R., a large acid manufacturing plant is producing steadily. Four years ago the Nichols Chemical Company began work here. Iron pyrites is mined locally and is purchased from several operators throughout the neighbouring country. This is probably the nucleus of an industry that will in time be second to none of its kind in North America. Deposits of clean pyrites, free from arsenic, occur over a large stretch of country. They wait the advent of the investor.

At Madoc, about fourteen miles to the east of Sulphide, is situated the only talc mill in Canada. The raw material is of exceptional purity. It is mined within a short distance of the town. The ground product now competes with unqualified success in the markets of the United States and Europe. As at Sulphide, so here, the introduction of hydro-electric power has cheapened operations materially. The capacity of the Madoc mill is soon to be doubled. At present the demand largely exceeds the output. Incidentally we may mention that the 125-foot shaft at the talc mine is a gratifyingly clean

piece of engineering, quite beyond the usual standard (or lack of standard) as regards safety and workmanship.

At Deloro, a short distance north of Madoc, is situated the plant of the Deloro Mining & Reduction Company. Here are treated ores from Cobalt, Ont. The recent addition of a complete cobalt-oxide plant brings this establishment into line with the most modern smelters. Cheap hydro-electric power is used here also.

The three places mentioned, Sulphide, Madoc, and Deloro, were the three principal points visited. They represent the three most advantageous centres of industrial enterprise. But the whole surrounding country is rich in such minerals as iron pyrites, copper pyrites, mispickel (nearly always carrying gold), fluorspar, actinolite, iron ores, slate, etc., etc.

We are strongly of the opinion that the whole countryside is worth exploiting. In many respects unique advantages are offered. Labour is plentiful, intelligent, and cheap. Hydro-electric power is available at remarkably low cost. The country is well opened up by railways. Farming and dairying are the chief present activities. Consequently living is cheap. Moreover, the natural beauty of the district, the plentiful supplies of clean water, and the negligible number of mosquitoes and black flies, are features that are positive inducements.

Local mining men have already accomplished much. But there is a limit to their capabilities—a limit set by lack of funds and an absence of outside interest.

We feel no hesitation in recommending such of our readers as are seeking channels of profitable mining investment to look carefully into the mineral deposits and the mining possibilities of Hastings County.

THE COMPRESSED AIR QUESTION IN COBALT.

In fairness to the Cobalt Hydraulic Power Company it was our intention to withhold comment upon certain difficulties that have been encountered by the users of hydraulically compressed air until fuller data should have been secured. Unfortunately, several journals and newspapers have published foolishly exaggerated accounts of these difficulties. Therefore it is but just to place before our readers the facts, such facts, at least, as are now available.

In the first place, we learn that the compressed air supplied by the Cobalt Hydraulic Power Company has been found absolutely satisfactory, except in such drifts and small stopes as are remote from shafts and in which ventilation has always been defective. In these places the "Taylor" air, owing to its deficiency in oxygen, does not readily support the combustion of a candle. "Sunshine" lamps, however, have been proved to work satisfactorily.

As our readers will remember, the plant of the Cobalt Hydraulic Power Company is situated at Ragged Chutes, on the Montreal River, nine miles from Cobalt. The Taylor system of air compression is employed, whereby advantage is taken of the huge volume of falling water to compress air hydraulically. The air is then transmitted to the mines of Cobalt through a system of 20-inch iron pipes.

When, some weeks ago, certain operators at Cobalt found that candles would not burn readily in restricted mine workings where this compressed air was used, it was thought that the asphaltum coating inside the pipe line was doing the damage. Brief reflection shewed that this explanation was untenable.

Light was thrown upon the question by the analysis of samples of air forwarded by the Hydraulic Company to Dr. J. T. Donald, of Montreal. It was found that the compressed air, instead of containing 20 to 21 per cent. of oxygen, contained only 17.7 per cent., the loss naturally being due to the solvent power of water in intimate and continued contact with finely divided air. This, in itself, is quite sufficient to account for the difficulty in using candles.

Upon the announcement of these analytical results alarmists at once predicted that the miners would not be able to work in air so deficient in oxygen. Not content with this, despatches were sent to the press describing purely imaginary instances of suffering. These had not even a colourable foundation in truth. No hardship has been experienced. Particular pains have been taken by those interested to investigate the effect of the air upon miners working in remote faces and stopes. Up to the present the unanimous verdict is that no evil effect is perceptible.

For the past four years "hydraulic" air has been in constant use at the Victoria copper mine, Michigan. Whilst here the same complication as to illuminants has been met and overcome, the miners have been in no way affected. Eighty-five analyses of samples of air from representative coal mines of Scotland have recently been published. Of these, twenty-six fall below 20 per cent. in oxygen contents. The lowest figure reported is 16.55 per cent. Hence conditions such as outlined are by no means unusual. But a marked difference exists in the case of Cobalt. Here air low in oxygen is encountered only in a few isolated workings. The condition is not general. Nor is it in any degree alarming.

Let us now look for a moment upon the other side of the question. The Cobalt Hydraulic Power Company has invested an enormous amount of money in installing the largest natural air compressor in the world. The boldness and vigour of its promoters are beyond praise. The undertaking was one that involved startling engineering difficulties. It has been carried to a successful issue. To Mr. Charles H. Taylor, the Canadian whose ingenuity made the whole thing possible; and to the men who put up the money, Cobalt is deeply indebted. To them, also, we take off our hat. They have supplied Cobalt with a better, cheaper source of power.

Of those persons who thoughtlessly or otherwise pub-

lish michievous untruths or damning half-truths concerning such an enterprise, we prefer to express no opinion. The postal authorities are decidedly more finnicky than they were in the palmy days of personal journalism.

LET THE PUNISHMENT FIT THE CRIME.

The punishment meted out to the men convicted of stealing Cobalt ores and to the local refiner convicted of purchasing these ores from unauthorized sellers, was totally inadequate. It consisted of nominal fines with light terms of imprisonment as alternatives.

We take it that legal punishment is inflicted as a deterrent of crime. Just how effective are the instances above quoted may be judged from the fact that as we go to press we learn that a large quantity of ore has been stolen from the Lucky Godfrey mine.

This miserable and demoralizing business will continue until a judge arises who is possessed of sufficient sense of proportion to make the punishment fit the crime. Anything short of this is inexcusable trifling.

CONCERNING ONE APPOINTMENT.

The appointment of Mr. H. E. Haultain to the position of Professor of Mining Engineering at the University of Toronto affords satisfaction to the mining public. During the past two sessions Mr. Haultain's position was that of associate professor. The translation, though necessarily tardy, is most welcome. The University is still far behind McGill and Queen's in its mining engineering department. Professor Haultain, vigourous though he may be, cannot do justice to the increasing number of students of mining. Toronto University is the largest and richest in the Dominion. The Province of Ontario derives more income from the mining industry than most of the other provinces put together. It should not require a surgical operation to convince both the Government and the University that a larger staff is required. Mining, ore-dressing, and metallurgy are totally distinct subjects of instruction. Were it not consumingly irritating, it would be laughable to observe that mineralogy and geology, two entirely subordinate sciences, are given far more attention than the industry that they are supposed to subserve.

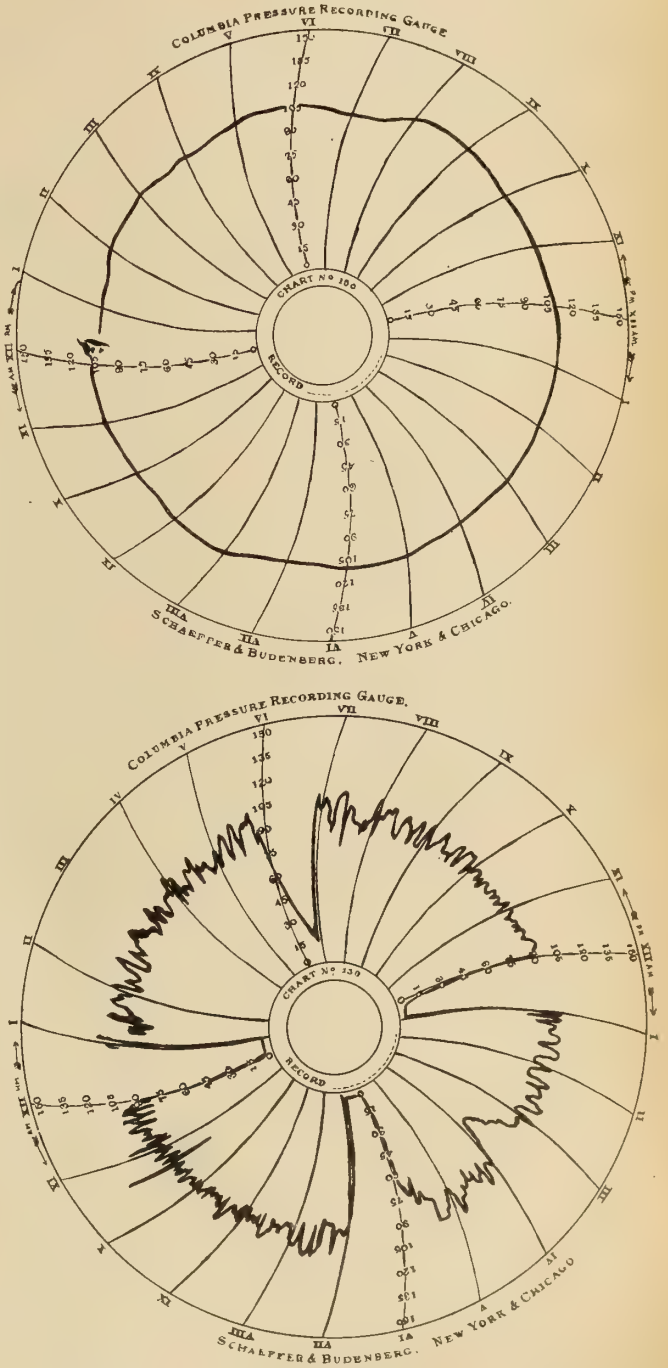
EDITORIAL NOTES.

A hammer drill is being used successfully in sinking a new shaft at Sulphide, Ont.

Spectacular finds of gold have recently been made at Fifteen Mile Stream, Halifax, Nova Scotia.

Before many weeks shall have elapsed we hope to announce the appearance of a special edition of the CANADIAN MINING JOURNAL to be devoted largely to the Province of Quebec. Preparations are now afoot.

In this issue is concluded a remarkable series of articles on the iron and steel industries of Canada. The writer, Mr. Watson Griffin, has for years made a close study of his subject. Perhaps no other Canadian journalist is so well qualified to write of these basic industries as is Mr. Griffin. At an early date these articles will be published in pamphlet form.



TWO CHARTS.

Fig. 1 is a reproduction of a pressure chart showing the daily record of air pressure from the Cobalt Hydraulic Company.

Fig. 2 is a pressure record from the same mine when an ordinary air compressor was being used. The contrast is obvious. Readers are referred to our editorial pages for further comment on this subject.

CANADIAN IRON AND STEEL.

BY WATSON GRIFFIN.

IV.

In my last article I described the location of the raw materials of iron-making, coal iron and limestone, in the Maritime Provinces.

No very large bodies of good iron ore have been proven to exist in the Province of Quebec, although there are widespread indications of iron, but it is possible that extensive beds of iron ore may yet be discovered or that some of the known deposits, now regarded as doubtful, may prove to be of great value.

There is some reason to believe that there may be extensive iron ore deposits along the Gatineau River in Hull Township, Ottawa County, Quebec, within a few miles of the City of Ottawa. Many years ago three mines were opened in what is known as the Hull Range, viz., the Forsyth, Baldwin and Lawless. From the Forsyth mine, 8,000 tons of ore were shipped to Cleveland, Ohio, between 1854 and 1858, averaging, it is said, over 60 per cent. in metallic ore. The ore was magnetite, low in phosphorus and sulphur. Shipments ceased because supplies of ore more conveniently situated for transportation to the Cleveland market, were discovered. In 1867 a charcoal blast furnace was started in the vicinity of the mine, but was only in blast for about a year. At the Baldwin and Lawless mines very little development work has ever been done. Mr. Fritz Cirkel, M.E., of the Dominion Department of Mines, who recently made a report covering 147 pages on the deposits along the Ottawa and Gatineau Rivers, thinks it probable that there may be a large body or ore in the Forsyth, and says that while the Baldwin deposits seem to be more irregular and to consist largely of pockets, the quantity of ore exposed, although scattered, is of sufficient importance to justify mining operations on a large scale. Of the Lawless mine he says that no solid ore bed of any extent can be seen on the surface, but there are some pockets of very good quality. He states that the principal constituent of the ores of the Hull Iron Range is magnetite, intermixed at some places with hematite and associated with a gangue material, and that they contain from 53 per cent. up to about 67 per cent. of metallic iron, the highest percentages being obtained from magnetite ores free from hematite. The ores are very low in phosphorus. Sulphur is present in the form of pyrites and is in some cases confined only to the edges of the deposit. Mr. Cirkel believes that in actual mining these parts of the deposits can be passed by or the pyrites can be eliminated by cobbing. The iron bearing area is estimated as having approximately a length of 6,800 feet, while the width ranges from 40 feet to 100 feet. The deposits are numerous in the eastern portion of the range, but thin out in the extreme western portions. In the Township of Templeton near the boundary of Hull Township, is the Haycock mine, where in April, 1873, rather extensive mining operations were begun and continued for several years. No work has been done for over thirty years. Very little information is obtainable regarding the old mining operations. Mr. Cirkel reports that all the deposits he examined so far as surface indications go are of limited extent, but he thinks it possible that large ore bodies may be found in the neighbourhood. The Haycock ore is hematite, having sometimes an admixture of magnetite, and samples taken from a number of pits indicate that it has a high percentage of iron, being low in both phosphorus and sulphur, but high in titanic acid. There are several other iron ore deposits in Templeton Township, which appear to be of much the same character as the Haycock. Mr. Cirkel reports that there are many small outcrops of both magnetite and hematite in the different townships bordering on the Gatineau River, but the value of the deposits cannot be determined without development work.

The Bristol iron mines are in the Township of Bristol, County of Pontiac, about two miles north of the Ottawa River and a little over four miles from Wyman station on the Canadian Pacific Railway. Between 1885 and 1888 about 12,000 tons of magnetite iron ore are said to have been shipped, principally to Pennsylvania furnaces, but no mining has been done for twenty-one years. Samples of ore analyzed show that it is high in metallic iron, very low in phosphorus, somewhat high in sulphur, and contains a small percentage of titanic acid. Mr. Cirkel says that the ore, though generally called magnetite, is really a mixture of crystalline magnetite and hematite of varying proportions. Regarding the sulphur, he says: "In the Hull Iron Range, iron pyrites is met with mostly in a coarse form in certain portions of the ore bodies, and these can easily be separated by hand from the pure ore. The distribution of iron pyrites throughout certain masses of the ore bodies at the Bristol mines, in the form of fine irregular veins and disseminations, renders mechanical cleaving impossible, consequently such ores, which from outside appearance contain too much pyrites, must be submitted to a roasting process, in order to keep the contents of sulphur in the smelting ore below the admissible limit." However, Mr. John Birkenbine, M.E., who made a report on the Bristol mine in 1888, said that while the large quantity of pyrites in the upper levels of the mine necessitated roasting the ore, the pyrites had become so much diminished in the lower workings that roasting was no longer necessary.

The Bristol iron-bearing formation has an approximate length of about 1,500 feet and an approximate width of 500 feet. "As to the extension of the ore bodies in depth," says Mr. Cirkel, "it is known that in the main shaft a depth of 200 feet has been reached and that the ore there is still continuous. In another place a depth of seventy-five feet was reached and, according to the statement of the foreman who worked this pit, the bottom is still in good ore."

The Chats waterfall of the Ottawa River is within a few miles of the Bristol mine and electric power could be developed at very low cost.

There are a number of deposits of iron ore throughout the County of Pontiac. Some of them are evidently poor in quality and limited in extent. Others make a better showing, but only development work would prove whether they are of any value or not.

On Calumet Island, in the Ottawa River, both magnetite and hematite ores have been found, but no development work has been done and the quantity of ore is uncertain. An analysis of hematite ore showed it to be very low in both phosphorus and sulphur, but it contained a small percentage of titanic acid.

There are large supplies of limestone within easy reach of the iron ore deposits along both the Gatineau and the Ottawa Rivers, and there are a number of waterfalls not far distant, from which electric power could be obtained. It has been suggested that these ores might be smelted by electricity.

In Grenville Township of Argenteuil County, about half way between the cities of Montreal and Ottawa, are iron deposits which have been talked of for years, but little development work has been done. There are a number of pockets of magnetite, but no large bodies of ore have been discovered. Other iron ore deposits which have been favourably mentioned in government geological reports, but which may be described as "not proven" are the St. Jerome mine in Terrebonne; the Boniface mine in Shawenegan; the Leeds mine in Leeds and the Sherbrooke mine in Ascot.

It is estimated that there are many millions of tons of iron sands containing a high percentage of iron along the north shore of the St. Lawrence, at Moisie, Mingan, Natashkwan and other places. These sands could be briquetted for use in the blast furnace, but unfortunately they contain a high percentage of titanium. Titanium while not injurious to iron, as sulphur and phosphorus are, causes trouble in the furnace when present in quantity. A very small percentage may be handled without much trouble and it improves the quality of the iron. There are a number of deposits of bog iron ore in the St. Lawrence Valley remarkably free from sulphur and phosphorus and containing so small a percentage of titanium that it may be regarded as advantageous rather than injurious. Dr. Eugene Haanel, director of the Dominion Department of Mines, says of these bog ores: "The origin of these deposits is interesting since they are being continually found at the present time, and it is possible to obtain ore which has been deposited during the last ten or twenty years. The rocks are highly ferruginous and the iron is dissolved from them by the action of the rain-water containing organic acids resulting from decayed vegetation. The iron thus dissolved is transformed into salts of the protoxide. These mineralized waters stream down from the hills into the valleys and inland lakes, where the protoxide salts carried by the decomposed vegetation float on the surface of the water and are acted upon by the oxygen of the atmosphere; which converts the protoxide into the insoluble peroxide of iron. By a natural accretionary process, the iron oxides form into cakes of ore about 7 inches in diameter; then they drop to the bottom of the lake. This evolutionary process is so rapid that some of the lake bed deposits which have been worked out, are found after a rest of five years to have grown sufficiently to enable the owners to work them by dredge mining for ten years continuously on a commercial scale."

The use of these bog iron ores by the Canadian Iron Corporation in its furnaces at Radnor Forges and Drummondville has already been referred to.

The Provinces of Quebec and Ontario, south of the Height of Land, are entirely destitute of coal. Lignite is known to exist between the Height of Land and James Bay, and it is possible that good coal may yet be found in some part of that great country. Recent newspaper despatches have stated very positively that good coal has been found under the lignite in the vicinity of the Mattagami River, about 70 miles from Cochrane, the terminus of the Temiskaming & Northern Ontario Railway, but such statements will not be taken seriously unless supported by the report of the exploring party which the Ontario Government has sent to investigate.

For ordinary domestic and manufacturing purposes the Province of Quebec gets its supplies of coal largely from Nova Scotia, although considerable quantities of coal are imported from the United States. Whether it would be possible to use Nova Scotia coal for iron making in Quebec Province is doubtful. If abundant supplies of iron ore could be laid down cheaply at Montreal and arrangements could be made with one of the Nova Scotia coal companies to supply coal at the mines at as low a price as the Dominion Iron & Steel Company secured its coal from the Dominion Coal Company, the cost of transportation to Montreal would probably not preclude its use for smelting purposes. There is deep water all the way and very large boats could be used for the transportation of the coal. It is not probable that coal could be obtained at so low a price from any of the existing coal companies, but it is possible that an iron and steel company with blast furnaces in Montreal might buy a Nova Scotia coal mine and so secure coal at the cost of mining and transportation. There are abundant supplies of limestone near at hand. The Drummond iron mine of the Canada Iron Corporation, near Bathurst, in Gloucester County, New Brunswick, is considerably nearer to Montreal than the iron mines of Michigan and Minnesota are to the blast furnaces in Buffalo and Hamilton. If the iron ore deposits along the Ottawa and Gatineau Rivers should prove to be important they could be economically transported to Montreal.

It has been announced that the Government will undertake the construction of the Montreal, Ottawa and Georgian Bay Canal as soon as the Grand Trunk Pacific Railway is completed, and as the leaders of both political parties have expressed themselves as in favour of the project there is little doubt that the work will eventually be carried out. In considering the present conditions of Canadian iron and steel industries it cannot be regarded as a factor, but in any estimate of the future it must be taken into account. When that canal is completed Montreal will be as near to all the iron ore ports of Lake Superior as Hamilton now is. Key Harbor, on Georgian Bay, the port of shipment of the Moose Mountain mines is within a few miles of the mouth of French River, where this short water route begins, a distance of 440 miles from Montreal.

Montreal is the commercial metropolis of the Dominion and it has many manufacturing industries using iron and steel as raw materials. It is the headquarters of the Canadian Pacific, the Grand Trunk and the Grand Trunk Pacific Railways, and the most important workshops of those companies will probably always be located there, so that the local demand for iron and steel will always be large. It is the meeting place of lake and ocean navigation. Situated 960 miles from the ocean, it has the unique position of being both an inland city and a port for ocean vessels, which gives it certain advantages as a distributing point over any other city in America during the season of navigation on the Great Lakes and the St. Lawrence River.

Under ordinary conditions it is much more economical to manufacture iron near the raw materials, but sometimes the advantage of being close to a large consuming centre partly offsets the disadvantage of being somewhat distant from all the raw materials. Thus the blast furnaces of Chicago get all their raw materials from a distance, Connellsville coke being carried 600 miles to that city, as shown in my last article. Professor Smith, of the University of Pennsylvania says regarding the economic location of blast furnaces: "In the making of iron it is usually necessary for the fuel or the ore to be transported to some common meeting place, and in the working out of the problem of transportation the location of the iron industry has usually responded to the motto that 'the ore goes to the fuel,' an example of this being the great movement of Lake Superior ores to the Pennsylvania coal fields. It is not, however, a maxim of absolute sway. The question is rather complex and is to be answered by weighing various freight factors involved in getting the

ore and the fuel to the furnace and the finished product to the market. It is, therefore, a triangular problem, and it sometimes works out to the moving of the fuel rather than of the ore. Examples of this are afforded by the present industry on Lake Champlain, and in Northern New Jersey. Here are ore fields of excellent character; in both fields iron is being made with coke from Western Pennsylvania. The reason they can afford to break the maxim and carry the fuel to the ore is found by noting the disposition of the finished product. It goes to New England and the East, and the fuel is therefore moving toward the final market of the iron.

Coal carried from Nova Scotia to Montreal would be "moving toward the final market of the iron," and this is true also of the United States coal or coke that goes to the Ontario furnaces at Hamilton, Midland, Sault Ste. Marie, and Port Arthur.

One advantage of having iron and steel works close to the market is that in case of a rush order delivery can be made in shorter time, and this is sometimes a factor in securing business.

All the blast furnaces in Ontario are distant from coal mines. Nova Scotia coal is sent in limited quantities to some of the most eastern counties of Ontario for domestic and ordinary manufacturing purposes, but the cost of transportation prevents it going farther west, and consequently almost all the coal used in Ontario is imported from the United States. Under present conditions the use of Nova Scotia coal for iron making could not be considered in any part of Ontario. If the Canada Iron Corporation owned a Nova Scotia coal mine it is possible that it might take coal as far as its blast furnaces at Midland, Ont., after the projected Montreal, Ottawa and Georgian Bay Canal is completed. It is not probable that Nova Scotia coal could be economically used for smelting purposes farther west than Georgian Bay ports, although Mr. Alex. Dick, the general sales-manager of the Dominion Coal Company, told me that if that canal were constructed so that large coal barges could go through from Cape Breton without breaking bulk, he believed they could sell large quantities of coal for domestic and ordinary manufacturing purposes as far west as Fort William. It may be noted that some of the iron ores of Northwestern Ontario are rather too high in sulphur for use with Nova Scotia coal. The blast furnaces at Port Arthur and Sault Ste. Marie use West Virginia coal, which has a very small percentage of sulphur. The Lake Superior Corporation recently purchased a coal mine in West Virginia in order to be in an independent position. The rail haul is between 330 and 340 miles from the West Virginian mines to Toledo on Lake Erie from which the coal can be shipped by water to the blast furnaces of the company at Sault Ste. Marie, Ont.

The blast furnaces of the Lake Superior Corporation at the Sault and the Atikokan Iron Company at Port Arthur, are distant from their fuel supply, but they have the advantage of being much closer to the great Northwest than furnaces farther east.

Midland blast furnaces at present use Connellsville coke, which has an all-rail haul of about 535 miles. When the coke ovens now projected by the Canada Iron Corporation at Midland are completed, coal will be imported instead of coke, and as it can be shipped a great part of the way by water the rail haul will be considerably reduced. The rail haul from Connellsville, Pa., to the blast furnaces of the Hamilton Steel & Iron Company is about 388 miles. Hamilton manufacturing industries consume large quantities of both iron and steel and it is the centre of a district in which are a number of manufacturing towns, so that the fuel meets the iron ore where the finished product is sold.

There do not appear to be any iron ore deposits in Southwestern Ontario worth mentioning except the bog ores of Norfolk and Oxford Counties. At Normandale, in Norfolk County, Joseph Van Norman successfully operated from 1820 to 1847 a charcoal blast furnace using local bog iron ore. Small quantities of the Oxford County bog ores have been smelted at the Hamilton furnaces. Whether the bog ores of Ontario grow, as the Quebec deposits are reported to do, I am unable to state.

Anyone reading the Dominion Government geological reports published some years ago and the Report of the Royal Commission upon the Mineral Resources of Ontario, published in 1890, would be likely to suppose that there were a number of very extensive ore beds in Eastern Ontario containing high-grade ore. Witnesses before the Royal Commission were quite enthusiastic about the extent and value of some of these deposits, but there is reason to believe that exaggerated views prevailed at that time. Iron ore is found over wide areas in Frontenac, Lanark, Renfrew, Leeds, Hastings, Peterborough, and Haliburton counties, but most of the deposits are now believed to be merely pockets. Prospectors have been too ready to assume that when several deposits of ore are found in line with each other they must be outcrops of the same ore bed. There appear to be a great number of separate deposits, many of them containing considerable quantities of ore, but as yet no very extensive body of good ore has been proven to exist. Magnetites are more common than hematites, but about 150,000 tons of hematite ores are said to have been taken out of Eastern Ontario mines. Bog iron ore is reported to exist in Lanark County.

Considerable quantities of both magnetite and hematite iron ore were shipped to the United States many years ago, and very favourable reports of the quality of some of the ores were received from the smelting companies, but nearly all of these mines were abandoned long ago, and very little development work has been done in recent years. It is difficult now to ascertain what was proven by these old-time mining operations. It is certain that in some cases the analyses showed the ores to be high in iron, low in both phosphorus and sulphur, and free from titanium, but in other cases the ores were of low grade and contained considerable quantities of sulphur, phosphorus, or titanium. Some of the deposits seem to be irregular in quality, inferior ore being found in close proximity to first-class ore. It would probably be correct to say that in general the ores of Eastern Ontario have a high percentage of iron, are low in phosphorus and titanium, and rather high in sulphur, but that there are exceptions. In some localities there are considerable quantities of magnetite containing a high percentage of titanium.

The Ontario Government for some years offered a bounty of one dollar per ton for pig iron made from Ontario ore, and the Dominion Government iron bounties for a number of years discriminated to the extent of one dollar per ton in favour of pig iron smelted from Canadian ore. But these inducements brought out very little Eastern Ontario ore. However, it would be a mistake to assume too readily that no ore deposits of great value will ever be found in Eastern Ontario. It is probable that thousands of tons of good ore will be taken from some of the mines already opened, and development work in some of the localities yet unworked may reveal valuable ore

beds. The mine of the Canada Iron Corporation near Eganville in Renfrew County has been already referred to. Considerable quantities of ore were shipped to the United States from the Wilbur Mine in Renfrew County many years ago, and ore from this mine has been used in Canadian blast furnaces in recent years, going as far west as the works of the Lake Superior Corporation at Sault Ste. Marie, Ont. The ore is magnetic, low in both phosphorus and sulphur and is suitable for making Bessemer pig iron. This mine has recently been acquired by a New York corporation, and it is stated that active development work is to be undertaken. There has been some talk of establishing a blast furnace at Kingston to use this ore.

Farther north in Ontario ore has been found at many points from Lakes Temagami and Temiskaming to Sault Ste. Marie, but no important iron ore bodies have been proven to exist in this region east of Sudbury. About 25 miles north of Sudbury in the Township of Hutton is the much talked of Moose Mountain iron range, which promises to yield large quantities of iron ore. The company owning the deposits has been incorporated under the name of Moose Mountain, Limited. J. W. Gates, the well-known New York capitalist, is president, and Donald D. Mann of Mackenzie & Mann is largely interested in the company, which owns forty-six hundred acres of land. There are said to be eleven well-defined bodies of iron ore on the property, which are numbered. No. 1, No. 3, and No. 4 are said to be high grade ore, while the others, so far as known, are low grade. The shipping point is Key Harbor, Georgian Bay, about eighty miles south of the mine, and transportation facilities are provided by the Canadian Northern Railway. The harbour has 24 feet of water, is well sheltered, and the dock equipment includes a thoroughly modern transfer loading plant.

I am indebted to Mr. C. E. Harrmann, assistant to the president of Moose Mountain, Limited, for the following statement:

"Not enough exploration work has been done on the property to permit making any accurate estimate of the tonnage or grade of ore available, except in the case of the Number One deposit. Diamond drill exploration on this deposit has developed over one million tons of concentrates of the present guaranteed grade, 54.50 per cent. metallic iron when dried at 212 degrees Fahr. The company is operating an open pit on this outcrop, and shipped between twenty-five and thirty thousand tons of concentrates during 1909. This ore was crushed to one inch maximum and magnetically cobbed, the average analysis for the season being, at 212 degrees Fahr.:

Silica	12.78	Manganese	.09
Iron	55.77	Lime	3.77
Phos.	.107	Magnesia	3.52
Alumina	1.58	Sulphur	.074
Loss by ignition			none
Moisture in natural ore			.77

"The plant and machinery used during the season of 1909 was largely of an experimental nature, the season's results demonstrated that the process used was entirely successful, and at the close of the year the company adopted a wider plan of operation. Construction work was carried on during the winter and a new mill, electrically operated and up to the minute in every particular, is nearing completion, and is, as far as is known to us, the only magnetic concentrating plant in Canada. Approximately one hundred thousand tons of concentrates will be shipped to the United States during the present season, according to program.

"The company's efforts have been concentrated upon opening the Number One deposit, and according to present status of the work the end of this season will see the mine on a good round tonnage basis. As soon as this is accomplished the other deposits of high grade ore will be attacked, and meanwhile investigations and experiments are being carried out with the view of utilizing the lower grade of ores."

Shortly after the discovery of the Moose Mountain iron range was announced, the Toronto newspapers contained articles intimating that the interests in control proposed to establish great iron and steel works at Ashbridge Bay, Toronto, using Moose Mountain ore. Toronto is not quite so favourably situated as Hamilton for assembling the raw materials of iron-making. Hamilton has limestone close at hand and there is natural gas in the neighbourhood, which is piped to the city. The railway charges for transportation of coal or coke from the United States are ten cents per ton greater to Toronto than to Hamilton. The iron ores of Eastern Ontario are nearer to Toronto, but the Moose Mountain Mines, the Atikokan range, the ores of Michipicoten, and all the great Michigan and Minnesota mines are about forty miles nearer to Hamilton than to Toronto. Large quantities of iron and steel are consumed in both Hamilton and Toronto, and the two cities have almost equal advantages for the shipment of iron to other manufacturing towns in Ontario. When the Ottawa and Georgian Bay Canal is opened the Moose Mountain mines will be nearer to Montreal than to either Hamilton or Toronto by the water route.

The Atikokan iron range on the line of the Canadian Northern Railway, about 130 miles from Port Arthur, was described in my second article. It seems likely to afford an ample supply of ore for the blast furnace of the Atikokan Iron Company at Port Arthur. The United States Steel Corporation is said to have purchased another promising magnetite deposit, running low in phosphorus and sulphur, a few miles west of Atikokan.

The Helen iron mine of the Lake Superior Corporation, about eleven miles from Michipicoten harbour, has already been described. It is undoubtedly an immense ore body, and great quantities of ore have already been taken out. There is reason to believe that a number of other valuable ore bodies will be found in the great region north of Lake Huron and Lake Superior, and south of the Height of Land, but exploration and development work is expensive. It is said that the great American iron and steel companies, which have ample capital for such work, are beginning to explore this region. If the United States Steel Corporation should get control of large iron ore deposits in Ontario it might seriously interfere with the development of the Ontario iron and steel industry. It would seem worth while for the Ontario Government to expend a large amount of money in exploration work, and to adopt measures which would prevent iron ore properties passing under American control.

The country north of the Height of Land is almost unexplored. It is claimed that extensive iron ore beds have been found near the Mattagami River, but until further investigation no opinion can be formed of their value.

It is unfortunate that Ontario blast furnaces are

dependent upon the United States for supplies of coal or coke. It has been suggested that the United States Congress may at some future time levy an export tax on coal. However, the United States constitution provides that "no tax or duty shall be laid on articles exported from any State." An amendment to the United States constitution must be first approved by a two-thirds vote of both Houses of Congress, and afterward ratified by the Legislatures of three-fourths of the States or by conventions in three-fourths of the States.

Charcoal pig iron is for certain purposes much superior to coke pig iron, and Ontario ought to be able to produce sufficient charcoal to supply a number of furnaces. Yet it has been difficult in the past to get supplies for the one charcoal furnace of the province, which is located near Deseronto. Owing to the scarcity of charcoal it was converted into a coke furnace, but since it came into the possession of the Standard Chemical Company, which is a large producer of charcoal, the use of charcoal has been resumed. When the Canada Iron Furnace Company, now included in the Canada Iron Corporation, selected Midland as a blast furnace site it was at first proposed to use charcoal, but the owners of timber suitable for the purpose demanded such high prices that the use of coke as fuel was decided upon.

There are large areas of Ontario unsuitable for agriculture, but well adapted for growing timber. It would be well for the Ontario Government to make enquiry as to the best means of assuring cheap supplies of charcoal in the future.

A series of experiments were conducted at Sault Ste. Marie in 1905-6, under the direction of the Dominion Department of Mines, with the object of establishing the feasibility of electrical smelting of Canadian magnetic iron ores. Dr. Eugene Haanel, Director of Mines, was well satisfied with the results. Three young Swedish engineers, Assar Gionwall, Axel Lindblad, and Otto Stalhane, stimulated, it is said, by the results of the Sault Ste. Marie experiments, undertook to solve the problem of designing and constructing a commercial electric smelting furnace. Arrangements were made with the largest iron manufacturers in Sweden to carry on smelting experiments at the Domnarfvet iron works. After two years of experimenting a furnace was evolved which they are satisfied can be economically used in practice. In December, 1908, Dr. Eugene Haanel went to Sweden to witness the first practical test, and after watching the working of the furnace in a twelve days' trial run, he was most favourably impressed, and he has published a very interesting report. The fuel used was coke, but charcoal may be used. If Dr. Haanel's expectations should be realized, iron ores may yet be extensively smelted in Ontario and Quebec by the thermo-electric process, both provinces having many waterfalls from which electric power can be generated. It is claimed that in the electric process the quantity of coke or charcoal consumed is so small that the cost of fuel is greatly reduced, and that sulphur can be much more successfully eliminated than in ordinary blast furnace practice. That iron of very high quality can be produced by this process there is no doubt. Whether the electric furnace can ever successfully compete with the ordinary blast furnace using coke as fuel is a question for the future to decide.

So little is known of the country surrounding Hudson Bay that no one can say what may be discovered there. It is possible that at some future time coal, iron and limestone may be found in locations from which they can be conveniently carried to Fort Churchill or Port Nelson for smelting. It is not probable that the Hudson Bay route to Europe will ever prove a great success, as Hudson Strait, at the far north, is blocked with ice for a great part of the year, but the great bay itself is open throughout the year and the harbours of Fort Churchill and Port Nelson are open for navigation for almost as long a period as Montreal is. There is no doubt that the vast prairie country will eventually have a population of many millions, and there will be a great demand for iron and steel. If raw materials could be cheaply assembled at one of the Hudson Bay ports this great market might be more accessible to works located there than to the works in Eastern Canada. However, this is not a problem for the present generation to consider.

Alberta has very extensive coal areas, lignite, bituminous and anthracite coal being already mined in considerable quantities. Much of the coal is unsuited for the manufacture of blast furnace coke, but the quality improves as the mountains are approached, and some of the bituminous and anthracite coal near the boundary of British Columbia will no doubt be suitable for iron making. So little exploration work has been done that nothing definite can be said about iron ores. The rule that iron ore can be carried a considerable distance to the coal when there is a market near at hand for the finished iron will apply in the west as well as in the east.

British Columbia has probably greater areas of first class coal than any other province of the Dominion. The mines in Vancouver Island and in the Crow's Nest Pass are well known to Canadians in general. The report of the Mines Department states that mines are being opened in various localities on the western slope of the Rocky Mountains, in the Nicola Valley, on the Thompson River, on the Queen Charlotte Islands, and in the valleys of the Skeena and Telkwa in the north. Other discoveries of coal will probably be made.

As there has in the past been no demand for iron ore in British Columbia very little exploration work has been done. The Mines Department reports that iron ore deposits of more or less value have been discovered in the following localities: Texada Island, between Vancouver Island and the mainland; West Redonda Island, in the Gulf of Georgia; Queen Charlotte Islands, Klaanch River, Quinsam River, Sarita River, Head Bay, Gordon River, Sechart, Kennedy Lake and Quatsino Sound on Vancouver Island; at Rivers and Knight Inlets on the mainland coast; Cherry Bluff, near Kamloops; Fort George, and in several localities of the mainland districts of Similkameen and Cariboo. As regards the value of these deposits no definite statement can be made until more development work has been done. The Puget Sound Iron Company, which has a property of 2,700 acres on the south-west side of Texada Island, has shipped small quantities of ore to Irondale, Washington, where it has been smelted with a mixture of one-ninth to three-tenths of bog ore, making an excellent foundry pig, which, according to the report of the Mines Department, was used by the Union Iron Works of San Francisco in the construction of the United States warships Olympia, Monterey, Charleston, and Oregon.

If iron and steel works on a large scale were located either on the mainland coast of British Columbia or on the islands they would be well situated for sending

the finished products to the markets of the Pacific, including the west coast of South America, Japan, China, Australia, and even to the Pacific coast cities of the United States, which are not favourably located for assembling the raw materials of iron making.

The building of steel steamships will probably become an important British Columbia industry, and some of the warships of the Canadian navy will no doubt be built at Pacific coast shipyards.

In the ten years ending 1908, royalty to the extent of $3,615,381 was collected on the gold production of Yukon Territory.

ELECTROLYTIC CYANIDATION AND AMALGAMATION.

BY ELMER ELLSWORTH CAREY.*

Inventions and processes are frequently announced many years before the world is ready for them. The electrolytic cyanide process was described by Rae in 1867, but to-day only one part of that process—electro-deposition—is in use. The electrolytic system of separating and refining metals is now rapidly superseding all other metallurgical systems, and the electrochemical system will before long be used extensively in the metallurgy of gold. By the use of electricity the percentage of gold won will be increased, the cost of extraction diminished, and the area of mining operations greatly enlarged. As soon as the various colleges, institutes, technical schools, etc., teach the principles of electrochemical metallurgy, important modifications and changes will be made in milling operations. As cyanidation made slow progress till a new generation of engineers had been trained in the use of the chemical system, so the electrochemical metallurgical methods will languish till the schools have supplied the necessary electrochemical engineers.

It has been known theoretically for forty years that the amalgamating action of mercury and the energy of the cyanide solution could be increased by the introduction of certain electrochemical conditions, but many difficulties had to be overcome before this knowledge could be used in a practical manner. Within the last ten years the science of electrochemistry has been placed on a firm foundation, and the troubles of the early inventors have been surmounted. Low voltage generators are now manufactured that produce the required current at an insignificant cost; by the use of Acheson graphite, all anode trouble disappears; and the time of treatment has been reduced to a few hours, while in some systems the values pass into solution and are deposited simultaneously.

Metallurgical science took a great step forward when the chemical (cyanide) system was introduced, and the next important step will be the adoption of the electrochemical system. Many troubles, obstacles and difficulties of cyanidation disappear when electrochemical conditions are introduced; values which ordinarily are refractory readily pass into the solution; a weaker solution than usual may be used; the solution is constantly regenerated; the loss of cyanide is reduced; the values are automatically recovered in the form of amalgam; the refining processes, with their attendant losses, are unnecessary, and the cost of installation greatly reduced.

In "The Mining World," Chicago, January 23, 1909, may be found a description of the Parks electro-cyanide process. The process here described is extremely simple, effective and inexpensive, and has been found successful with ores which are not amenable to the usual cyanide treatment. In the works on cyanide practice by Bosqui, Wilson, Smart and others, will be found descriptions of other systems of electro-cyanidation, all of which have similar basic features, differing only in detail, modes of construction, etc. Some years ago electro-cyanidation was successfully used for several months at the Delamar Mine in Idaho, and a description of the process there used will be found in Bosqui's work.

The recovery of values from a cyanide solution (after the usual leaching process) by electro-deposition has proved successful in many mills in South Africa; the Siemans and Halske process of electro-precipitation was introduced several years ago on the Rand, and despite the primitive apparatus used, the high cost of installation, and the five per cent. royalty, many companies have adopted the process.

To-day the special process in question is obsolete, as far better methods are known; Acheson graphite is much better for anodes than the clumsy iron anodes used in the German system, and amalgam plates can now be used instead of the lead cathodes. With the introduction of discoveries, methods, machinery and accessories which have been placed at our disposal by American inventors and investigators in the electrochemical field, the time has now arrived when the art of cyanidation can be completely revolutionized. Some of the advantages that may be expected from the improved system are mentioned in an article on "Electrochemical Amalgamation and Cyanidation" in the Engineering Magazine, for December, 1909, as follows:

"Turning to electrochemical lixiviation, the claim is made that under electrochemical conditions the cyanide solution is much more active than usual; values pass into the solution which are lost in the ordinary systems; the time of treatment is reduced and the extraction increased, while there is a decrease in the operating cost; precipitation by electro-deposition goes on simultaneously with the leaching process and the usual troubles are eliminated; a molecule of cyanogen after taking up a particle of gold, is released as nascent cyanogen, having greatly increased affinity for gold and silver. The solution is constantly regenerated, the loss of cyanogen being negligible. The larger particles of gold are amalgamated directly without passing into the solution. In electro-cyanidation the pulp and solution are agitated in a shallow tank having the bottom covered with quicksilver (cathode); revolving stirrers cause the pulp to travel with a circular motion over the quicksilver for an hour or two; this is equivalent to passing the pulp over several miles of mercury surface. During this period the values are amalgamated directly, or pass into the solution and are precipitated by electrolysis, the extraction averaging 97 per cent. All ores, so far as known, are capable of successful treatment by means of electro-cyanidation."

Regarding electro-amalgamation, it may be said that

---

* Member American Electrochemical Society, San Jose, California, U.S.A.

experimental work relating to electrochemical amalgamation began in 1859, the first patent being issued to Henry Brevoost, of San Francisco; some 75 patents for various electro-amalgamating devices have been issued by the United States patent office, but only within the last three years have machines been constructed which meet the requirements of mining men. The various engineering difficulties have been overcome and an electro-amalgamating device is now constructed which is very simple, inexpensive, has large capacity, is easy to operate, skilled attendance not being necessary, and which extracts all values not encased, regardless of refractory elements which may be present in the gangue. Such a device works equally well with mill pulp or screened placer material; in placer operations all rusty, coated and black sand values, as well as platinum, are amalgamated; fine, float and beach gold is readily amalgamated in the electrolytic device. Those who wish an authoritative statement as to the value and scope of electrochemical amalgamation are referred to a paper by Warnford Lock mentioned below, and also to the patent issued to Sir William Crookes.

Those who wish further to investigate electro-cyanidation are referred to the following:

"Mining World," Chicago, January 23, 1909; article by John R. Parks, E.M.

"Engineering Magazine," New York, December, 1909; article, "Electrochemical Amalgamation and Cyanidation."

Books:—"Cyanide Process," by E. B. Wilson, E.M.; "A Handbook of Practical Cyanide Operations," by Wm. H. Gage, M.D., F.R.S.; "Practical Notes on the Cyanide Process," by F. L. Bosqui; "Electric Smelting," by Dr. W. Borchers, and "Cyaniding Gold and Silver Ores," by H. Forbes Julian and Edgar Smart.

Additional references for data regarding electro-amalgamation are as follows:

"Electrochemical Amalgamation," C. G. Warnford-Lock, E.M., M.L.I.M., Vol. 1, page 205, "Proceedings of the (London) Institution of Mining and Metallurgy."

United States Patent, No. 462,535, issued to Sir Wm. Crookes for an electrolytic amalgamating process; the following numbers refer to other United States patents covering devices for saving gold by electrolytic methods:—328,532; 307,081; 342,421; 492,711; 590,524; 947,958; 757,557.

Copies of any of the above patent specifications may be obtained from the Commissioner of Patents, Washington, D.C., U. S. A.; send 10 cents (no stamps) for each specification desired.

Articles on electro-amalgamation have appeared as follows:

"The Canadian Mining Journal," November 1st, 1909; January 1st, 1910.

"The Mining Journal," London, May 15th and June 12th, 1909.

"The Mining World," Chicago, March 27th, April 17, and June 5th, 1909.

"Pacific Miner," San Francisco, Cal., April and August, 1909; also February, 1910.

"Electrochemical and Metallurgical Industry," New York, May, 1909.

"Scientific American," New York, August 7th, 1909.

"Scientific American Supplement, November 6th, 1909.

"The Enginering Magazine," New York, December, 1909.

"The Mexican Mining Journal," October, 1909, and January, 1910.

A SLOCAN, B.C., PIONEER AND HIS MINING PROPERTIES.

By E. Jacobs.

The death of George W. Hughes, which took place at Portland, Oregon, U.S.A., on June 14, brings to mind remembrance of the active and very useful part he took in the development of the Slocan mining district of British Columbia, particularly in the nineties, in which Slocan mines made large production of silver and lead, and some of them paid considerable amounts of money in the shape of dividends to their then fortunate owners.

The late Mr. Hughes prior to going to the Slocan in 1892 was engaged in railway construction work in northeastern Washington and contiguous parts of the northwestern United States. He took to British Columbia a pack train of some 40 mules, to pack supplies in to the Slocan mines and ore out to Nakusp or Kaslo, for shipment thence to the United States. Becoming impressed with the great ore-producing capabilities of the Slocan, he took a prominent part in road-building, so that it might be practicable to transport larger quantities of ore to the waterways of the country than could well be done by pack train. The wagon road from the heart of the Slocan to Kaslo, on Kootenay Lake, was accordingly built, and this gave the district an outlet for its mineral products to the east, in addition to that to Nakusp, to the westward on Arrow Lake, Columbia River, provided about the same time. Later, railways were constructed from both those places to Sandon, thereby giving the numerous producing mines of the Slocan competing routes for the transportation of ore to smelters, and for getting in supplies.

After adequate transportation facilities had thus been provided, Mr. Hughes turned his attention to practical mining and for some years managed one or other of several of the mines of the Slocan. Later he acquired large interests in well-known properties, operating them successfully and thereby realizing a competence. Chief among these were the Sunset and Lucky Jim mines, respectively, both of which were important producers of ore, the former of high-grade silver-lead and the latter of zinc. Other properties in which Mr. Hughes became interested as owner or part owner were the Bell, in Jackson Basin; and the Mountain Chief, Apex, and Mammoth, near New Denver. The passing away of the late owner of these mining interests would appear to make the present an opportune time to give some information relative to these properties in the development of which he took so prominent a part, and incidentally contributed to the material progress of the Slocan district.

The Sunset Group.

The Sunset group of six mineral claims is situated on the divide between Jackson Basin and Cody Creek. The group embraces the Sunset, Trade Dollar, No. 3 Fraction, Nabob, Cashier, and Bell. The last-mentioned was not one of the original Sunset group, but was acquired later than the others; it is on the Jackson Basin side of the mountain and is a zinc more than a silver-lead mine.

From a return showing the quantity and value of the total production of the Sunset group, the following figures have been taken: Total output of ore, 2,663 net tons; average metal contents, 132.23 ounces silver per ton and 72.8 per cent. lead; total value of ore produced, $263,358 gross; smelter, freight and treatment charges per ton, $14.91; net value of ore per ton, $83.95.

The first ore met with in the Sunset was on the floor of No. 1 tunnel and the shoot continued down to No. 5, which was the lowest level driven on the claim. This was on the Jackson Basin side of the divide. The best results were obtained in 1898-1899; after those years not nearly so much ore was shipped. The greatest bulk of the ore was taken from Nos. 2 and 3 levels. In the Trade Dollar, No. 1 level was practically non-productive. No. 4 proved a barren level, while No. 5 produced only a little ore. Nos. 6 and 7 were very productive especially the latter. The ore shoot in No. 7 was about three times as long as in No. 6; it has been stoped clear through from No. 7 to No. 6. There is not any connection between Nos. 6 and 5, but there are raises from 5 to 4, 4 to 3, and 3 to 2, respectively. Much of the known ore above No. 7 has been stoped out up to No. 1. The indications are that No. 8 will contain more ore than No. 7 did.

The Sunset mine was closed in the years 1903-1904. In 1905 Mr. A. J. Becker took charge as manager and resumed shipping ore, which he continued until October, 1908. On January 1, 1909, owing to the serious illness of Mr. Hughes, operations were discontinued for the time, and the mine was closed until the following September, by which time it had been conditionally purchased by the Sunset Silver Lead & Zinc Mines Company, incorporated under the laws of the State of Washington. This company has an authorized capital of $1,000,000 in shares of the par value of $1. The following constitute its board of directors: R. V. Montague, president; George Robertson, vice-president, and E. R. Locke, secretary-treasurer (all of Mexico, Missouri); A. J. Becker, of Kaslo, B.C., general manager, and J. H. Lothrop, of Spokane, Washington, assistant secretary and treasurer. Beside the Sunset group and Bell, the company acquired the late Mr. Hughes' interests in the New Denver mineral claims already mentioned. Other interests held in those claims are two-thirds in the Mountain Chief by A. W. McCune and associates, and a controlling interest in the Mammoth by Finch & Campbell, of Spokane, Washington.

Immediately after the organization of the Sunset Company and its arrangement to acquire the property, a contract was let for driving No. 8 tunnel on the Cody side of the mountain, with the object of cutting the vein at a lower level and opening up new ground for ore stoping. It was calculated that this adit would have to be driven between 500 and 600 feet to reach the vein at a vertical depth of 246 feet below No. 7 level. The breast of this drive is now 520 feet from the portal, so it will not be long until the vein shall be reached. Thereafter drifting for about 500 feet will be necessary to reach the ore shoot which proved so productive in No. 7, and which, it is believed, will prove to be still longer on No. 8 level. There are good indications that another shoot of ore will be found in the vein between the point at which the cross-cut will enter it and the calculated position of the continuation of the ore body worked in No. 7. The reason for driving No. 8 from its chosen starting point was that in doing so an exit from the lowest level of the mine clear of snowslides would be thereby provided, and danger to men going to and fro would thus be avoided. In this connection it should be remembered that during nearly half the year there is much snow on Slocan mountains, even where the altitude is only about 6,000 feet, as in the case of the Sunset group, so that it is imperative, for considerations of safety to the miners, portals of tunnels shall if possible be out of the path of the snowslides which come down each recurring season.

The first ore shipped from the Sunset was rawhided over the Jackson Basin trail down to the Kaslo & Slocan Railway at Whitewater, a distance of seven miles. Later, after connection had been made between the Trade Dollar, on the Cody side of the divide, and the Sunset workings on the Jackson Basin side, the ore was sent down to the railway terminus at Cody, distant only two miles, and at an elevation about 2,000 feet lower than that of the Trade Dollar workings. The K. & S. Railway has not been operated beyond McGuigan, which is 10 to 12 miles from Cody, during the two years past, though the rails have been left down in case there shall be a sufficient tonnage of ore available for shipment from mines about Cody to make it worth while for the Great Northern to make the necessary renewals to bridges and trestles, damaged by snowslides, before traffic can be resumed. But even if the railway shall not again be operated, it will be practicable to provide for the transportation of Sunset ore by the construction of an aerial tramway down to the end of the wagon road the Provincial Government has had constructed up Cody Creek to within 2,000 feet of the Trade Dollar workings. This provision for facilitating the shipment of Sunset ore will most likely be made, if the ore shoots now being driven for shall prove up to expectations. Most of the work on the group has been done on the Cody side of the mountain, so that for this reason as well as considerations of cost, the tramway will be built on that side if at all.

The Sunset-Trade Dollar vein does not contain much concentrating ore; in fact the ore met with is practically all clean enough for shipment to the smeltery. What is not is of comparatively little value. An advantage here enjoyed is that when zinc is met with it is usually in bunches, not disseminated through the silver-lead ore, consequently the latter is clean. It is only in the slate country, though, that zinc occurs in the Sunset mine; the ore may be clean silver-lead and suddenly change to clean zinc. The present expectation is that in the future the Sunset mine will be found to contain much pay ore in the porphyry formation; if not, there is not much looked for in the slate. No. 7 tunnel crossed a porphyry dyke about 200 feet in width, and where the vein was in porphyry it produced freely ore of high grade. It is stated that the ore occurring in the porphyry runs higher in silver than that in the slate; it averages two ounces of silver or better per unit of lead in the former, while in the latter it runs only about one ounce and a half per unit.

One of the features of mining in the Slocan now rendering its future hopeful is that mine owners have recognized that in order to make the mines productive much well-considered development work must be done. In

earlier years the custom on most properties was to mine all the ore that could be reached without first having a lot of development work done, and to divide what profits there were, thus making no provision for ensuring the continued working of the mine after the shoot or shoots of ore should have been taken out. Recent years have witnessed a decided change in policy in this respect, and much development has been done, some of it at deep levels, and in several cases with most encouraging results. In degree the owners of the Sunset group have adopted this policy, and the outlook for their mine is that it will again be productive and leave a considerable margin of profit to reward them for their faith in its future and their enterprise.

The Bell Mine.

The following information concerning the Bell mine has been extracted from the "Report of the Commission Appointed to Investigate the Zinc Resources of British Columbia and the Conditions Affecting their Exploitation," published in 1906 by the Mines Branch of the Department of the Interior, Canada. The information was gathered by Mr. Philip Argall, M.E., of Denver, Colorado, U.S.A., one of the members of the Zinc Commission, who visited this mine, among others, in the autumn of 1905. Since that date the Bell has been inoperative, so there is little to add to Mr. Argall's report, in part as under:

"The Bell claim is situated at the head of Jackson Basin, on its eastern side, about three-quarters of a mile from the Jackson mine where the wagon road from Whitewater terminates. This road must be extended to the Bell before steady shipments can be made, except by pack or by rawhiding during the winter months.

"The upper, or No. 1 tunnel was started on a vein of zinc blende, one foot in width, continuing quite regular for ten feet from the portal, where an open fissure comes in, along which the blende widens out to ten feet and continues along the drift at a gradually decreasing width until a slip cuts it off, 30 feet from the portal, at which point the blende was only five feet wide. A stone in the roof from 10 to 25 feet from the portal shows a very good vein of zinc blende. A sample taken across the roof stope for a width of ten feet assayed, silver 2.2 ounces, lead nil, zinc 40 per cent. A small stope in the floor of the drift shows at a depth of five feet an almost solid vein of zinc blende eight feet in width, containing, however, some small ribs of slate, but showing in either end, nine feet apart, almost solid blende. This shoot or chimney of ore should go down for considerable depth and produce a fair tonnage.

"At a distance of 45 feet from the portal there is no vein to be seen, the slips that terminated the ore having reached the floor of the drift; but a cross-cut of 27 feet easterly reached what appears to be a parallel vein on which a drift extends 22 feet northerly, showing two small veinlets of zinc blende in very tight ground, and but a few feet in length. For 20 feet south of the cross-cut the drift is timbered, but from the end of the timbers to the face, a distance of 30 feet, a very solid lens of first-class zinc blende occurs that will average 30 inches in thickness. A sample taken from four cuts across this vein assayed, silver 2.1 ounces, lead 1 per cent., zinc 46.1 per cent. At the south face of the drift, 50 feet from the cross-cut, a porphyry dyke occurs which forms, or parallels, the hanging wall of the blende for some distance. About 30 feet south of the cross-cut a raise goes up ten feet, apparently reaching the top of the lens, which, however, continues strong and regular in the bottom of the level for the entire distance of 30 feet.

"Two other tunnels are opened below No. 1, but the formation and ore occurrence are different, and I am doubtful if either of these tunnels is on the main deposit opened in the upper tunnel. Two approximately parallel lenses are opened in the upper tunnel, as described, but in the absence of any connecting raises, or even a survey of the workings, one is not justified in pronouncing a positive opinion. Tunnel No. 2 passes through dark slate for 50 feet and then turns northerly on an irregular deposit, showing small veinlets of zinc blende and galena. A short stope or raise has been started at the end of this drift, showing in one place a small lens of galena 10 inches maximum thickness. A winze was also started under the raise, following down the galena, but was full of water. Judging from the ore on the dump some good grade galena and zinc blende had been taken out of these workings.

"The lower, or No. 3 tunnel, goes in for about 100 feet through graphitic slate, and then turns northerly. At this point a streak of zinc blende four inches thick can be traced diagonally across the drift for a length of 15 feet. A little further on a 5-inch parallel streak of fine-grained crushed and slicken-sided blende occurs for a length of 20 feet. At the end of the drift, which is 30 feet from the turn in the main tunnel, a raise or a small stope was found. The platform in the raise, covered with loose rock, prevented one from passing through it. The rock is black slate and the footwall smooth and well-defined, with a southerly dip of 60 degrees.

"The ore lenses are very irregular and have a peculiarity of running diagonally with the vein walls and terminating on contact with them. The 20 foot lens was sampled in three places, which averaged a thickness of five inches, and assayed, silver 2.2 ounces, lead nil, zinc 48.5 per cent.

"This property gives promise, when opened up, of being a good producer of zinc blende. It will be noticed that No. 1 tunnel shows rather a large vein of high-grade zinc blende, with practically no galena, while the lower tunnels show small irregular lenses of both galena and zinc blende, like the average Slocan veins. The deposit of high-grade, almost lead-free, blende in No. 1 however, more nearly resembles the Lucky Jim type of ore deposit."

The Lucky Jime Mine.

Mr. Argall also examined the Lucky Jim mine, which last year shipped more zinc than any other mine in British Columbia. Extracts from his published report follow:

"This property, situated at Bear Lake, Slocan, is owned by Mr. G. W. Hughes and associate. It consists of 12 mining claims and fractions, aggregating about 350 acres. The Lucky Jim vein was discovered in 1892 and worked irregularly for some years for silver-lead ore; during the years 1896-1899 concentrating ore amounting to 5,641 tons was produced, from which 1,600 tons of zinc blende averaging 50 per cent. zinc was sorted out. The remainder, a zinc-lead product, was sold to the owners of the Pilot Bay concentrating and smelting works. The 1,600 tons of zinc ore assaying about six ounces of silver per ton, three per cent. lead, and 50 per cent. zinc, was shipped partly to Antwerp, Belgium, and partly to the Fry process works on the Manchester Ship Canal, England, a special freight rate of $14.50 per ton having been secured from the mine to these works, but unfortunately the works, the process and its inventor all came to grief about the time the ore arriv-

ed in England and the shippers gained nothing but experience by the transaction.

"During 1901-2 the property was shut down, but it was re-opened in 1903 by Mr. G. W. Hughes, the present owner, who has declared dividends of $100,000 as the result of zinc ore shipments during 1904 and 1905.

"The production under Mr. Hughes' management up to the end of 1905 amounted to 5,345 tons of zinc blende averaging 54 per cent. zinc, a small portion of the tonnage being concentrates from a trial shipment to the Payne concentrator at Sandon.

"Development.—The property is developed by five tunnels, the uppermost worked exclusively for silver-lead ore and now abandoned, being situated at an elevation of 4,551 feet above sea level. The Slide tunnel, so called because its portal is situated on the slide of the gulch, in the track of a large snowslide, is at an elevation of 4,474 feet. A second tunnel (Safety tunnel) was driven in at this same elevation from a sheltered point on the side of the mountain and connected with the workings of the Slide tunnel, so that men can enter or leave the mine in safety when slides are running in the gulch.

"Two tunnels, one on the east and one on the west side of the gulch, have their portals at an elevation of 4,366 feet. These tunnels (called No. 2) are connected with the Kaslo & Slocan Railway by a gravity tram 1,300 feet long, with a fall of 830 feet. These tunnels, together with the branch levels, aggregate about 3,000 feet of drifts.

"Geological.—The Lucky Jim ore deposit differs so much from the general run of the Slocan vein series, that a short note on the geological conditions is necessary to a clear understanding of the ore occurrence at this very interesting mine. In a word, the ore is found in a zone of limestone and calcareous slate where penetrated by fissures, and invariably in the purer crystalline limestone of the zone. The footwall of the limestone zone is a hard dark green fissile slate, more or less pyritiferous near the plane of contact with the limestone. Impure quartzite beds occur in the footwall slates, but not in the vicinity of the ore deposits. The hanging-wall country, as seen in No. 2 tunnel, appears to be the average graphitic slate of the Slocan series. The foot and hanging country is separated by about 100 feet of calcareous slates, limestone, etc., that make up what I shall call the limestone zone. The pay ore occurs in chimney-like columns in the purer limestone, invariably along some line of fissuring, or extending along the fissure in vein-like form, where limestone forms one or both of the fissure walls. The fissuring, like most of the Slocan series, is greatest at the present surface, and becomes less in depth, the minor fissures often disappearing in less than 100 feet from the surface. These latter, however, are confined to the limestone zone, and are more properly called incipient fissures. The key to this ore deposit is, however, the east-west fissures crossing the strike of the limestone zone and this fact should not be lost sight of in prospecting at the Jucky Jim, or other properties along the strike of the limestone zone to the south."

Mr. Argall's detailed description of the mine workings is too long for reproduction here. It may be found by those requiring to read it on pp. 201-6 of the Zinc Commission's report, above mentioned. Concluding, Mr. Argall observed: "The Lucky Jim ore deposits occur in a limestone zone in part interbedded with the slates. This zone consists of crystalline limestone of great purity, calcareous slates and dark impure limestone bands which in some places follow the strike of the slates and in other places are of irregular form, more particularly the crystalline limestone in which the two developed ore chimneys occur. The ore deposits occur in association with a system of vertical fissures crossing the zone at about right angles to its strike. The fissuring is best and largest near the surface and does not continue very strong in depth. Future prospecting should therefore take the form of developing the cross fissures at a shallow or moderate depth in the limestone zone. Moreover, the shallow deposits carry galena and very clean blende, while in the deepest workings a fine-grained pyrites and pyrrhotite occur in quantity, mixed with the blende, and hence the deep ores will require a concentration mill and magnetic separator to handle them effectively. The Lucky Jim mine should produce large quantities of concentrating ore as well as the high-grade zinc for which it is famous. Further development along the strike of the limestone will in the fissured zones undoubtedly result in the discovery of other deposits of high-grade blende."

Since the Zinc Commission made its report the Lucky Jim property has passed into other hands. In 1909 it was acquired by Mr. G. Weaver Loper, of Spokane, Washington, U.S.A., and associates, who organized the Lucky Jim Mines, Limited, and have been operating the property for more than a year. In February of that year the new owners obtained possession of the mine, and they were reported to have spent during that year about $50,000, including the cost of overhaul of machinery, erection of new buildings for the accommodation of the miners, and development work. The year's output of zinc ore exceeded 5,000 tons, averaging about 50 per cent. zinc. Besides cross-cutting, and sinking a winze from the upper workings, the driving of another tunnel was undertaken, at such a depth below the old workings as to give 300 feet more stoping ground on the dip of the ore. Production has thus far all been from ground above No. 4 tunnel. The new tunnel is 250 feet vertical depth below the lowest old tunnel in the mine. The present owners state that the ore occurs in fractures crossing the lime dyke, which varies in width up to 250 feet. The fractures are from 12 to 50 feet wide and in places are filled with zinc ore, and sometimes with lead and zinc ores mixed. The zinc ores run up to 54 per cent. zinc, and the lead ores 68 to 75 per cent. lead, with silver averaging about one ounce to the unit of lead. The quantity of milling ore available at the close of 1909 was estimated at about 60.000 tons, this containing 8 to 10 per cent. lead, 25 to 30 per cent. zinc, and 10 ounces silver per ton. This ore will not be utilized until after a concentrating mill shall have been erected and equipped. The proposal is to put in a plant that will supplement production up to a total of 1,500 tons of 50 per cent. zinc ore and concentrate. It could be noted that the estimated values of the ores as just given are higher than those quoted by Mr. Argall, but they are given as stated by a representative of the company.

Quite recent notes relative to this property are as follows: "An aerial tramway is being constructed from the portal of the lowest tunnel of the Lucky Jim mine down to the Kaslo & Slocan Railway below. Heretofore the zinc ore shipped has been sent down over a gravity tramway to the shipping bin alongside the railway. During the latter part of 1909 a tunnel was driven to cut one of the big ore shoots at greater depth. In December, at 380 feet in, this ore shoot was entered; now the tunnel is being extended towards a second big

shoot of ore distant between 800 and 900 feet from the mouth of the adit. This shoot should be reached by the end of June. About the same time the new tramway should be completed, for the cables are on the ground, timbers for the upper terminal and derricks are framed, and the ore bin at the lower terminal about finished. The length of this tramway will be approximately 1,000 feet. By the middle of July ore should be coming down from the lower tunnel, and thereafter shipments should amount to between 300 and 400 tons per week.

"The last winter's development work also included putting up two raises, each about 80 feet, from adit No. 4 to No. 3. One is through and the other within 10 feet of making connection. Between 30 and 35 men are employed, with Mr. Charles Norman as resident foreman. Mr. A. J. Becker, of Kaslo, is superintendent for the Lucky Jim Mines, Limited."

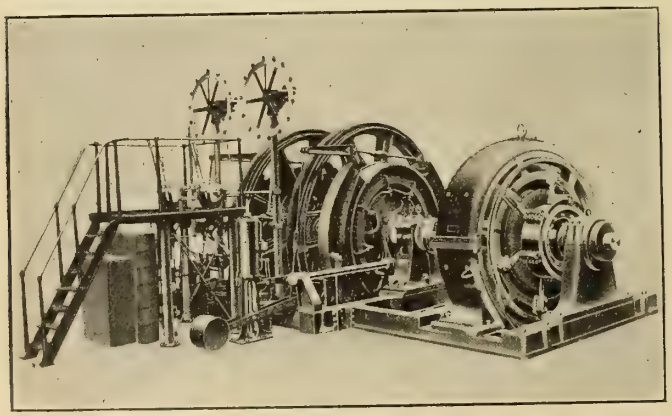
The Lucky Jim Company's head office is in Spokane, Washington, and Mr. G. Weaver Loper is managing director. He is at present energetically pushing the proposed concentrator erection scheme, and is determined to make the operations of the company both large and successful.

The Mountain Chief Group.

Not much information is available concerning this property, which is situated on the south side of Carpenter Creek, about a mile and a half from New Denver, this town being on Slocan Lake. There is an excellent wagon road to within a quarter of a mile of the principal tunnels, and thence to the mine there is a good pack trail. No work has been done on the property for several years, owing, it is said, to disagreement between two of the former owners. The ore lying on the dump, and some sacked at the mine, was assayed for the Zinc Commission, and showed that it contained fair value in silver, lead, and zinc. The value of the property as a prospective shipping mine is, however, under existing conditions, not ascertainable.

THE HECLA MINE HOIST.

The operation of large electric hoists, with mutual satisfaction to the mining company and the power company, has, during the past few years, received very careful consideration, and to-day there is no question but that this problem has been satisfactorily solved.



Hoist—Shop View.

With the introduction of the polyphase alternating current generators and high tension transmission lines, electric power has become available in most of the great mining districts. The simplest method of utilizing this power for hoist work is through the direct application of an alternating current induction motor. If the capacity of the hoist is comparatively small, this is quite satisfactory, but where heavy loads must be handled at high speed, the peak due to acceleration of the moving parts, is often far in excess of the average requirements of the hoist, in which case, if the current is purchased from a power company which also carries a lighting load, the voltage fluctuation at each recurrence of the hoist cycle peak will prove most objectionable. If the hoist is located at the end of a long transmission line, and excessive amount of copper must be installed to prevent an undue drop in the voltage during the maximum demand. In any case, the power company must install all its equipment with reference to the peak instead of the average load, and must



Hoist, as Installed.

charge accordingly. To meet these conditions the fly-wheel motor-generator type of hoist has been developed. The essential parts of such a hoist system are:

(A) A shunt wound direct current motor geared or coupled to the hoisting drums.

(B) A fly-wheel motor-generator set, consisting of

(a) An alternating current induction motor with variable external secondary resistance.

(b) A direct current shunt wound generator with auxiliary commutating poles.

(c) A heavy fly-wheel mounted on the motor-generator shaft.

(d) A direct current exciter for separately exciting both generator and hoist motor.

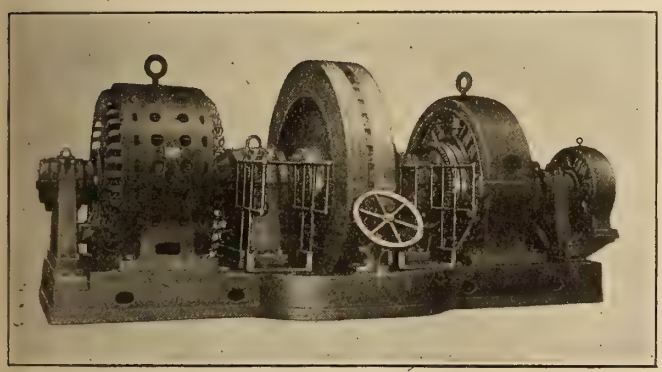
(C) A slip regulator which by varying the secondary resistance of the A. C. motor causes it to slow down under heavy loads.

(D) A suitable controller for varying and reversing the D. C. generator field current.

The armatures of the D. C. generator and hoist motor are connected in series and the field of each machine is separately excited, constant full field being maintained on the motor. The hoist is started by applying a gradually increasing field to the generator, thus causing a proportionate voltage to be impressed upon the armature of the hoist motor. When the load on the A. C. motor reaches a predetermined limit, resistance is automatically cut into its secondary circuit by means of the slip regulator. The speed of the motor-generator is thus reduced and a portion of the stored

energy in the fly-wheel utilized in overcoming the peak of the hoisting cycle, with a minimum demand on the power system. In stopping the hoist at the end of a cycle the generator field is gradually weakened so that any excess energy stored in the descending cage, rotating hoist motor, and drums, is returned to the fly-wheel through the D. C. generator, which momentarily acts as a motor, receiving electrical energy from the hoist motor, the functions of which are also momentarily reversed. To reverse the hoist, the field of the generator is reversed, causing the motor to rotate in the opposite direction. The heavy peak loads are thus eliminated from the line, and the wear on the mechanical brakes is very much reduced. Since the current handled by the controller is very small, a great many steps can be provided, giving the operator a very elastic and sensitive control under all conditions.

Perhaps no electric hoisting plant has attracted more attention from the mining men of the entire country than that of the Hecla Mining Company at Burke, Idaho; the American Institute of Mining Engineers during their 1909 tour, made the trip to this mine for the express purpose of inspecting the installation.



Motor, Generator Set.

The power available for this plant is 3 phase, 60 cycle current, ranging from 2,080 to 2,300 volts. The motor generator, Figure 1, is self-contained, having a cast iron base, four bearings, and shaft. A 450 h.p., 3 phase, 60 cycle motor drives the direct current generator, which is equipped with commutating poles to enable it to handle full load current at any voltage between 0 and 600 volts. The fly-wheel, weighing 30,000 lbs., is mounted on the shaft between the motor and generator, while the direct connected exciter is carried upon the shaft extension at the end of the set. The direct current 550-h.p., 600-volt hoist motor, operating at 60 r. p.m. (Figure 2), is direct connected to the main reel shaft by a flange coupling.

The control of the direct current circuit for operating the hoist is obtained by means of a lever, the forward movement of which starts the hoist in one direction, and the backward movement in the opposite direction. This lever is direct connected to a reversing field rheostat with a large number of points; since it is used to vary the generator voltage instead of cutting resistance into and out of the hoist motor armature circuit, economical operation is secured at all points, whenever conditions necessitate running at lower than normal speed. All the operating levers have the same direction of throw with a movement of less than thirty inches. They are conveniently grouped upon a raised platform, consisting of an iron frame and hardwood floor, with a suitable stairway leading from the engine room floor to the platform, and a brass hand rail enclosing the stairway and platform. The entire electrical equipment described above was supplied by the Westinghouse Electric & Manufacturing Company.

The hoist, Figure 3, which was built by the Wellman-Seaver-Morgan Company, consists of two reels, each capable of holding 2,500 feet of 3-8-in. x 4-in. flat rope. Under normal conditions the hoist operates balanced; that is, the empty cage descends as the loaded cage is raised. If desired, however, either reel may be operated independently of the other. The winding diameter of the reel varies from a minimum of five feet when empty, to a maximum of thirteen feet when the entire 2,500 feet of rope is wound up. Each of these reels is fitted with a Webster, Camp & Lane band friction clutch, post brake, and indicator.

The brakes, which are operated by means of combined air and oil cylinders and heavy counterweights, are so designed that they are set by the weights and released by means of air cylinders.

This hoist has a maximum hoisting speed of 2,400 feet per minute, and will handle an unbalanced load of 16,000 lbs. including rope, from a depth of 2,500 feet, yet its operation is the acme of simplicity.

The complete equipment, including the motor-generator set, hoist motor, slip regulator, switchboard and hoist, weighs over 300,000 pounds.

ONTARIO MINERAL OUTPUT FIRST QUARTER OF 1910.

Returns to the Bureau of Mines show that the output of the metalliferous mines and works of Ontario for the three months ending 31st March, 1910, was as follows:

	Quantity.	Value.
Silver, ounces	6,399,927	$3,041,158
Cobalt, tons	78*	14,485
Copper, tons	2,491	357,074
Nickel, tons	5,250	1,131,024
Iron ore, tons	6,735	15,034
Pig iron, tons	109,718	1,750,396

* Only cobalt paid for included.

Shipments from the silver mines of Cobalt and adjoining regions aggregate 7,155 tons, of which 6,094 tons were ore and 1,061 tons concentrates. The ore shipped averaged 864 ounces silver per ton, and the concentrates 1,066 ounces. Of the shipments, 271 tons of ore came from mines in the Gowganda region, containing 287,316 ounces of silver. For the corresponding quarter of 1909 shipments from Cobalt were 6,833 tons ore and 290 tons concentrates, containing together 5,628,860 ounces of silver, the increase for the quarter being about 14 per cent. During the three months there were treated at the silver reduction works of Ontario 2,053 tons of ore and concentrates, containing nearly 50 per cent. of the total yield of silver. Low grade ores continue to go to the United States, but the concentration of low grade material has become an established feature of the practice at Cobalt.

The nickel-copper mines of Sudbury were very active during the quarter, and turned out nearly double the quantity of nickel produced during the first three months of 1909, namely, 5,250 tons as compared with 2,794 tons. The output of copper was also larger, being 2,491 tons as against 1,906 tons during the first quarter of 1909. The movement of iron ore during the first quarter of the year is always small, as the season of navigation does not open until after the quarter closes. The output of pig iron was slightly greater than during the same period of 1909.

OUR EUROPEAN LETTER.

England at last steps into line on the question of providing proper mining rescue apparatus. Details of new proposals. Further colliery reports show big drop in profits but condition not unsatisfactory. Monks as early coal getters. Important opinions on electric power in collieries. A new oil mine locomotive. The Rand dividend season.

Exclusive correspondence of Canadian Mining Journal

London, June 18th, 1910.

The reproach is at last to be removed from England that she is one of the backward countries of the world in the provision of proper rescue apparatus for mines. Winston Churchill, for the Home Office, admitted in Parliament on June 16th, that the Whitehaven disaster had lent a stimulus to the discussion of this question. He announced that within the last two years coal owners in this country had spent $50,000 on experiments with life-saving appliances. While full recognition was paid to this enterprise, there was nevertheless a general agreement in Parliament that the work was one which should be undertaken by the Government rather than left to individual effort. Already in consultation with various experts, the Home Office has drawn up an important series of regulations which, if finally adopted, will have the effect of standardizing the work of rescue in coal mine accidents.

It is proposed that a central rescue station shall be established in each coal field, with sub-stations at each of the neighbouring mines. This central station will resemble a miniature coal mine, in which selected men from the mines of the district will be trained to use the oxygen breathing apparatus, and to make their way through all kinds of obstacles to reach the victims of a supposed disaster. At each central station there will be kept twenty complete sets of breathing apparatus, stocks of oxygen, and smoke helmets. A motor car also is to be kept in constant readiness to proceed wherever help may be needed.

At the sub-stations which will be established at each mine, there must be kept five complete sets of breathing apparatus, five electric hand lamps, one stretcher with oxygen appliance for bringing unconscious men safely through poisonous gases, one apparatus for reviving men overcome by choke-damp, and an ambulance outfit.

The central station is to be connected by telephone with all the mines in the district.

Annual reports of colliery companies that have come to hand since I dealt with the last group continue to show the effect of the drop in prices and of the coming into force of the Miners' Eight Hours Act in 1909. A decrease of about 11 per cent. in export values could not but fail to lower profits, and since it, unfortunately, happened that the cost of production increased through the readjustments rendered necessary by the new legislation, the industry has had to bear a double burden. Having regard to the cumulative influence of these factors, it is really a matter of congratulation that the various undertakings are able to make as excellent a showing as they do. The Welsh companies have undoubtedly been harder hit than any others, but the enormous extent of their trade has also enabled them better than most to stand the strain of the troublous times out of which they are now, one is emboldened to think, definitely emerging.

Taking thirteen concerns covering the whole country whose reports are just to hand, I find the average decline in profit is about 36 per cent., but the individual showing varies considerably. In one or two instances earnings have advanced and losses have been converted into surpluses; in only two cases has a previous profit become a deficit.

The big Welsh firms, such as Partridge Jones & Company, the United National, Locket's Merthyr and the Penrikyher Navigation, register reduction in profits ranging from 48 per cent. in the case of the United National to 60 per cent. in the case of Locket's Merthyr. There is, however, barely 12 per cent. between the maximum and the minimum, which demonstrates how evenly the South Wales field was affected in contrast to the much more fluctuating character of changes in other parts of the country. In each of the above instances the ordinary distributions were naturally lowered, but as the amounts paid were not below 7 1-2 per cent. and went up to 15 per cent., it cannot be said that an undue part of the past year's burdens were transferred to the shoulders of the ordinary proprietors.

Amongst the earliest coal getters in this country were monks. When President Simpson of the Institution of Mining Engineers had occasion to investigate some titles of mining royalties near Newcastle-upon-Tyne, he discovered that the monks of Tynemouth had carried on coal mining in Northumberland in early times, dating from the latter part of the twelfth century. These records had induced him to study also the history of coal mining in the neighbouring County of Durham, where he found that under the auspices of the monks of the Palatinate the industry had been carried on in various places with great vigour, which led him to conclude that they had been more extensive workers of coal than was generally supposed. Further investigations had elucidated the fact that in other parts of England as well as in Scotland and in Wales where coal existed in the neighbourhood of monasteries it had been worked by the monks. It was generally surmised that the Romans during their occupation of Britain worked coal, but there was not much evidence to that effect. There was, however, abundant evidence that they worked ironstone and other minerals. The accounts of working coal in Saxon times were scanty and obscure. Little working seemed indeed to have taken place until after the Norman Conquest. The President proceeded to give many details of the information which he had gleaned of coal mining by the monks, and the source of revenue which was thus afforded to the monasteries up till the time of the dissolution of these institutions.

The Mining Institute of Scotland has been discussing electric power in collieries. Two important papers were read, one by Frank Anslow and one by Robert Crawford and Harold Moores in collaboration. Frank Anslow discussed the controversy which is raging just now as to the relative advantages of three-phase and direct current for colliery work. He did not propose to enter into discussion at this stage other than to say that when a supply is taken from a supply company there is no option but to adopt the system at which the supply is given, if capital expenditure is to be avoided. For all practical purposes each system is equally dangerous, or perhaps it is better to say equally safe if properly installed under conditions suitable for the system selected. One of the main objections raised to direct current plant was upon the score of sparking. The improvements in the design of this plant had resulted in prac-

tically sparkless commutation even under severe overload conditions, but it would not be disputed that the danger of ignition of gas or coal dust from this cause still existed. However, this danger was also present with alternating current slip ring motors, and also in a modified degree with those of the squirrel cage or short circuited type.

On the subject of coal cutters, Mr. Anslow said that from a working point of view direct current coal cutters were superior to those operated by alternating current, but the latter type had proved itself quite reliable and satisfactory in working. In conclusion he remarked that given these essentials which had been present in all the successful developments of electric power in other directions, and which were even more necessary in colliery work, they could look forward with all confidence to the future of the power in the knowledge that it would not only outlive the suspicion with which it was at present looked upon, but would further extend its field of usefulness.

Crawford & Moores dealt with power production at collieries with special reference to gas power and electric centralization. They pointed out that the production of cheap power at collieries was a question of vital importance demanding more and more attention year by year in proportion to the drop in price of the saleable article, due to the pressure of highly competitive times, the comparatively less efficiency of colliery plants in general, and the increased depth at which the coal was being worked. The growing need for economy made the subject of power cost one to which the colliery manager must devote considerable attention with a view to transmitting and generating his power in such a manner as would ensure the highest possible efficiency. The report of the Royal Commission on Coal Supplies pointed out that collieries were extremely wasteful in the amount of fuel consumed in driving their own plant, the annual consumption in British mines reaching the enormous total of 18,000,000 tons. This was equivalent to about 7 per cent of the total output, while it was an ascertained fact that in some individual cases the consumption in the colliery boilers reached the high proportion of 11 per cent. This proved the urgent need for economy, and the intention of the present paper was to demonstrate that very high economies could be obtained by various methods and in varying degrees, according to individual circumstances.

The authors at considerable length illustrated how in their opinion savings could be effected in regard to non-bituminous pressure gas plants, non-bituminous suction gas plants, bituminous suction gas plants, and bituminous pressure gas plants, while they called special attention to the Mond gas plant, a type of plant which they considered to be adapted for power installations of over 2,000 horse-power. Finally, they argued that a gas-driven central electrical power station for a group of collieries was the ideal arrangement where circumstances admitted of the outlay which such a scheme involved; and there appeared to be no doubt that many such would spring into existence during the next few years with a view to using to the best advantage the heat possibilities of the coal consumed.

A most efficient and well-designed mine locomotive of the internal combustion type is being supplied by an English firm to German and Austrian owners. Owing to its special design and small wheel base, it can traverse the most confined mines' roads and turn curves of very small radius without losing engine power. A skilful arrangement also exists for the condensation of its exhaust gases. Powers run from 6 to 50 h.p., and they can haul loads varying from 15 to 150 tons at speeds from 4 to 14 miles per hour. The motor is an ordinary single cylinder one and ignition is effected by a low tension magneto. For underground haulage in fiery mines both terminals in accordance with Austrian regulations for coal mines are insulated and the current conveyed to and from the sparking points in special metallic woven tables. Further indication of the explosion proof character of the locomotive is given by the total elimination of any form of carburetter outside the cylinder. A 12 h.p. locomotive is found to consume during a ten hours' trip about 5 gallons of fuel and a saving of two-thirds in the cost can be shown as compared with horse haulage.

The Rand dividend announcement season has now well begun, and, roughly, about half the dividend payers have informed their shareholders what dividends are to accrue to them. The showing, as was expected, is not a very good one, and it becomes a matter of satisfaction to find so many companies maintaining the June distribution at the level paid in respect of the last half year of 1909. The only advances, so far, are the Consolidated Main Reef's 7 1-2 per cent. for the half year, and the new Goch 7 1-2 per cent. for the half year, as against its 10 per cent. for the preceding whole year. On the other hand, the Modderfontein goes back to the rate it paid in June last year, although something better than this had been expected in view of the provision of further working resources by the recent issue of shares at $55 each. This time there is no bonus with the Ferreira's return. Perhaps the best picture of the Rand returns is shown by working out the approximate yield per annum on a basis of the last twelve months' dividend and the current market price. Here, however, the exceptionally high yields are usually due to the remarkable period of the mines' life being comparatively short, and the exceptionally low returns sometimes discount better things in the future. Prominent in the former category figure the Ferreira and the Meyer Consolidated, Knight's Durban Roodepoort, Kleinfontein, Langlaagte, Simmer and Witwatersrand Deep, show up well amongst the mines with a fairly long period of life still in front of them.

	Yield per annum to investor, p.c.
Village Deep	4
New Modderfontein	5
East Rand Proprietary	7½
New Goch	8
Main Reef West	8¼
Rose Deep	9
Geldenhuis Deep	9
Meyer & Charlton	9¼
Van Ryn	9½
Langlaagte Estate	10
New Kleinfontein	10
Witwatersrand Deep	10¼
Nigel	10½
Knight's Deep	11
Consolidated Main Reef	12
Simmer and Jack	12
New Heriot	12½
Princess Estate	12½
Durban Roodeport Gold	13
Village Main Reef	16
Ferreira Gold	21
May Consolidated	32

NEW EMERGENCY SIGNALING APPARATUS FOR MINES.

The great value of an emergency signaling system for mine use, whereby a signal may be given simultaneously in every mine working, on every mine level, and reaching every man, is acknowledged by all mine operators. In some states the installation of such a system for the protection of the workmen in the mines has been compulsory by special legislation.

The value of such a system, which is used only in case of fire, flood or accident, is that its signal is an indication of danger and a command for every man in the mine to leave his work immediately and come to the surface. The size of the gongs for such a signaling system is required by law to be not less than eight



Fig. 1.

inches in diameter. The signal is thus made distinctive, differing greatly from the telephone and hoisting bell calls, and is so loud and clear as to reach for long distances in the mine levels.

The Western Electric Company has designed an emergency signaling system which meets the requirements of the laws of Illinois and other states for this service. It comprises a generator signaling set, as shown in Figs. 1, 2 and 3; emergency signal bells or gongs, as shown by Fig. 4, and the necessary wiring.

The generator signaling set consists of a strong metal case containing a hand generator and the line termi-

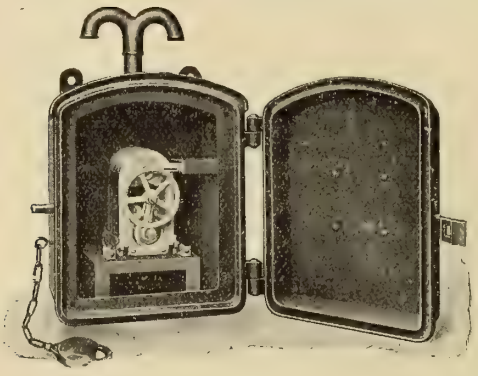


Fig. 2.

nals. It is provided with a strong hasp and staple and is locked with a padlock. On the front of the cover within a small box having a glass window, as shown by Fig. 1, hangs the key to the lock. Only in case of emergency the glass window is broken and the key used to open the set so that the crank which signals the alarm can be turned.

When the set is open for use a sheet metal partition protects the generator from injury, moisture, dust and foreign particles. Through this partition only the handle of the generator projects. The metal case of this set is protected by special treatment from rust and corrosion, due to gases.

The most important part of this signaling set, and, in fact, any emergency signaling system is the generator that supplies the source of the signaling current. In such a system the failure of the signaling apparatus involves serious consequences. Dry batteries are unreliable and inadequate as they deteriorate even when not in use, and need frequent inspection and renewals. A generator is the most satisfactory means of furnishing signaling current, as it is always ready to deliver current for an indefinite length of time and does not deteriorate either in use or when standing idle.

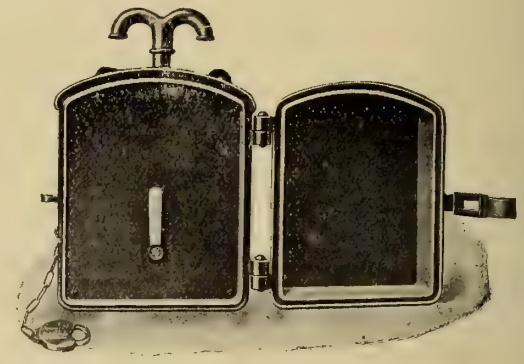


Fig. 3.

The hand generators used in the two new Western Electric signaling sets, come in five-bar and fourteen-bar sizes; each is a compact, durable and well-constructed generator, built for the most severe service. The magnets, both in the five-bar and fourteen-bar types, are of the highest grade tungsten steel and are hardened and aged to insure retaining their strength indefinitely. The bearings are large and well-proportioned. The five-bar generator is very efficient under practical working conditions and will ring perfectly the equivalent of twenty eight-inch loud ringing emergency signal gongs on an eight-mile full metallic line of No. 12 B. W. G. iron wire.

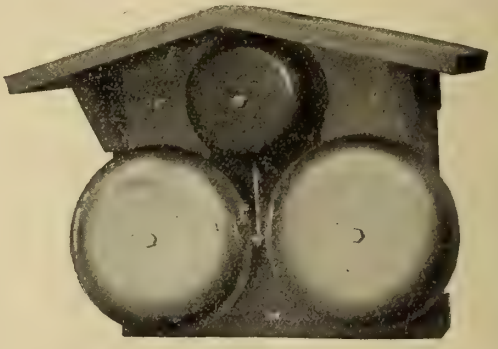


Fig. 4.

The larger generator equipment consists of a fourteen-magnet generator mounted in a metal case similar to that of the five-magnet equipment, but a little larger. This generator will ring the equivalent of sixty of the eight-inch gongs over an eight-mile line.

The generator of the signal set on this emergency system furnishes the current for ringing all the bells in the system. No batteries are needed and all the troubles of battery deterioration, failure and renewal are obviated. There are no switches to open and close —simply turning a handle rings all the bells. When

not in use the generator is on open circuit, and turning the crank automatically closes the circuit. The windings of each generator are specially treated with insulating material, making them moisture-proof and insuring continuous service.

The emergency signal bell, Fig. 4, of the Western Electric signal system, consists of a non-sparking bell provided with two eight-inch gongs mounted upon a backboard having a protecting canopy. The gongs are hot galvanized and have an especially loud, clear tone. All metal parts are specially treated to adapt them for use in mines.

The signal system above described may be used with or independent of a telephone system. For mine telephone service the Western Electric Company has new designs of metal and wood sets, and also a new design of an intercommunicating metal mine set, all of which are fully up to the standard of the telephone apparatus furnished to the telephone companies in the "Bell" system, who are its principal customers.

A UNIQUE TUNNELING MACHINE.

By Frank C. Perkins.

A most interesting form of tunneling machine has recently been devised at Denver, Colorado, the details of construction being shown in illustration Fig. 1, and drawing Figs. 2 and 3, while the method of operation of the same in tunnel work with electric locomotives for conveying the material as excavated from the tunnel is indicated in the accompanying illustration, Fig. 4. There is no doubt a great field for a practical machine for tunneling through hard substances, for, although the present process of drilling and blasting is effective, it is slow and costly. A blast is a dangerous thing, especially when used in close proximity to foundation.

It may be stated that the success or failure of any

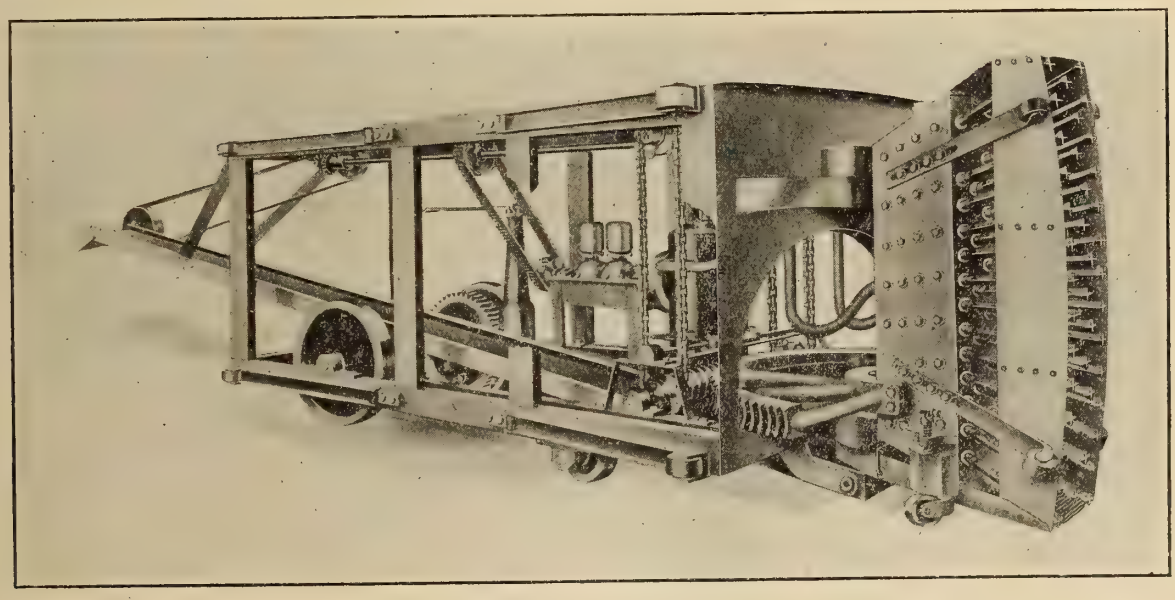


Fig. 1.

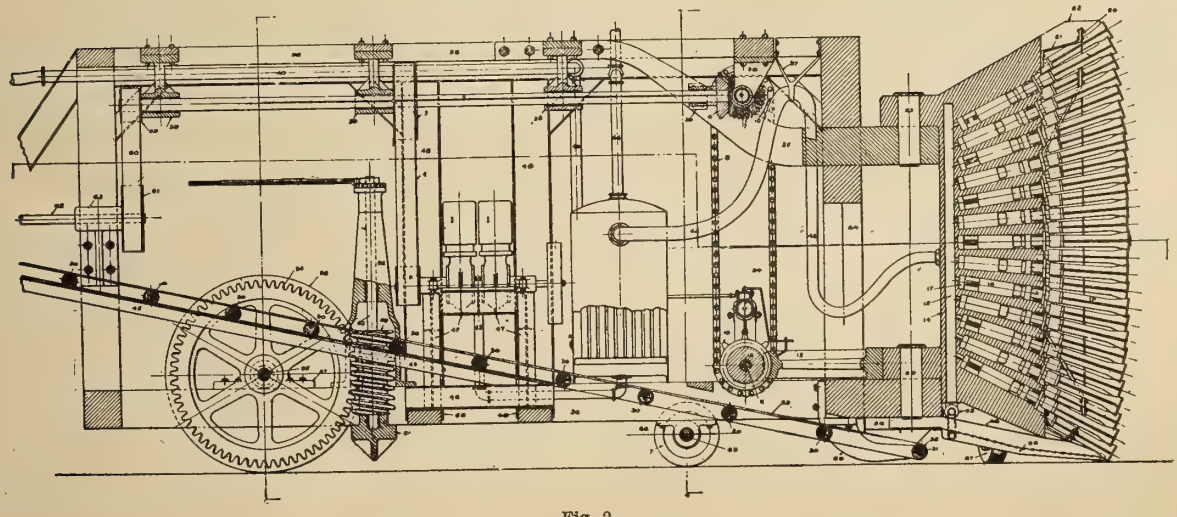


Fig. 2.

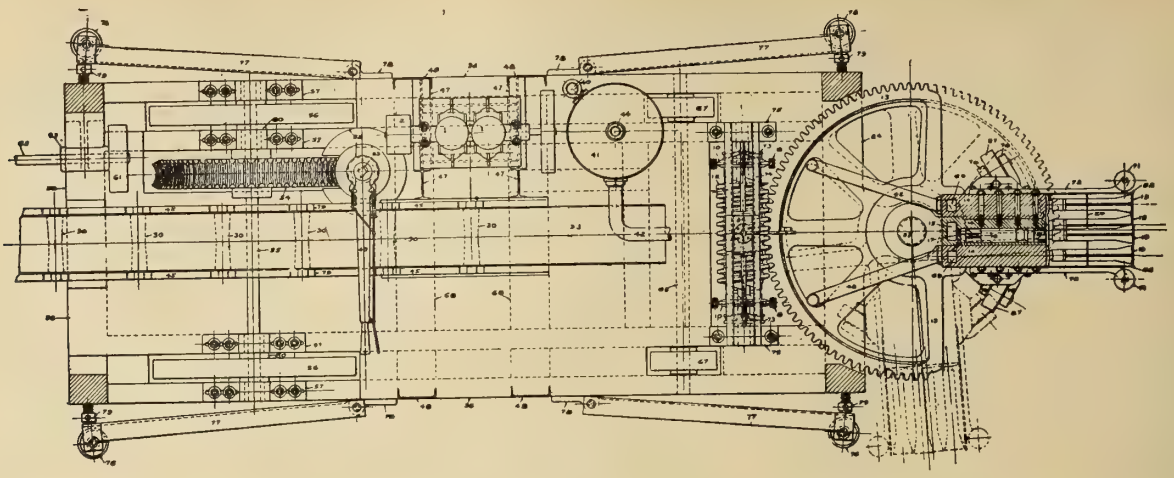


Fig. 3.

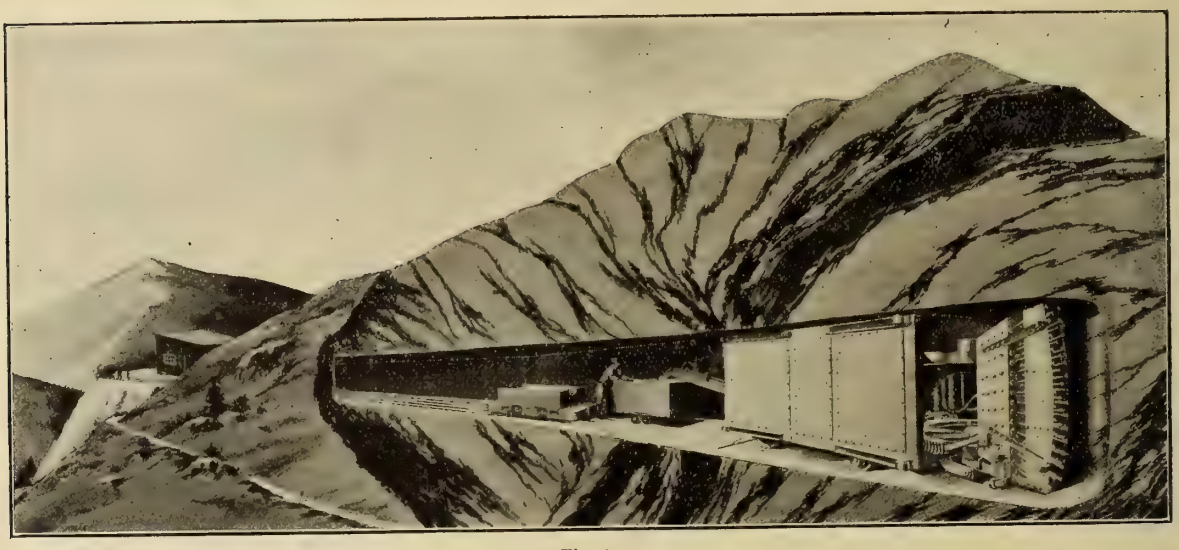


Fig. 4.

tunnel machine rests almost entirely in the effectiveness of its cutting head, which is the first consideration. The Fowler machine noted in the illustrations is equipped with forty-one hammer drills, which are used as a battery set into a casing of cast steel, hung by massive hinges to the frame of the machine. In operation, this battery of drills and the casting which incases it, is swung backward and forward, by means of a worm gear, across the breast of the tunnel.

It will be noted that the drills have no rotary motion but are arranged in the battery so as to slightly overlap in their work, as the cutting head swings from side to side.

It will be seen that the cutting battery is enclosed in a steel and rubber casing which snugly fits the roof, floor and face of the tunnel in such a manner as to inclose all cuttings, which are given just enough water to render them dustless. These cuttings are connected to cars at the rear of the machine by means of an endless conveyor.

As the cutting head occupies but a small portion of the breast of the tunnel, it is, therefore, possible to have free access to the surface of the breast at all times.

For power the drills are operated by compressed air and as each cutting unit strikes 600 blows per minute with a force of 1,150 pounds on each drill per blow, we have a force of 28,900,000 pounds per minute on the breast of the tunnel.

CANADIAN PATENTS.

The following is a list of Canadian patents granted on May 31, 1910, relating to mining and metallurgy, and furnished by Fetherstonhaugh & Co., 5 Elgin Street, Ottawa, Canada, Russel S. Smart, Resident, from whom all information regarding same may be obtained.

125961—T. L. Willson, and Maximilian Haff, Ottawa, Canada, metallurgical processes and products. T. L. Willson.

125969—A. P. Turner, Copper Cliff, Ont., converter hoods and flues. International Nickel Company.

125991—P. B. Martyn and Wm. Martyn, Audrie, Lanarkshire, Scotland, apparatus for the manufacture of metal grit.

125990—A. W. Catton and Chas. W. Cattons, West Seattle, Wash, regenerative furnaces.

126046—Jas. C. Kelker, Selby, Cal., apparatus for handling matte and the like products from blast furnaces, smelters and other reduction works.

Since the year 1897 no mercury ore has been mined in Canada. Pockets of cinnabar in quartz veins near Kamloops Lake, B.C., were the source of all recorded Canadian production. The maximum output, that of 1895, yielded 71 flasks of mercury, amounting in value to $2,343. The annual consumption in Canada is valued at about $100,000.

PLACER GOLD MINING IN BRITISH COLUMBIA.

Present indications are that this year there will be larger returns from placer gold mining in British Columbia than in 1909. This, by the way, is not saying a great deal for the industry, since the official records show that last year's production of placer gold in the province was the smallest in fifteen years, and less than one-half that of 1905, which in turn was smaller than that of any previous year since 1809.

There were exceptional reasons for the considerable falling off in production last year, but apart from these it is to be expected that the recovery of gold from old placer fields will show a gradual decrease under ordinary conditions, for the reason that the richer places soon become exhausted and as a result there is little inducement to individual miners to continue working where there is not much likelihood of returns being considerable to those working on the small scale on which as a rule individual miners must work. Generally speaking, the fields are thereafter either practically deserted or the gold-bearing gravel areas pass into the possession of companies or other large partnerships able to supply the capital requisite for the provision of plant and equipment for operating on a much larger scale than usually is practicable in the case of individuals. To the transition from individual to company ownership may in considerable measure be attributed the gradual yearly decrease in the quantity of placer gold recovered in British Columbia. Of course, there is also to be taken into account the great attraction new fields always have for the ordinary placer miner. Alaska has in recent years tempted many a miner from old placer fields on the Pacific coast to its far-off richer streams and beaches. The last, though, was not one of the reasons for last year's decreased production in British Columbia; rather was the decrease the result partly of the possession of the gold-bearing gravels by companies not then prepared to work them and partly the shortness of water and gravel-washing season for those who did operate their placer properties. It is believed, however, that the season now entered upon will see a change for the better, for not only are some of those whose operations last year were restricted by circumstances not then under their control now prepared for work on a larger scale, but there seems to be good reason to expect the water supply to be larger and the season's work proportionately longer.

In Cariboo.

The largest individual operator in Cariboo district in 1910 will be Mr. John Hopp, well known for years as a persistent believer in the eventual success of deep-drifting on Slough Creek, but who had finally to transfer his attention to the less costly hydraulic mining owing to the large amount of capital and lengthy period of work required to make the rich gravels of the old deep channel of Slough Creek accessible. During recent years Mr. Hopp has been gradually acquiring additional placer leases and water rights, chiefly in the vicinity of Barkerville, until now he has a property, or more correctly, several placer properties, which may be expected to be productive to an extent not reached for some time past in that district.

Last season was a very busy one on Mr. Hopp's properties and even after gravel-washing was at an end for the year work was continued, to get things in shape for extended operations this year. Bigger hydraulicking plants were placed on both Mosquito and Lowhee Creek properties. All the water as previously used for two small plants on Mosquito Creek is this year available for one larger system, and the ditches have been enlarged sufficiently to allow of their carrying the whole of the water any ordinary freshet will bring down. A No. 4 monitor was substituted for the two No. 1 size previously in use. The pressure on this plant is about 200 feet vertical head, with pipe 14 and 15 inches in diameter, and using 5 and 6-inch nozzles. It is planned to increase still further the supply of water by making another ditch, about four miles in length, which work will probably be undertaken this year. On Lowhee Creek the plant is larger than that on Mosquito Creek. Formerly a No. 2 Monitor was used on Lowhee, with pipe 11 and 15 inches in diameter; now a No. 6 Monitor does more effective work, having nozzles 6, 7 and 8 inches in diameter, and 16, 18, 22 and 30 inch pipe. For this property a new ditch, 5 1-2 miles in length, has been constructed, and the old ditch enlarged from 3 feet to 4 feet 6 inches in width for 2 1-2 miles. Capacity of ditch is now 2,750 miner's inches of water, under 400 feet vertical pressure to bottom of pit. In connection with the Lowhee plant a reservoir dam has been partly constructed; when completed it will be between 80 and 100 feet in height, but last winter it was built to a height of only 23 feet. It is estimated that the additional supply of water this reservoir will hold will increase the capacity of the plant for the season by at least one-third. About 2 1-2 miles of ditch have yet to be made to connect with the ditch completed last summer; also a flushing reservoir, the dam of which will be 15 feet high on Lowhee Creek a mile above the mine. When all shall have been completed as above outlined, the Lowhee, taking everything into consideration, will be, for its size, one of the best equipped hydraulic mines in British Columbia. Mr. Hopp is also working the Mucho Oro, on Stout's Gulch, and the Forest Rose, on the east branch of Williams Creek; operations on these properties are less important than those first above mentioned.

Other placer mining properties in Cariboo mining division are the following: Of the Lightning Creek Gold Gravels & Draining Company, on Lightning Creek; the Venture Mining Company, on Peters Creek; the Wormald Creek Mining Company, on a tributary of Lightning Creek; the Fountain Creek Mining Company, on Fountain Creek; the Thistle Gold Company, at Eight Mile Lake; the B. A. Lasell properties, on China Creek and Nugget Gulch; the Western Canadian Deep Leads, and a number of others on various creeks in the same division. There are also several deep-drift properties, on some of which much money has been spent in endeavouring to work the deep old channels of streams known to be gold-bearing.

In Quesnel mining division, Mr. John B. Hobson has an important hydraulic mine, which he will work this season, employing between 50 and 100 men. The biggest undertaking in this division, though, is that Mr. Howard W. DuBois is carrying out for Philadelphia capitalists, at an estimated total cost of about $1,500,000. The work in progress is the construction of a ditch and flume twenty miles from Swift River to the ground to be worked, which is at Twenty Mile Creek, on Quesnel River, about 20 miles below Quesnel Forks. The capacity of the ditch will be from 6,000 to 7,000 miner's inches of water. Included in the works are a dam of considerable size, and an inverted syphon 6,000 feet in length and 60 inches in diameter, with a pressure of 90 feet at its deepest part.

Incidentally it may be noted that latterly more than half the placer gold recovered in the province has been obtained from mines in the Cariboo district.

In Cassiar.

Cassiar district during several years prior to 1908 produced more gold than did Cariboo, but for two years it has taken second place in this respect. Its chief gold field is Atlin, the other divisions — Liard, Stikine, Skeena, and Queen Charlotte—together contributing but a very small proportion of the total gold obtained yearly in the district. Atlin gold field was discovered in 1898. Official records show an aggregate value of about $4,700,000 as that of the gold recovered on its streams during twelve years to the end of 1909, but unofficial estimates give a higher total—in excess of $6,000,000. The highest yearly total on record was that of 1899, of $800,000, while 1904 came next with $530,000. Since the latter year there has been a steady decrease in production recorded, until that for last year reached the lowest on record since the year of discovery—only about one-third of the value of the production in 1904. However, it is thought the turning point has been reached and that the yield will be larger in this and following seasons than in quite recent years. The number of individual miners working on Atlin creeks has become quite small in comparison with that in the earlier years of the history of the camp. There are also fewer companies operating there than several years ago. The larger hydraulic operators are the North Columbia Gold Mining Co., Pine Creek; Amalgamated McKee Creek Mining Co., McKee Creek, and Societie Miniere de la Colombie Britannique, Boulder Creek. Much information relative to mining at Atlin is contained in a paper, by Mrs. Rosalind Watson Young, M.A., of Victoria, B.C., printed in the "Quarterly Bulletin of the Canadian Mining Institute," No. 7, July 1909. Mrs. Young wrote from personal observation and knowledge of placer mining operations and conditions in Atlin camp.

There is little of importance to mention concerning placer mining in other parts of Cassiar district. Two hydraulic enterprises in the Dease Lake Country, Liard division, from which good returns had been expected, have suspended operations, lacking money to continue necessary preliminary work. The Ingenika diggings, of which much was heard two years ago, seem to have proved of small value. Quite recently, however, reports have reached Victoria of gold in payable quantity having been found on a tributary of Taku River, but little is yet known beyond the fact that coarse gold has been discovered. The new find appears to be in country situated between Telegraph Creek and Atlin.

In Other Parts.

Placer mining is being continued on a small scale on White Horse and Perry Creeks, upper Moyie River, and other streams in East Kootenay. In the Big Bend of the Columbia district, north of Revelstoke, which is in the northern part of West Kootenay district, there will probably be more hydraulicking done this year than last. Not much is looked for from streams in the Similkameen, Yale, or Ashcroft divisions, but there may be better results in Lillooet district than during the last few years. Operations in the western part of the Boundary district will not add much to the year's production, nor is it expected that Vancouver Island will yield any quantity of placer gold worth noting.

Reviewing the situation as a whole it seems that first from Cariboo and next from Cassiar may larger returns be expected this year, but not from other parts to any considerable extent.

A MINISTERIAL VISIT TO SULPHIDE, MADOC AND DELORO.

For long it has been the desire of the Hon. Mr. Cochrane, Minister of Mines for Ontario, to inspect personally the mining industries of Eastern Ontario. Pressure of routine business (and the Minister of Mines is kept quite as busy as the hardest working deputy) has heretofore prevented this. But on the morning of Thursday, June 23rd, the decisive step was taken, the ships were burned, and the Minister, accompanied by Dr. W. G. Miller, Mr. E. T. Corkill, and Mr. J. C. Murray, editor of the CANADIAN MINING JOURNAL, boarded the train.

Taking the east-bound C. P. R. express at 9 a.m., the party reached Tweed shortly after noon. Here a motor car was in waiting. The spin to Sulphide was delightful. A detour was made round one of the lakes and Sulphide hove in view, surrounded by groves of shade trees. Manager Deblois showed the party over the works and the mining plant. A short inspection of Mr. B. A. C. Craig's pyrite mine, situate less than half a mile from Sulphide, concluded round one. A very pleasant breathing space was afforded when Mrs. Deblois, the manager's wife, entreated the party most hospitably at their charming residence at Tweed. The motor then took the road for Madoc.

The fourteen miles between Tweed and Madoc were all too short. All Canadian scenery is beautiful in summer; but the County of Hastings has a charm all its own. The country is dotted with farms, groves of hardwood, lakes, and quaint streams. Its topography is sufficiently varied to remind one sometimes of an ideal English landscape, and sometimes of the highlands of Nova Scotia. The roads are good, grades are not excessive, and there are long stretches where one's craving for speed can be amply gratified.

Several mild adventures befell the motorists. A company of young pigs performed astounding gymnastic feats in their attempt to climb a four-foot fence. Similarly a covey of hens acted in a manner truly feminine. But for sheer stupidity honours seemed to be equally divided between the casual cow and the male human being. Only few horses, mostly of the vintage of 1880, displayed a violent interest in the progress of the car. Their masters made much more fuss.

On the road from Tweed the first glimpse of Madoc is caught just as one passes the easterly corner of Moira Lake—a lake, by the way, that deserves its name. It is as lovely a sheet of water as the heart can desire. Some Christian re-christened it Moira. Formerly it was known as Hog Lake.

The party was safely bestowed at the St. Lawrence Hotel, an hotel with a reputation, shortly after 6 o'clock. News was received here that a formal dinner was impending. This turned out to be true, for at 9.30 p.m. the dining room of St. Lawrence Hotel was thrown open and sixty or seventy citizens sat down to a meal that will be long remembered.

The Madoc Board of Trade were the hosts, and the Hon. Mr. Cochrane and his party the guests of honour. Mr. W. A. Hungerford occupied the chair, and occupied it well. To say that the menu was varied is putting it mildly. But it was more than varied. Every dish was completely edible.

Amongst the principal speakers were: Mr. Hungerford, the Hon. Mr. Cochrane, Mr. Thomas Cross, Mr. Pearce, M.P.P., Mr. Dale, Dr. W. G. Miller, Mr. E. T. Corkill, Judge Fraleck, and Mr. J. C. Murray.

Judge Fraleck and others drew the Minister's attention to the disability under which the district laboured

on account of the fact that the Canada Company, an ancient and parasitic English growth, holds the mineral rights over enormous tracts. Mr. Dale, who is a prominent local banker, advocated the guaranteeing by the Government of bonds to facilitate the establishment of a local customs grinding plant for grinding all suitable classes of minerals. Dr. Miller referred felicitously to the plucky pioneer work done by the chairman, Mr. Hungerford, by Mr. D. K. Stewart, Mr. S. Wellington, Mr. William Cross, Mr. Arthur Coe, and other citizens. Mr. Corkill dwelt upon the business aspects of measures for preventing accidents. Mr. Thomas Cross, in a speach sparkling with true humour, harked back to the past and kept his audience spellbound. As Mr. Cross is an indefatigable prospector himself, his words of cheer were heartily received. Mr. J. C. Murray emphasized the point made by Judge Fraleck concerning the Canada Company. He also corrected a misapprehension on the part of one speaker, who had referred to the "unearned increment" that may accrue to miners. Mr. Murray asserted that the term was an absolute misnomer. The miner deserves all he gets.

The dinner wound up with a warm vote of thanks to Mr. John Cochram, the proprietor of the St. Lawrence, for the pains he had taken in preparing such an entertainment in so short a space of time. Hardly ten hours' notice had been given.

Friday morning was occupied in looking over the Henderson talc mine and G. H. Gillespie & Company's mill. A quick run was then made to Deloro, where Mr. P. Kirkegaard and Mr. S. Wright conducted the party through the extensive plant of the Deloro Mining & Reduction Company. After a delightful luncheon at Mr. Kirkegaard's residence, the road to Marmora was taken. At this mining town Mr. Pearce, M.P.P., showed the visitors the chief points of interest. At 3.30 p.m. the west-bound express was caught at Central Ontario Junction and the visitors returned to Toronto pleasantly wearied after two strenuous days of sight-seeing and hospitality.

. . . . . .

Few Toronto people realize that within a short railroad journey there lies a mining country so fraught with historic interest and with present opportunity. Moreover, the motorist will find nowhere a more charming land wherein to risk his own and others' necks.

BOOK REVIEWS.

TELEPHONOLOGY--A DESCRIPTION OF MODERN TELEPHONE APPLIANCES, ETC., BY H. R. VAN DEVENTER, B.S., E.E. SPECIAL ARTICLES BY EMINENT EXPERTS. 586 PAGES, PROFUSELY ILLUSTRATED, PRICE $4. McGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK.

The complicated science of telephony is the subject of this substantial volume. Every important phase of modern telephony is explained. Wireless telephony is not omitted. Although a large amount of detail as to construction and installation is presented, general principles are given a full share of attention.

The modern mine manager cannot afford to be ignorant of telephony. When he digests "Telephonology" he will have mastered the science.

THE CORROSION AND PRESERVATION OF IRON AND STEEL, BY ALLERTON S. CUSHMAN AND HENRY A. GARDNER. 373 PAGES—NUMEROUS HALF-TONES AND DIAGRAMS—PRICE $4. McGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK, 1910.

Preservation is one of the first laws of engineering, and one of the fundaments of conservation. Conservation, in its narrow colloquial sense, is made to apply only to natural resources. But its meaning is fuller than that. Everywhere the observer can see unmistakable evidence pointing to waste and loss of finished materials. Nothing illustrates this better than the widespread custom of permitting iron and steel utensils, implements, structural parts, etc., etc., to remain without protection against the weather. On the other hand, the rapid depletion of our richest iron ore deposits accentuates the present need of directing our energies towards the efficient prevention of waste through corrosion.

The volume before us embodies the latest and most definitive knowledge of the phenomena of corrosion, and presents the best known methods of prevention and preservation. No effort, apparently, has been spared to mention or include all recent matter touching on the subject.

The extraordinary growth of what we may term industrial science and the evolution of practical chemical knowledge as applied to the manufacturing industries are nowhere better exemplified than in the book before us. It is now possible indefinitely to lengthen the life of steel and iron. Hence one step has been taken towards conserving our raw materials, our ores and metallurgical fuels.

The chapter-headings of "Corrosion and Prevention" will give the reader a bird's eye view of its scope.

CHAPTERS—

I.—The Problem of Corrosion.
II.—Theory of Solution.
III.—Theory of Corrosion.
IV.—Application of Electrolytic Theory.
V.—The Inhibition and Stimulation of Corrosion.
VI.—The Technical Protection of Iron and Steel.
VII.—Relation of Pigments to the Corrosion of Iron.
VIII.—Recent Field Tests on Protective Coatings.
IX.—Paints for Various Purposes.
X.—Testing and Design of Protective Paints.
XI.—Properties of Pigments.
XII.—Properties of Paint Vehicles.
Appendices, etc.
Bibliography.

Whilst the last word in scientific investigation is included, the book is also thoroughly practical. It will be found most helpful by all interested in the use of steel and iron.

One most commendable feature of the volume is an admirably arranged bibliography covering 63 pages.

PORTLAND CANAL ANALYSES.

Assays of some typical Portland Canal (B.C.) ores have been reported thus:

	1	2	3	4
Gold	0.20 oz.	0.20 oz.	0.24 oz.	1.20 oz.
Silver	20.00 oz.	18.0 oz.	26.66 oz.	48.80 oz.
Lead	7.96 p.c.	9.28 p.c.	11.61 p.c.	4.29 p.c.

All but No. 4 are run-of-mine ores. No. 4 is the assay of a rich streak.

The most abundant minerals are pyrite, pyrrhotite, galena, blende, and chalcopyrite, with which are associated gold and silver. Native silver is frequently encountered in considerable quantities. Gold, while it occurs persistently, appears to be irregularly disseminated. Apparently, also, gold fluctuates with the silver.

Correspondence.

QUEBEC PLACERS.

To the Editor of CANADIAN MINING JOURNAL:

Sir,—All legitimate prospecting, and the circulation of real mining news is to be commended, but such stuff as has been going the rounds of the press lately so evidently emanates from that class of prospectors whose experience is acquired in brokers' offices and around the fountain in Victoria Square that its purpose is easily seen, and it is sprung on the non-discriminating press with a view to the short-lived glory of the lime-light, or for the purpose of "seeing some capitalists."

The result, to mining men, of the appearance of such absurd items is to discredit all mining news that appears in the same papers. The art of discrimination in mining, as in other news, should be learned in the editorial sanctum sanctorum.

The class of prospector-promoters alluded to above is doing much to make this province appear ridiculous in the eyes of the mining world. Recently some New Englanders were enthused to the point of sending a man hundreds of miles to examine and report on one of these mares' nests which they had optioned for a high figure. He reported it absolutely without mineral values, and backed his opinion with assays—result, a cold wave in New England and a black frost in Montreal. The report, true to facts, pleased neither party. In this case the holders of the claims appeared to be sincere, but had been misled themselves by others.

Again, some of these metropolitan prospector-promoters with a pull got a few acres about 999 miles from Sherbrooke, and after the usual ebullition of super-heated caloric, hied them thither with a couple of young men in tow who had money to burn. A pan, taken from surface gravel, yielded a nugget as big as a soldier bean. The man who brought it from town for the purpose was the first to cast his cap in the air and yell with surprise. But capital was cautious, and demanded more nuggets—it was such easy money. Unfortunately, the jeweller from whom that one was bought had had only the one, and, as capital clung to that one, the prestidigitator couldn't produce.

And now the story of a remarkable find of what has long been known to exist along the Arnold and other small rivers in Woburn and all south-eastern Quebec has been going the rounds of the press in a way no mining news item was ever known to without propulsion from the rear.

The gold on these streams has never been found in quantities to pay for working by any method hitherto tried (though in some places solitary miners have made, perhaps, fair wages for a few days) except in Ditton, whence some thousands were taken by the crudest methods years ago, and by gouging out the cream of the ground. But the gravel on almost any stream in the valley of the St. Francis will yield colours. Imagine, then, 25, 50 or more pans worked down to the black sand and perhaps a few cents' worth of gold, in all say a half or a whole tea-cup full, sent for assay. Of course the returns will be thousands of dollars to the ton—of black sand—but they won't state how much gravel must be washed to get a ton of black sand. (This sand often contains minute jewels, such as garnets, but is of no appreciable value in itself or for the jewels). Such an absurd test as this made on ground that won't run 50 cents per cubic yard will show values in thousands per ton of black sand. No mining man would write, take stock in or print such stuff, as is very evident when, in reference to placer ground, we read such phrases as "the richness of the ore," etc.

Rich or fair placer or other finds will be welcomed by all who have the mining interests of the Province at heart, but we want the truth, rightly told, not absurd and evanescent sensationalism that can do no possible good even to the originators.

Yours truly,
G. R. E. KENNEDY.

"THAT TIMMINS SAMPLE CAR."

To the Editor, CANADIAN MINING JOURNAL:

Sir,—While quite approving of your word of caution in regard to the Porcupine district, I think I can go you one better in the way of *hopes* and *beliefs*. After my visit to the district I have sufficient ground for *belief*, though I have not sufficient for definite *knowledge*.

I *believe* that Porcupine is going to give us a very important output of gold. I *believe* there are going to be paying mines in the district. I also believe that there are going to be many wild-cats and many disappointments, as there are in every healthy mining camp.

In regard to that sample car I have no special information on the subject, but I think I understand it. In the first place I have not heard anywhere that the owners of the carload have based any broad claims in regard to it. They have given the matter no publicity except to their intimates. They are not selling any stock to the public.

The car load was not supposed to be representative of the camp, nor even of any particular vein; but I believe the samples were taken without any sorting or picking, and were representative of those parts of the vein where the samples were taken, and not just of rich spots and seams. I have seen both the surface and the underground quartz from the veins on the Timmins Syndicate claims, and if they chose to sort or pick their ore they would have no difficulty whatever in shipping a car load that would assay many times as high as this shipment. A car load of three samples will not prove a camp, nor even a claim, but this shipment must have been a source of considerable satisfaction to the owners. My only regret is that it should go all the way to New York to be sampled, but that is a matter entirely at the pleasure and discretion of the owners. I am not in accord with this outfit in the matter of this very expensive sampling, nor in the idea of sampling a claim with a stamp mill—Tremain or otherwise—but the highest credit is due to them for the way they have tackled this new district. Two years ago I came away from the Laker Lake district thoroughly disgusted with the way operations were being conducted up there, as I explained at the time in this journal. My recent visit to the Timmins Syndicate camp gave me the keenest pleasure and satisfaction.

Yours faithfully,
H. E. T. HAULTAIN.

J. C. Murray, Esq.,
Editor, CANADIAN MINING JOURNAL,
Toronto, Ont.:

Sir,—I have before me the Toronto "Star" of June 11th, with an article on air supplied this camp by the Cobalt Hydraulic Power Co., in which they say, "it also causes the men to bleed at the nose, and suffer

from buzzing in the ears, headaches, and other symptoms of partial suffocation."

As we are not interested either directly or indirectly with this company, I think it only right that this should be denied. I have not heard of a single case in this camp of miners being affected in any way, except those on contract work, and it certainly has increased their footage considerably.

I have written the editor of the Toronto "Star" regarding this, and hope he will correct same.

Yours truly,

THE CONIAGAS MINES, LIMITED,
per R. H. Royce, Asst. to President.

PERSONAL AND GENERAL.

The Nelson Iron Works of Nelson, B.C., has taken over the business and stock of the Rossland Engineering Works, of Rossland, B.C., and will succeed that company as British Columbia agents for the Sullivan Machinery Co., of Chicago. An increased stock of Sullivan rock drills, diamond drills, hammer drills, air compressors and supplies for these machines will be maintained at Nelson.

The latest circular issued by the Link-Belt Company, Booklet No. 95 (revised), covers a wide range of the products of that enterprising company. Tipples, retarding conveyors, car hauls, and coal washers are described and illustrated. The half-tones are taken from photographs of actual working installations. The pamphlet will prove useful to all workers in coal.

Mr. James Hargreaves, M. E., has opened an office at Room 34, 124 McDougall Avenue, Edmonton, Alberta. For more than twenty years Mr. Hargreaves has been identified with Canadian coal mining. His wide experience in the west was preceded by a long and thorough training in the coal mines of Nova Scotia.

Prof. J. C. Gwillim has been elected a Member, and Mr. Alex. Longwell an Associate, of the Institution of Mining and Metallurgy.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay.—Following the return of the U.M.W.A. strikers to work, matters seem to be going smoothly enough. There has been dissatisfaction amongst those strikers who have not been able to obtain work, but this cause of complaint is being rapidly removed. Some 300 men were left over when all the vacant places had been filled, and to give work to these men the Coal Company are arranging to double-shift No. 6 Colliery. No. 3 Colliery is already on double-shift, and when No. 6 follows suit, the company will have the largest number of workmen at the collieries in the history of the mines. The number of strikers who returned to work tallied with the figures which from time to time were given out by the company. During the strike it was stated on several occasions by responsible officials of the United Mine Workers that the number of men who went on strike at the mines of the Dominion Coal Company was over 5,000. It may be of interest to state that even to-day, when the force of workmen at the collieries includes the P. W. A. members who remained at work, the bulk of the men imported during the strike, and the returned strikers, the total number of men at the collieries, surface and underground inclusive, does not exceed five thousand men. There must have been something wrong with the U. M. W. A. calculation. The United Mine Workers' Journal in its last issue states that 400 miners are on strike at Inverness. Actually there is no strike at Inverness, and the mine is fully manned.

A significant accompaniment of the U. M. W. A. agitation is the rise of the Socialist party in Nova Scotia. The Cumberlan Labour party has been formally declared defunct, and those who were prominent in its leadership at one time are now avowed exponents of the social revolution. The Socialist Party is increasing in numbers in Glace Bay, and they intend to nominate a candidate for the next parliamentary elections. One of the most active of the local Socialists, in expressing his views in the U. M. W. Journal, uses as an argument in favour of socialism that "it is for the workingman, and **him alone.**" No doubt it is just as well to be candid about it.

Dominion Coal Output.—The annual production of the Dominion Coal Company during the years 1906, 1907, and 1908 remained almost constant in the neighbourhood of 3,550,000 tons. But for the depression in the coal trade the production for 1908 would have been 3,750,000 tons, but although the mines of the company have a productive capacity of at least this tonnage, owing to trade depression and labour troubles, the three and a half million has up to the present not been exceeded. Present indications point to an output for 1910 of between 3,400,000 and 3,500,000 tons. The production which will be necessary to reach these figures will be 300,000 tons in excess of the production during the second half of 1908, or in other words, the probable output of the Coal Company for the second half of this year will be at the rate of 4,000,000 tons per annum. The company has now in operation thirteen collieries, and two collieries in the construction and development stage. Out of the thirteen collieries in full operation, no less than seven are new and expanding mines. At one or two of the older mines, such as Reserve, Caledonia, and International, the outputs will gradually decrease, but this decrease will not become very marked for several years to come. In the meantime the new mines will have become large producers. It may therefore be expected, if labour troubles are averted, that the Coal Company's coal production during the next three years will reach very high figures indeed, when compared with past records. It would not be surprising during the present summer, indeed, to see daily outputs in the vicinity of 16,000 tons. To reach this figure, however, would require almost ideal conditions, and at colliery work, as one manager expressed it, "there's always something, or else going to be."

Colliery Explosions and Barometric Pressures.—In your correspondent's last letter reference was made to a statement, evidently inspired, that a "colliery warning" had been issued immediately before the Whitehaven Colliery explosion and fire, and the inference which some newspapers took that had attention been paid to this "warning" the disaster might have been averted. The imputation of carelessness has been hotly denied by most of the colliery journals in England, and the incident has occasioned much newspaper correspondence. It has been clearly demonstrated that the influence of changes in the atmospheric pressure varies with the local characteristics of a coal mine. In places where the surface cover is light and the strata is broken, it is evident that atmospheric pressure will act in a different manner than in a mine such as the one at Whitehaven, where the workings are five miles under the sea, where any changes in atmospheric pressure are modified or neutralized by the ventilating pressure. One of the writers quotes from the Report of the Royal Commission on Mines (1909), the following: "They (the "Colliery warnings") are misleading, and so far as we can see, their publication serves no useful purpose. We do not wish to underrate in any way

the value attaching to an intelligent appreciation by colliery managers of barometric changes, but we think that more harm than good is done by the issue of irresponsible notices of this kind.'' This, from such a source, is strong language, and should effectually dispose of any further newspaper criticism. The same writer remarks: ''Those officials are also more capable of forming an opinion as to what conditions affect the safety of the pits under their charge than an anonymous association which is shown, by the character of its utterances, to be innocent of that branch of scientific mining on which it professes authoritative knowledge.''

The Whitehaven disaster has given an impetus to the agitation for the provision of breathing appliances for rescue and fire-fighting work at collieries. The Home Secretary shortly after the disaster asked the colliery company to provide such appliances, and to arrange for their men to be instructed in the use of the same. Commenting on this the ''Colliery Guardian'' remarks: ''We have already expressed our opinion that, in order to be of use, the apparatus must be kept on the spot.''

ONTARIO.

Cobalt.—A few years ago New Ontario was practically unknown to the outside world, and not until the discovery of the riches of Cobalt was much attention paid to it. Even then for several years the energies of the prospector were centred upon the search for silver, and this resulted in the discovery of South Lorrain, Gowganda, and other camps. As the possibilities of these fields became better defined, the prospectors were forced out into the hitherto unexplored parts, and then followed the discovery of the Porcupine gold district. The latest new development is the rediscovery of iron near the Grand Rapids on the Mattagami River. These deposits were first noticed by the Geological Survey over thirty years ago, and six years ago it was again reported on by the same department. It was stated to be a very important deposit of limonite, containing a high percentage of iron, and free from sulphur and phosphorus. A syndicate has recently become interested, and has staked a number of claims. These are within a few miles of some of the lignite claims which gives them additional importance. The present railroad expansion in this part of the country, coupled with the fact that the Hudson Bay line may be started before long, is responsible to a great extent for the increased interest in mining possibilities in New Ontario. The search for precious metals has retarded development in other directions, but the unexplored area is large, and chances for the future are brighter than ever before.

The McKinley-Darragh will in future pay quarterly dividends instead of half-yearly as formerly. The next dividend, which will be payable July 15th, is at the rate of three per cent. for the quarter, with a bonus of two per cent.

At the annual meeting of the Peterson Lake the following board of directors was elected:—Sir Henry M. Pellatt, Major Murray, Hugh Blain, W. F. Scott and A. M. Hay. With this new board it is to be hoped that there will be no more quarrelling and that the directors will get down to business.

It was pretty generally expected that when the camp was supplied with cheap power a great increase in mining activity would be the outcome, but so far this has failed to materialize. One feature however is the very much lower cost of concentrating, which in the case of the McKinley-Darragh, is now only $1.30 a ton, while at one of the larger mills the management expects to be able to treat for about $1.00 a ton. This of course is only about fifty per cent. of the milling costs of a year ago, and permits of the treatment of much lower grade ore.

The returns from ore royalties paid to the T. & N. O. Railway Commission for the month of March amounted to only $375.00. This is a great falling off from the previous year, and is partially due to all the companies, with the exception of the Right of Way, paying 25 per cent. of the net profits instead of the gross returns as formerly.

A deputation of local mining men waited on the Hon. Mr. Cochrane with a view to getting an extension of time for the performance of work on the claims staked on the iron deposits near Grand Rapids. As the district is over eighty miles from a railroad, and the trip is very hard, the Minister promised to allow them ample time.

The Crown Reserve has declared the regular quarterly dividend of six per cent., with a nine per cent. bonus. This is payable July 15th. The payment of dividends at this rate means that the shareholders are receiving practically $3,000 a day. This property has already paid and declared 120 per cent. on its capital of $2,000,000.

The shaft of the Bailey is now down 160 feet, and at that point a station is being cut. A cross-cut will be run to cut several small veins that are showing in the tunnel. Another will be driven about 200 feet in an effort to locate the Bailey vein.

Porcupine.—The transportation facilities into this district are very bad, and it is believed that they will eventually lead to a shortage of supplies. Provisions are quite scarce now, and prices are very high, and there appears to be no immediate prospect of their bettering. This condition is partly accounted for by the larger number of men employed than was anticipated, and also by the early break up, which destroyed the roads a full month ahead of the usual time. Although active representations have been made to the Government to construct a road, and there is no question of the needs of the district, work was only started a short time ago. A small sum of money has been voted, and some prisoners from the North Bay jail are to be sent up to cut out the road. Several good discoveries have been reported lately, two of which are on the Reserve. On the silver properties a good vein was uncovered, and another strike was made on the Novak claim. A Boston syndicate has taken options on over fifty properties in Tisdale. These claims are owned by several people, but they are in almost a solid block. On about twenty of these good showings are reported. It has been decided to start work again on Gold Island, in Night Hawk Lake, the first property in the district on which work was done. A number of surveyors are in the bush running out the lines for twenty-seven new townships. The boundaries of the mineralized area have become so extended that it is necessary to have new points to which to tie the claims. On the Timmins property the small stamp mill will soon be erected and running, and will be used to treat the ore that comes from development work. By this means the owners will gain a much better idea of the average value of the vein. Negotiations are under way for the purchase of several claims, and there is a great deal of activity throughout the camp. It is stated that there will be twenty-four companies operating during the summer that will spend a minimum of $15,000 each. It is stated that a contractor has offered to grade a line into Porcupine from mile post 222 on the T. & N. O., for $10,000 a mile. This would be only for the grading, and the Government would have to lay the steel and put the line in shape. It is very doubtful, however, if the matter will be taken up. A couple of lines of boats are now operating, so that accommodations for travellers have much improved. There appears to be a renewal of interest in the finds in Bryce Township, and some good finds have been reported lately. The Martin claims have been purchased by a Montreal company known as the Thelona Gold Mines Co. and work is to be started immediately. The property consists of six claims, and on the principal vein a number of test pits are to be sunk. In order to gain as much information regarding their properties in the shortest possible time the Dome Mining Company is sending in two diamond drills. Some very high grade ore is being produced, and high grading has become so common that it has been found necessary in some instances to employ guards.

South Lorrain.—A party of Buffalo men has lately gone into the district to look over several claims with a view to purchasing. It is a peculiar fact that fully two-thirds of the capital invested in this section is from the city of Buffalo. On the Fuller properties surface trenching has uncovered ten veins. These are largely calcite and cobalt, with low silver values. Another new company, known as the Alice Lorrain Mines, with a capital of $500,000, has been formed. Its headquarters are Haileybury. At the annual meeting of the Maidens, recently held, the old board of directors was re-elected. The report on the conditions prevailing at the mine was satisfactory, and there is talk of putting in a new plant. Despite the handicap of bad roads throughout the district, things are progressing favourably, and there will be a large amount of work done this summer. The Mines Power Company expects to have its installation completed about the end of July, and this will very naturally help the district. The new power driven compressor for the Wettlaufer is still lying at the wharf, and on account of the bad roads there is no immediate prospect of getting it to its destination. Negotiations are under way for the purchase of the Beaver Lake property. Just before it shut down, for lack of power, silver was struck in the drift at the 110-foot level. The price asked is about $300,000. The Mayflower Company has started a gang of men to work surface prospecting. Several promising veins have been found in the vicinity of this property. It is reported that Buffalo people have taken an option on a sixty per cent. interest in the Little Keeley, which adjoins the Haileybury Frontier. Last year a promising vein, carrying silver values was discovered. A shaft has been sunk some distance on another vein, but with this exception little work has been done. The Montrose company is pumping out the shaft preparatory to resuming underground operations. A promising vein has been traced from the Harris property adjoining, and shows considerable bloom with low values in silver.

GOWGANDA.

This season's work has already been productive of excellent results, and has helped to demonstrate the fact that the district shows every promise of becoming one of the important silver mining camps in New Ontario. Unlike Cobalt the area is of large extent, and there are many groups of mines scattered over a large territory. At the Bonsall property ore was discovered at a depth of 110 feet in the shaft, and at 140 feet the vein was carrying about 4,000 ounces in silver. The Hudson Bay Mining Co. of Cobalt is working two properties, one near Lost Lake and the other at Hanging Stone Lake, and good results are reported. The Rawhide property has good ore, but has been forced to practically suspend operations underground until a plant is installed. Excellent discoveries have also been made near Calcite Lake. At Maple Mountain a good find has been made on the Devine properties near Skull Lake. The vein was in one place twelve inches wide, and carried high values in silver. This section has never received much attention in comparison with other places, but is being quietly developed with satisfactory results. The extension of the Morrison vein is stated to have been cut at the 100-foot level of the McKay property, where it shows considerable high grade ore. The Silver Alliance at Elk Lake is reported to have sunk a small test pit on a new vein and opened up some rich ore.

BRITISH COLUMBIA.

The quantity of concentrate and crude ore shipped from the St. Eugene Mine, East Kootenay, to the Consolidated M. and S. Company's smeltery at Trail during four months ended April 30th was 5,860 tons. The greater part of this was lead-silver concentrate—approximately 5,000 tons.

The report that the North Star Mine had been sold to the Consolidated M. and S. Co. has been contradicted. Officials of the company state that, so far as they know, there have not been any negotiations for its purchase.

The Silver King Mine, near Nelson, has been closed, owing to difficulties experienced in keeping the water down so as to allow of ore being mined below water level. Operations have latterly been unprofitable, so the Kootenay Development Syndicate, which was working it under lease, is not likely to do anything more on it.

The British Columbia Copper Co. has commenced to ship ore from its Wellington group mine to its smeltery at Greenwood, the railway spur to the mine having lately been completed. The same company is now in charge of operations at the Rawhide and other New Dominion Copper Co. mines, in Phoenix camp, following the purchase of a controlling interest in the latter company.

The old City of Paris Mine, situated south of Phoenix Boundary district, near the International Boundary line, will probably be prospected with a diamond drill shortly. In the early nineties approximately 7,000 tons of ore of good grade was shipped from this mine to the Granby Co.'s smeltery, but on the ore shoot becoming exhausted, operations were suspended and the mine has since remained closed.

Mining has been resumed at the Queen Victoria Mine, near Nelson, and ore is again being sent to the smeltery after about eighteen months inactivity. The ore is copper-gold and occurs in large quantity.

Swede Group, Poplar Creek.

Another effort is being made to test the value of mineral claims at Poplar Creek camp, which is near the boundary between the northern part of Ainsworth mining division and the adjoining Trout Lake division. A Scottish syndicate has taken an option on this property, which in 1903-4, when there was much local excitement concerning finds of rich surface specimens of free gold on the Swede group, Lucky Jack, and other claims, was regarded as one of the best in the camp. The syndicate referred to is represented in the province by Mr. W. J. Anderson, who has already been two months in the district, and has let a contract for driving 300 feet of tunneling, and good progress is being made with this prospecting work. It is stated that Mr. Anderson intends remaining in the district until next October, and that his principals will bond other mining properties should the results of the work undertaken on the Swede group be considered satisfactory.

In the Lardeau.

The Silver Cup Mine, owned by the Ferguson Mines, Ltd., is again being worked, after having been closed temporarily, owing to the great difficulty of getting supplies up to the mine during the depth of winter. This mine last year shipped to the Consolidated M. and S. Co.'s smeltery at Trail 1,631 tons of high-grade silver-lead ore, which also contained some gold. The Silver Cup group consists of nine mineral claims, situated on the north slope of Silver Cup Mountain, south of the south fork of Lardo Creek, and distant from the Town of Ferguson about six miles in a direct line. The altitude of the mine is 6,500 to 7,000 ft. above sea-level. The ore occurs in two leads striking nearly parallel to the formation. The northern lead is called the Silver Cup vein, and the southern one the blind lead, the latter not being exposed at the surface. Between the leads are cross fissures, one of which made a large shoot of ore. The ore body usually consists of a number of veins of quartz; the ore being localized in shoots, lenticular in form both horizontally and vertically. Some of these are of comparatively large size, one continuous stope being 275 feet in length. The quartz is usually heavily mineralized with grey copper, galena, blende, and some copper and iron pyrites. It seems evident that mining operations have been and continue to be profitable, for they have been carried on, with but little intermission, during about 14 years.

Improved Prospects for Kamloops Camp.

It has been learned on good authority that the sum of $100,000 has been appropriated for the development of one metal mining property in Kamloops camp, and that there is reasonable probability of others being worked, as well.

Of one part of Kamloops camp, the following was written a few months ago: "Generally speaking, it may be said that south of Kamloops Lake, between Cherry Creek and about three miles east of Kamloops, there is an area of ore-bearing rocks extending some eight miles along the shore of the lake, and four to six miles south from it. The extent of surface mineralization, as regards copper, is considerable over a large part of this area. Taking the camp as a whole, however, the great mass of ores occurring in it is of too low a grade to admit of its being shipped to outside smelteries, unless extensive development shall prove that below the surface the average grade of the ore is much higher than has been demonstrated in that occurring nearer the outcrops. With its really immense mineralized areas, the district amply warrants much more investigation in the way of mining development than it has yet had. Its great extent, however, will involve a large expenditure before it will have had the thorough examination necessary to determine its general value. It offers advantages, though, for making it a smelting centre, conditionally, of course, that thorough development of its mineral claims shall warrant that being done. Among these advantages are its proximity to the Nicola Valley coal fields, which would most likely supply metallurgical coke of good quality, and the fact that within a few years Kamloops will be the meeting place of two or three transcontinental railways. Keeping in mind the several favourable factors, it may be concluded that Kamloops may yet become one of the important mining and smelting centres of British Columbia.

Emissions Minieres, Ltd.—A French company, named the Emissions Minieres, Limited, having offices in England, intends working the Joker Mine, situated in what was formerly known as Camp Mansfield, at the headwaters of the south fork of Kaslo Creek. Work was done in this camp about ten years ago, but since that time the claims have been allowed to remain unworked. Much money was spent on this property, but without profitable results to the former owners. The new company has appointed Mr. A. Fournier to superintend the installation of a power plant on or near the Joker claim, and to drive a tunnel an estimated distance of 800-ft. with the object of cutting the vein at a depth of between 300 and 400 feet. The machinery to be put in consists of a 5-ft. Pelton waterwheel and a Fraser & Chalmers 16 by 18-inch belt-driven air compressor, with the usual complement of accessories. The air compressor is designed to supply sufficient air to drive three machine drills. It is expected to shortly be received at Kaslo from England. Provision has been made for its enlargement should more power be required later. The Pelton wheel is already at Kaslo, whence it will be transported to the mine as soon after the Provincial Government road men shall have repaired the wagon road up the creek as shall be found practicable. The distance between the railway and the Joker mine is about 18 miles. There will also have to be taken up to the mine 1,500 to 2,000 feet of 10-in. pipe through which to convey water to the wheel. It is estimated that ,with the 500-foot head available, from 600 to 800 horse-power will be developed by this wheel. There will hardly be sufficient time after putting in the machinery to do much development work before next winter, but it is hoped a start will be made at driving the adit, and all necessary supplies have been taken up to the mine to admit of operations being continued throughout the winter, during which period no communication can ordinarily be made with the mine, owing to its high altitude. The enterprise of the company is a plucky one, and merits success, but it is by no means sure that this will result, although it is known that ore of good value occurs in Camp Mansfield properties.

Slocan Mines Near Sandon.

Steady progress is being made at several of the mines in the vicinity of Sandon, Slocan district. Among the number are the Ruth-Hope, Slocan Star, and Richmond-Eureka groups, in the immediate neighbourhood of Sandon, and the Surprise, Noble Five, and Sunset, above Cody.

There is in the Ruth Mine a lot of milling ore ready for stoping, and preparations are being made to start the concentrator for the season's run on ore from this mine. Last year's output from the Ruth-Hope Mines was nearly 1,000 tons of silver-lead ore and concentrate, shipped to the smeltery at Trail, and 655 tons of zinc-silver concentrate sent to the United States.

The showing of ore in the Hope No. 4 tunnel, known locally as Malcolm's tunnel, is an excellent one, and from this shipments will shortly be made. The deep wash has been sluiced off the hillside below the portal of No. 4, and the vein exposed at a vertical depth of approximately 200 feet under that opening. The driving of an adit on the vein at this lower level will shortly be commenced, and this will provide another face from which to take out ore and, as well, admit of opening new stopes.

The Slocan Star mine, owned by the Byron N. White Company, and the Richmond-Eureka, by the Consolidated Mining & Smelting Company of Canada, are being worked so far as the Nos. 5 and 6 tunnels of the latter and the Slocan King tunnel of the former, under an arrangement mutually advantageous. Both Nos. 5 and 6 were started on the Eureka claim and passed thence into the Hidden Treasure claim of the Slocan Star group. No. 5 crosses one corner of the Hidden Treasure passing thence again into Richmond-Eureka ground. No. 6 is on the Eureka for about 500 feet, and has been extended a similar distance into the Hidden Treasure. At 1,200 feet from its portal it will enter the Consolidated Company's Summit claim. In Hidden Treasure ground an incline raise is being made in the vein from No. 6 to No. 5, a distance of 170 feet, rather more than half of which has been driven. It is expected this raise will be through to No. 5 early in July; thereafter the driving of No. 6 to the boundary of the Hidden Treasure will be proceeded with, and then the Consolidated Company will take up the work of its further extension so as to develop the Summit claim at that level. The adit opened on the Slocan King at about 200 feet below No. 6, is in approximately 1,600 feet on the vein, and is now in the Hidden Treasure. Three shoots of ore have been passed through, and it is expected another shoot, opened in Nos. 5 and 6 above, will be reached at 200 feet farther ahead. The chief purpose now is to get No. 6 and the King tunnels well into the mountain so as to cut on their downward extension several ore-shoots found in No. 5 and believed to go down, and to make raises in them so as to provide good ventilation. After this shall have been done the miners will be set to work cross-cutting from these main adits at several places where such work shall be deemed likely to lead to the finding of other shoots of ore. Stopes will be opened in the ore shoots and all ore of sufficiently good grade will be shipped to the smeltery. A baby tram is to be constructed from the portal of No. 6 up to the upper terminal of the aerial tramway from No. 5 level down to the railway in Sandon, the distance between the two portals being 500 feet. This will be a single-bucket tram, with one stationary and one hauling cable. The latter will be wound round a drum at the top attached by gearing to the main tramway, which will provide the power necessary to haul the ore up from No. 6 for both companies. As practically all the shipping ore from the above-mentioned workings will be of suitable grade for shipment crude to the smeltery, it is improbable the Slocan Star concentrating mill will be operated this season, not unless work shall be resumed in the older parts of the mine which were closed several years ago following extra lateral rights litigation, happily now settled.

On the several Cody properties already mentioned development work is being continued. The deep-level tunnel by which the Surprise is being developed is an extension of the Last Chance tunnel. It is a long cross-cut, and enters the Surprise vein at a depth of about 1,100 feet below the surface workings of that mine. The old workings of the Surprise are down about 300 feet, so a raise has to be put up 800 feet to make the necessary connection. About one-third of this raise has been driven, but the work is necessarily slow and difficult. Some good ore

has been met with, but no stoping will be done until after the raise shall have been put through and proper ventilation thereby provided.

No. 8 tunnel of the Sunset group is now in about 520 feet, and the vein should be reached in 50 to 80 feet further. It will then be necessary to drift something like 500 feet in order to get into the ore shoot worked in No. 7 at a vertical distance of 246 feet above No. 8. Indications show that another shoot of ore should be encountered before that going down from No. 7 shall be reached. The portal of the tunnel is out of the way of snow-slides, so that there is no danger to men going to and fro when the snow lies deep above it.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

There was a further heavy decrease in the coal export trade of South Wales in May. This to some extent was contributed to by the fact that May contained one less working day, owing to the funeral of the late King Edward. Apart from this, however, the decrease in all respects is very disappointing, and it is quite clear that at least up to the end of the past month the coal trade had failed to throw off the serious after effects of the dispute in the coal-field. At Cardiff shipments in May totalled 1,411,770 tons, or a decrease of 123,364 tons on May of 1909. Newport, also accounted for a heavy falling-off, namely, 125,678 tons. This was largely due to the dispute of the general cargo workers and employers, resulting in a temporary stoppage of the whole of the dock workmen and the fears of shipowners that a prolonged strike would take place, and also the diversion of tonnage to South Wales ports which was resorted to in consequence. Swansea accounted for a decrease of 28,146 tons, but Port Talbot, unlike the other ports of South Wales, continues to retain the record of the preceding months of the year, and again shows an advance of 32,427 tons.

The shipments of Cheshire salt for the month of April, as disclosed in the official return prepared by the Salt Union, reached the comparatively large total of 39,418 tons, as against 30,318 tons a year ago, while the coastwise trade reached 12,539 tons, as against 6,530 tons, the total increase being slightly over 15,000 tons. In the foreign trade the chief improvement is with Calcutta, the increase being 9,000 tons, while in the home trade Scotland has taken 10,503 tons, as against 4,918 tons last year. There has also been a substantial improvement in the exports to Denmark, and in other directions trade was normal.

FRANCE.

The technical commission appointed by the British, French, German and Spanish Governments to draw up a scheme of mining regulations to be applicable to Morocco for submission to the Diplomatic Body at Tangier has concluded its labours, having agreed upon the terms of its report.

AUSTRIA.

In view of the resumption of the Petroleum Conference at Vienna, the Austrian Government is bringing pressure to bear on the Standard Oil Company in order to induce the latter to come to terms with the refiners in the dual monarchy and abandon the campaign of price-cutting in kerosene and other products.

Two of the points singled out by the Government for attack will probably be the quantity of oil refined by the Standard Oil Company—which is asserted to have been last year largely in excess of that for which it is licensed—and the system of tank-wagon delivery directly to the private consumer, which the Standard Oil Company has brought to a high pitch of organization.

Another well on the Tustanowice field has struck oil—the Dlugoza well No. 4, which is yielding 60 tons a day, estimated to be worth over £80.

UNITED STATES.

New York City, June 18th.—The reports of the Greene Consolidated Copper Company and the Cananea Consolidated Copper Company for the year 1909 have been made public. The latter company, whose stock is owned by the former, shows a slight increase in the cost of producing copper last year as compared with that of the previous year. The cost of mining was $2.22 a ton, as against $2.13 for the previous year and $3.28 a ton for the 15 months ended October 31, 1907. Of this sum of $2.22 nine and one-half cents per ton consists of improvements and equipments installed charged off during the year. This is most satisfactory, the report says, for the reason that the extra money spent in development has amounted to at least 20 cents per ton over the same cost the year previous, and for the reason that there has been a greater proportion of smelting ore mined in the new mines, where cost is necessarily higher. Copper production costs were 11.64 cents per pound, as against 10.51 cents in 1908. The average selling price was 13.11 cents.

New York City, June 15.—The report of Jay P. Graves, vice-president and general manager of the Granby Consolidated Mining, Smelting & Power Company, to the directors of the company, apparently is of such a nature that they do not care to make it public. The Granby board has just held its second meeting since Mr. Graves submitted his report on the condition of the property, and the statement was made after the meeting that no business of public interest was transacted.

Boston, Mass, June 18.—The Utah Copper Co'y is now earning from the operations of its own properties $3.13 per share on its enlarged capital, against $3 being paid. This is on the basis of 12 1-2 cent copper. The company therefore may regard as "velvet" the $1,425,712 derived from its ownership of 950,476 shares of Nevada Consolidated stock, which is paying dividends of $1,500,000 a year.

Spokane, Wash, June 15.—Reports compiled by the statistical department of the Spokane Chamber of Commerce show that mines in the Coeur d'Alene district in northern Idaho have produced ore of a total gross value of $192,455,691 since the discovery of the placer ground late in 1882, and that, including the June disbursements, a total of $39,391,200 has been paid in dividends, as follows: Bunker Hill & Sullivan, $11,737,200; Standard-Mammoth, $9,000,000; Empire State, now Last Chance, $4,750,000; Hercules, $3,750,000; Morning, $2,000,000; Hecla, $1,970,000; Snowstorm, $1,300,000; Tiger-Poorman, $1,250,000; Granite, now Success, and Gem, $500,000 each; Hunter, $250,000; Sierra Nevada, $225,000; Pittsburg Lead, $200,000; Caledonia, first dividend paid April 25, 1910, $39,000; other gold mines, estimated, $600,000.

Against this net earning there is chargeable as an offset approximately $2,376,000 for 30 miles of non-productive development work. This shows that $19 has been earned in actual profits for every dollar assumed to have been lost in opening new properties in the district.

Goldfield, Nev., June 14.—Despite its materially reduced mill capacity the Consolidated Mines Company is maintaining earnings upon a basis insuring its ability to continue dividend payments at the rate of $2 per share annually. Immediately after the fire in the mill on April 8 officials of the company declared that no interruption in dividends would result and that earnings would continue at the rate of approximately $700,000 monthly.

The report of Manager J. R. Finlay for the month of May shows that the net profits of that month have been surpassed in only three prior months of the company's history. The tonnage mined was above the average and total costs were still somewhat high owing to the charge for mill reconstruction.

The mill treated during May an average of nearly 640 tons daily

and all repairs will be completed before the end of the current month. Ten additional stamps, which were only slightly damaged, have been placed in commission, making 80 now operating. The gross value of ore mined in May was $1,021,656, the total costs and losses $298,260, and net profits $723,396.

Parker, Ariz., June 18.—The old Planet mine is making good. According to the predictions of Dr. Harvey Weed, a large body of ore has been encountered in prospecting with churn drills.

Years ago this mine was made famous by the thousands of tons of high grade copper ore that was taken by primitive methods from the surface workings and shipped to Swansea, Wales, for treatment.

Los Angeles, Cal., May 28.—The Ventura oil fields are the centre of wide interest as a result of the steadily increasing demand for the high-gravity petroleum of this section. Approximately 40 strings of tools are in commission and dozens of new derricks are in course of erection. The product for April was about 20 per cent. in excess of the March yield, and the demand for the high-class oil has stimulated developments to a tremendous extent. In order to overcome the difficult transportation problems that have been the chief cause of holding back the district the Sagan-Loomis Company has placed in commission a 40-ton traction engine and two 10-ton wagons. These will facilitate the rapid and economical shipment of supplies and enable operations to be conducted along more rapid lines. The district is very hilly and the transportation question has been an important one.

MEXICO.

Evidence of the progress of the oil industry in Mexico is afforded by the news that early in May a tank steamer received, from the Oilfields of Mexico Company, whose property is situated at Finbero, in the State of Vera Cruz, a shipment of 22,000 barrels, equal to 924,000 gallons. The oil was passed through a pipe line from Finbero to the receiving tanks of the Eagle Company, which was floated in this country by Sir Westman Pearson a few weeks ago. The receiving tanks are some 60 miles from the fields, and are connected with them, both by railway and pipe line. After using the pipe line for the first shipment, early in May, it was found to be defective, but it has since been thoroughly tested and is now in perfect working order. Oil is now being pumped into the tanks at Tuxpan, and it is expected that regular shipments will now be made, another tank steamer being due to be loaded within the next few days.

SOUTH AFRICA.

As the April crushing returns from the Witwatersrand Mines exhibited an improvement upon the March figures, so do the results of May show an advance upon those of April, only in a greater degree. The aggregate profits of some fifty-five mines in May reached £966,000, as compared with the April figure of £938,000, and £923,000 in respect of March. If the results of one or two minor undertakings be included, and also those of concerns which operate in other sections of the Transvaal goldfields, the million pounds sterling mark would be passed for the first time this year. This attainment is all the more noteworthy when it is recalled that during May for various reasons more than one important mine had either to hang up a portion of its mill or to entirely suspend crushing for a time. Despite this fact, the ratio of operating costs as a whole shows no increase, and a small improvement in the mill grade is accordingly reflected in an increased profit per ton. Well over a score of the companies earned higher profits in May than during any other month this year, amongst them being four of the Rand Mines group.

Company Notes.

Notice is given that a quarterly dividend of 1 3-4 per cent. on the preferred shares of the capital stock of the Amalgamated Asbestos Corporation, Limited, has been declared payable on July 1st, 1910, to shareholders of record June 20th, 1910.

At the monthly meeting of the Board of the Lake Superior Corporation, held in New York June 22nd, the executive reported satisfactory earnings for the past month, and also for the ten months ending April 30th.

The president reported that, in pursuance of the present policy of the executive of making the steel department independent in regard to its requirements for raw materials, the Connelton Collieries in West Virginia have been purchased; the property consisting of about 6,000 acres and now producing about 1,000 tons of coal of high quality per day. The purchase was unanimously approved by the Board.

The steel department, through this purchase of coal properties and recent developments in iron ore properties on the line of the Algoma Central Railway, and through the securing of extensive limestone areas, is now fully assured of a practically unlimited supply for its necessities in raw materials.

The delivery of the Connelton Collieries as a going concern will be taken on July 1st next, and new machinery will be installed to double the present output, and further increase will be made in output as found necessary. The coal property carries three seams of high quality, and will be operated by a subsidiary company, which has been incorporated in West Virginia as the Connelton Coal & Coke Company; the stock being owned outright by the Lake Superior Corporation.

Good progress was also reported in connection with the construction of the Algoma Central Railway and of the new coke oven and by-product plants, rolling mills, blast furnaces, etc., at Sault Ste. Marie.

DOMINION IRON & STEEL ANNUAL MEETING.

The annual meeting of the shareholders of the Dominion Iron & Steel Company, Limited, was held on June 17th in the Bank of Commerce Building. Mr. J. H. Plummer, as president, was voted to the chair, and, after a few formalities, he presented the annual report, which has already been published.

In discussing the report, he reviewed at some length the events of the year in connection with the company. He referred to the purchase of the fifty thousand shares of Dominion Coal Company, and pointed out that, though there might be some criticism on the part of a few shareholders as to the deal, it must be remembered that when a thing is wanted, "you have to pay the price."

Mr. Plummer stated that the bounty on pig iron will cease in December next, and that on wire in June of next year. To make up for this he had every reason to believe that at the next session of Parliament increased protection would be given.

The new works of the company, such as the ovens, machinery, finishing mill and others will be ready in the near future, and it is the intention of the management to build new shops and foundry.

Mr. Plummer then referred to the various exceptional expenditure of the year, such as the $160,000 above contract price which they had to pay for coal, and the $300,000 loss in the battle with the Coal Company. The consolidation of the interests was, however, a source of great satisfaction all round, and was, of course, the feature of the year. It was also a matter of congratulation that the company holds ninety per cent. of the shares of the two companies. He said, with a smile, that if there are any shareholders holding out for an increased offer they will be disappointed, as the ninety per cent. is very satisfactory. The consolidation of the two companies removed all chance of trouble, and a bright future was looked forward to.

Resolution of thanks to the president, directors, management and employees were passed and responded to and the following board of directors was re-elected:

Sir H. Montagu Allan, George Caverhill, Hon. George A. Cox, H. F. Dimock, Hon. L. J. Forget, Hon. Robert Mackay, Hon. David MacKeen, William McMaster, Frederic Nicholls, J. H. Plummer, Elias Rogers, W. G. Ross, and Sir William Van Horne.

STATISTICS AND RETURNS

LA ROSE PRODUCTION.

The properties of the La Rose Consolidated Mines Company during the fiscal year ending May 31, 1910, produced 3,125,000 ounces of silver, compared with 3,010,831 ounces for the previous year.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending June 17, and those from Jannuary 1, 1910, to date:

	June 18. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	120,450
Buffalo	80,000	963,368
City of Cobalt	.....	363,835
Chambers-Ferland	118,480	589,300
Cobalt Central	.....	293,286
Cobalt Lake	64,000	260,900
Cobalt Townsite	.....	68,000
Colonial	.....	148,900
Coniagas	.....	687,076
Crown Reserve	86,000	3,018,068
Drummond	.....	664,200
Hargraves	.....	101,800
Hudson Bay	.....	186,435
Kerr Lake	586,800	4,149,657
King Edward	.....	174,966
La Rose	238,020	5,962,951
McKinley-Darragh	90,480	1,488,199
Nipissing	367,670	4,923,797
O'Brien	.....	648,046
Peterson Lake	.....	330,710
Provincial (Govt.)	.....	65,000
Right of Way	.....	757,257
Silver Cliff	.....	117,510
Temiskaming	60,000	741,830
Trethewey	.....	503,950
Waldman	.....	63,992

Ore shipments for the week ending June 17 were 1,692,350 lbs., or 846 tons.

Total shipments from January 1 to June 17 were 27,393,483 lbs., or 13,696 tons.

Another unusually heavy output of ore from the Cobalt camp is recorded this week. Eleven mines are named in the list and they shipped during the week 1,808,869 pounds, or 904 tons. The feature of the shipments was Nipissing's consignment of 483,540 pounds, thus heading the list. The Kerr Lake property continues to ship largely, being second in the list this week, with 470,159 pounds. La Rose came third, with 272,790 pounds of ore. Both Chambers-Ferland and Crown Reserve sent out over 124,000 pounds each. The total shipments from Cobalt to date since January 1 are 14,601 tons.

	Week ending June24. Ore in lbs.	Since Jan. 1 Ore in lbs.
Beaver	.....	120,450
Buffalo	.....	963,368
City of Cobalt	.....	363,835
Chambers-Ferland	124,300	713,300
Cobalt Central	.....	293,286
Cobalt Lake	.....	260,900
Cobalt Townsite	.....	68,000
Colonial	.....	148,900
Coniagas	58,100	747,176
Crown Reserve	124,170	3,142,238
Drummond	.....	664,200
Hargraves	.....	101,800
Hudson's Bay	55,000	241,435
Kerr Lake	470,159	4,619,816
King Edward	.....	174,966
La Rose	272,790	6,205,741
McKinley-Darragh	.....	1,488,199
Millerette	57,340	57,340
Nipissing	488,540	5,407,337
O'Brien	.....	648,046
Peterson Lake	.....	330,710
Provincial (Govt.)	.....	65,000
Right of Way	60,990	818,247
Silver Cliff	42,480	159,900
Temiskaming	60,000	801,880
Trethewey	.....	503,950
Waldman	.....	63,992
Total for week	1,808,869	

B. C. ORE SHIPMENTS.

Nelson, June 18.—Appended are ore shipments and smelter receipts to date:

Boundary.

	Week.	Year.
Granby	21,571	586,078
Snowshoe	1,819	82,473
Mother Lode	3,300	149,705
Oro Denoro	360	6,013
Jack Pot	370	983
Other mines	.....	411
Total	27,480	825,663

Rossland.

Centre Star	4,483	91,398
Le Roi	120	7,042
Le Roi No. 2	488	15,470
Le Roi No. 2 (milled)	300	7,200
Le Roi No. 2 (concentrates)	48	48
I. X. L.	8	129
Other mines	.....	229
Total	5,447	121,516

Slocan-Kootenay.

St .Eugene (milled)	2,775	66,600
Whitewater (milled)	600	14,400
Van Roi (milled)	800	19,200
Kootenay Bell (milled)	70	1,680
Granite-Poorman (milled)	250	6,000
Queen (milled)	420	10,080
Nugget (milled)	110	2,640
St. Eugene	177	8,322
Sullivan	191	5,671
Richmond-Eureka	63	2,096
Queen Victoria	161	525
Silver King	41	1,589
Yankee Girl	81	2,714
Van Roi	31	636
Johnston	1	1
Athabasca	26	26
Queen	100	271
Standard	67	526
Other mines	.....	21,160
Total	5,964	164,740

Total shipments for the week, 38,891 tons, and for the year to date, 1,111,919 tons.

Smelter Receipts.

Granby, Grand Forks	21,571	586,198
Consolidated Co., Trail	8,026	231,783
B. C. Copper Co., Greenwood	4,030	156,701
Total tons	33,627	974,682

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous,—June 23, 1910.

	Bid.	Ask.
Amalgamated Asbestos	20¾	22
Dominion Coal Company	63¾	..
Dominion Steel Company	64	..
N. S. Steel	81	82
Granby	39	40
Consol. Smelting	68½	80
Crow's Nest Pass	..	88

Cobalt Stocks—June 23, 1910.

Amalgamated	.03	.03¾
Beaver Consolidated	.26¾	.27
Buffalo	2.20	2.55
Chambers-Ferland	.21⅞	.22
City of Cobalt	.24	.25
Cobalt Central	.10	.11
Cobalt Lake	.20⅞	.22
Coniagas	4.90	5.25
Crown Reserve	2.97	3.01
Gifford	.07¼	.08
Foster	.13¼	.15
Green-Meehan	.02⅛	.03
Great Northern	.07¼	.07⅞
Hudson Bay	97.00	101½
Hargraves	.22	.23
Kerr Lake	8.30	8.37½
La Rose	4.40	4.45
Little Nipissing	.18¾	.19
McKinley-Darragh-Savage	.97	.98
Nancy Helen	.04⅞	.05½
Nipissing	11.45	11.57½
Nova Scotia	.37	.38
Otisse	.04	.04½
Peterson Lake	.21¼	.21½
Right of Way	...	...
Rochester	.18⅛	.18½
Silver Leaf	.07¼	.07½
Silver Bar	.06⅝	.07
Silver Queen	.09	.12
Temiskaming	.65¾	.66¼
Trethewey	1.26	1.27
Watts	.05	.10
Wettlaufer	.72	.80
Ophir	.20	.48

New York Curb—June 23, 1910.

Boston Copper	15	20
Brit. Col. Copper	5¼	5½
Butte Coalition	19	19¾
Canadian Mines	6¼	6½
Chino Copper	11½	11¾
Davis-Daly Copper	1¼	1⅜
Ely Consolidated	.50	.60
Gila Copper	5½	6
Giroux Mining	6⅞	7⅛
Goldfield Consol.	9½	9 9/16
Green-Can.	7½	7¾
Harcuvar Copper	No Market.	
Inspiration Copper	8 1/16	8¼
Miami Copper	20	20¼
New Baltic Copper	5	9
Nevada Con. Copper	19⅜	19⅝
Ohio Copper	1 15/16	2
Rawhide Coalition	20	21
Ray Central	2⅝	2 11/16
Ray Consolidated	16¾	17¼
Union Mines	1	1 1/16
Yukon Gold	4¼	4⅜

SILVER PRICES.

	New York	London
	cents.	pence.
June 7	53¼	24 9/16
" 8	53⅛	24½
" 9	53¼	24 9/16
" 10	53¼	24 9/16
" 11	53¼	24 9/16
" 13	53¼	24 9/16
" 14	53⅜	24⅝
" 15	53⅜	24⅝
" 16	53½	24 11/16
" 17	53½	24 11/16
" 18	53½	24 11/16
" 20	53¾	24¾

TORONTO MARKETS.

Metals.

June 23—(Quotations from Canada Metal Co., Toronto).
- Spelter, 5½ cents per lb.
- Lead, 3.65 cents per lb.
- Antimony, 8 to 8½ cents per lb.
- Tin, 34.25 cents per lb.
- Copper, casting, 13.25 cents per lb.
- Electrolytic, 13.25 cents per lb.
- Ingot Brass, 9 to 12½ cents per lb.

June 23.—Pig Iron.—(Quotations from Drummond McCall Co., Toronto).
- Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
- Summerlee No. 2, $23.00 (f.o.b. Toronto).
- Midland No. 1, off the market.
- Hamilton No. 1, $21.00 (f.o.b. Hamilton).
- Hamilton No. 2, $20.50 (f.o.b. Hamilton.
- Clark's, $20.75 (f.o.b. Toronto).
- Cleveland, $21.00 (f.o.b. Toronto).
- Coal, anthracite, $5.50 to $6.75.
- Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

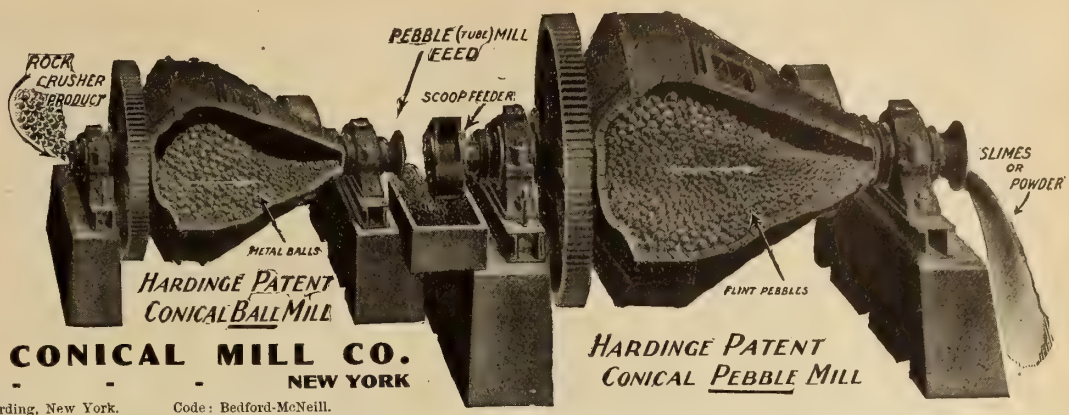
June 20.—Connellsville Coke (f.o.b. ovens).
- Furnace coke, prompt, $1.65 to $1.70 per ton.
- Foundry Coke, prompt, $2.10 to $2.25 per ton.

June 20.—Tin (Straits), 32.82½ cents.
- Copper, Prime Lake, 12.75 to 12.87½ cents.
- Electrolytic Copper, 12.50 to 12.60 cents.
- Copper wire, 14.25 cents.
- Lead, 4.40 to 4.42½ cents.
- Spelter, 5.35 cents.
- Sheet Zinc (f.o.b. smelter), 7.50 cents.
- Antimony, Cookson's, 8.37½ cents.
- Aluminium, 22.75 to 23.25 cents.
- Nickel, 40.00 to 49.00 cents.
- Platinum, ordinary, 32.00 per ounce.
- Platinum, hard, $34.00 per ounce.
- Bismuth, $1.75 per lb.
- Quicksilver, 47.00 to 48.00 per 75 lb. flask.

STEP REDUCTION

Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of."



HARDINGE CONICAL MILL CO.

37 Wall Street, - - - NEW YORK

Cable Address: Halharding, New York. Code: Bedford-McNeill.

MEN OF WEALTH



Are almost invariably the greatest believers in Life Insurance because they recognize the value of a "Cash" estate absolutely secured, and therefore they aim to maintain a considerable portion of their estate in the form of Life Insurance.

The North American Life Assurance Company appeals to business men because of its long record of success and its able and progressive management.

Assets, over $10,500,000. Net Surplus, over $1,000,000. Good Agency openings for energetic men.

HOME OFFICE, TORONTO ONTARIO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

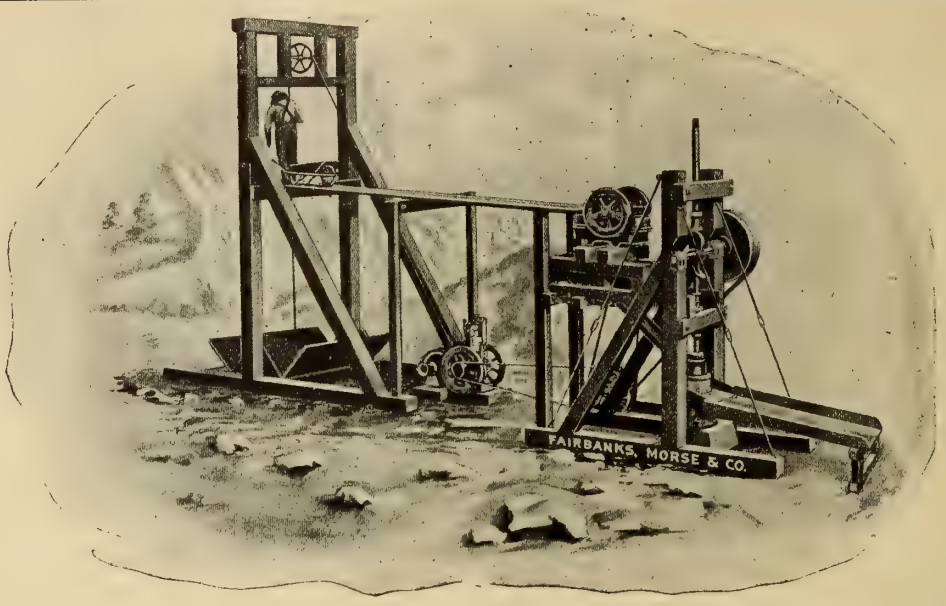
hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

J. S. CARTER, General Agent, 217 McDermott Ave. Winnipeg.

I. E. SUCKLING, General Agent, S. E. Cor. King & Yonge Sts. Toronto



PROSPECTOR'S OUTFIT—FITTED WITH

NISSEN STAMP MILL

A practical outfit for prospectors—one that is easily taken apart for transportation, and that can be used as a unit in a larger plant should your claim make good. One man is all that is required to operate the outfit. A FAIRBANKS-MORSE gasoline engine furnishes the power. Nissen Stamps are conspicuous for their large capacity and small power consumption. Descriptive pamphlets upon request.

The Canadian Fairbanks Company, Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

Montreal **Toronto** **St. John, N. B.** **Winnipeg** **Calgary** **Vancouver**

CONSTANT-HERZIG COMPANY

SUCCESSOR TO

C. L. CONSTANT COMPANY

MINING ENGINEERS AND MINE MANAGERS

ASSAYERS AND ANALYSTS

42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management

Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

KNOW YOUR ORE.

The best you now get is an assay of an infinitesimal part of a ton, which is often misleading.

WE ASSAY

Any kind of ore in sufficient quantities (from 100 lbs. to one ton) to give you what should be your exact smelter returns. All values recovered held subject to your order.

REFRACTORY ORES

Successfully assayed and all values therein shown.
Terms reasonable. Returns made promptly

NEWARK ASSAY AND SAMPLING WORKS

352 Mulberry Street, **NEWARK, N. J.**

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - **Manufacturers,**

Agents Everywhere **PETERBOROUGH, ONT.**

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. SC.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYER, CM., B. SC.
Mining and Consulting Engineer
Box 145, HAILEYBURY, ONT.

GROCH & GROCH
Consulting Engineers and Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

W. D. MCPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office; MCPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

S. F. KAVANAGH C. D. BOOTH, C. E.
Assayer
Mining Broker
Kavanagh & Booth
Mining Agents. Civil Engineers.
Contractors Assayers.
Mining Properties bought and sold.
Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont.
Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

Millman Wanted
Young man with experience in milling—must have fair knowledge of machinery and of handling men. Apply stating experience and wages to G. O. G., care of
CANADIAN MINING JOURNAL
Toronto, Ont.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, ROOM 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc., and any work connected with the mining profession.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT. Works: COBALT, ONT.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.

This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.

980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.

This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.

1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

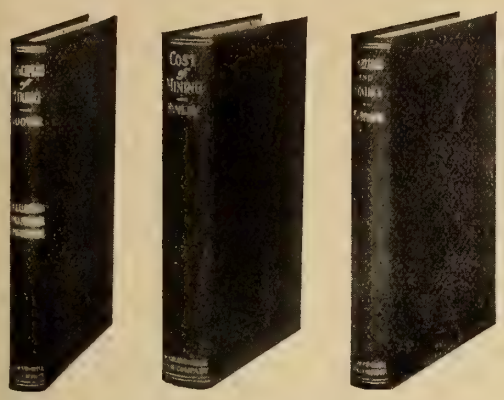
1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific. profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.

Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00 Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals

Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL. 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide
Smelter and Refinery at Deloro Ontario

Branch Office:
32-33 Home Life Building
Cor Adelaide and Victoria Sts. - - TORONTO.

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West
Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MINERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1 00.**

DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **$1.50** paper cover, **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of these books in his library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canada Metal Co.....v
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii
Hardinge Conical Mill Co.....xvii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Nova Scotia Steel & Coal Co..viii
Newton & Treloar.....xxvii
Nova Scotia, Province of....xxvi
Nissen Stamps xviii
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xxi

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd,, Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co,
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
McKee & McLeod Co.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link Belt Co.
Mussens, Ltd.
Peacock Bros,

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock.
S. Flory Mfg, Co.
M. Beatty & Sons.
Sullivan Machinery Co
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock.
Peacock Bros.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Alex. Fleck, Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis-Chalmers-Bullock.
Peacock Bros,
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

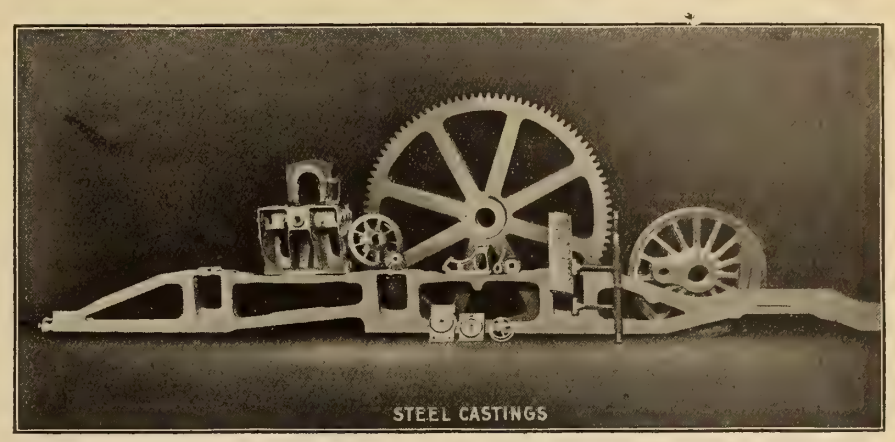
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse

Type "CCL" Induction Motors

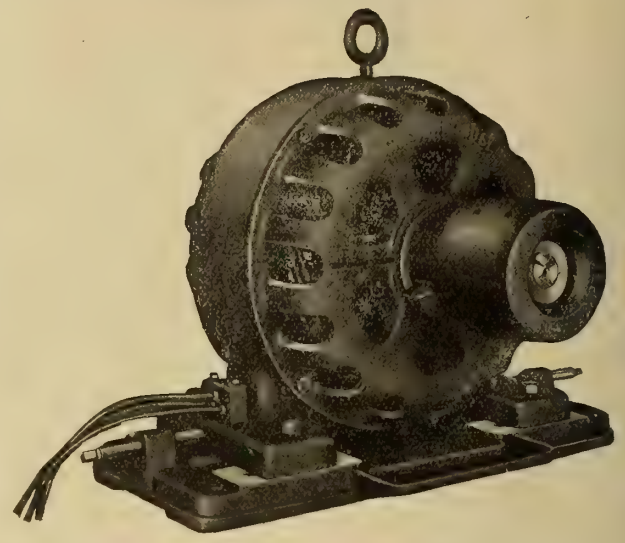
The only wearing parts of Type "CCL" Motors—the bearings

are designed and constructed to withstand years of the severest service without other attention than an occasional filling of the oil wells.

On motors above 5 horse power capacity the bearings are split, the interior of the housing forms the bearing shells which are lined with a special grade of bearing metal, the bearing housings are clamped between the halves of the bracket and are held in perfect alignment with each other by dowel pins.

On motors below 5 horse power capacity the bearing housings are cast solid with the bracket, and the bearings are bronze bushings pressed into place and pinned.

Each split bearing has two oil rings; the solid bearings one. The lower part of the housing forms an oil well from which oil is carried by the rings to the top of the shaft and distributed through grooves to all parts of the bearing, thus keeping it flooded with oil while the motor is in operation. **Ask nearest office for Circular 1118. It tells all about Type "CCL" Induction Motors.**



Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Street West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

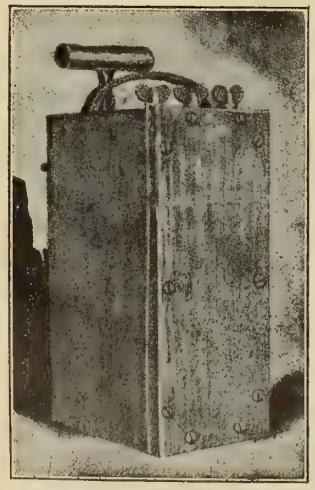
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

A Ten-by-twelve Tent for $9.90

Made of 8-Ounce Duck



THIS is a photographic illustration of a special tent we have had made on a quantity-order basis. In no other way could we supply a tent of this size and quality of canvas for $9.90.

Made of 8 ounce duck, with double sewn seams and re-inforced strain points.

Used either with an outside ridge pole, or a ridge rope stretched between trees. An ideal prospector's tent with plenty of wall.

Dimensions—Height, 7 feet; Length, 12 feet;
Width, 10 feet; Height of walls, 3 feet.

Complete with guy ropes,..... **$9.90**

Poles and pegs if desired, **95c** extra

A "Black-Fly"-Proof Netting

A SPECIAL FLY NETTING with *smaller mesh* than the ordinary mosquito netting, so that it is proof against Black Flies, and all other insect pests. This netting we have had made to meet a special demand from the north country; per yard—9 cents, or piece of 24 yards for..... **$2.00**

36 INCHES WIDE, WHITE OR GREEN.

THE ROBERT SIMPSON COMPANY LIMITED
TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

---

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

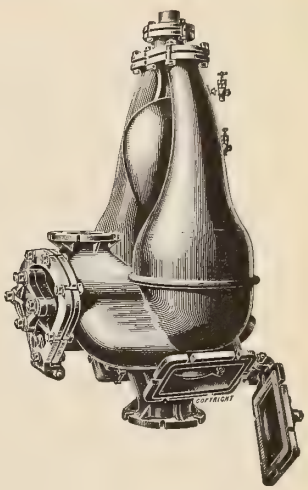
No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

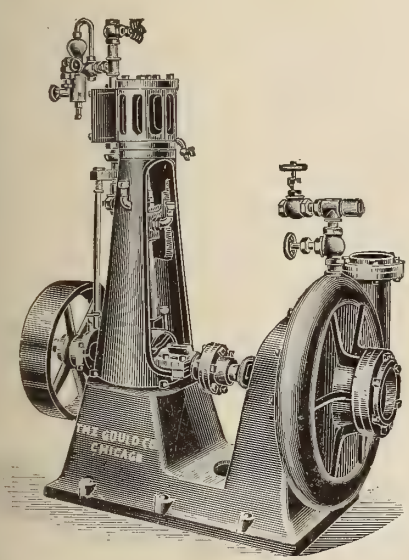
VOL. 31 TORONTO No. 14

Pulsometer Pumps

All Sizes in Stock



Pump dirty and gritty water, use little steam, and require little or no attention. No rods, packings or levers.



Centrifugal Pumps

In Stock

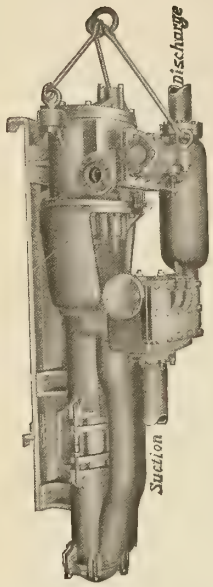
Write for prices

MUSSENS LIMITED

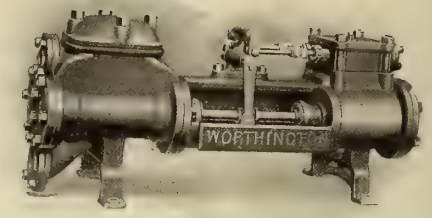
MONTREAL, 318 St. James St.
TORONTO, 73 Victoria St.
COBALT, opp. Right of Way Mine
WINNIPEG, 259-261 Stanley St.
CALGARY, Crown Bldg.
VANCOUVER Mercantile Bldg.

PUMPS FOR MINES

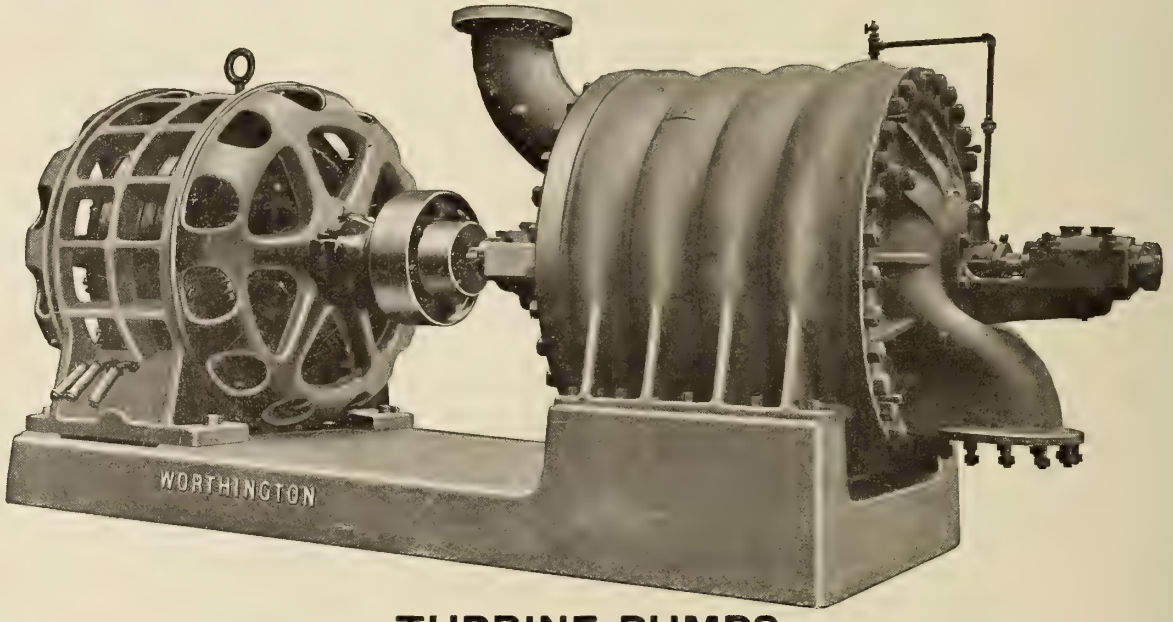
AND GENERAL SERVICE



VERTICAL SINKING PUMPS



BOILER FEED PUMPS



TURBINE PUMPS

The illustration shows a 4-stage 8-inch turbine pump, driven by 300 h.p. induction motor and having a capacity of 1200 Imperial gallons per minute against 500 ft. head. The pump is fitted with special chambers and impellers to resist the corroding effects of mine acids.

The John McDougall Caledonian Iron Works Co.

LIMITED

Works: Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

BELLISS ENGINES

Have won the approbation of the well informed engineers of Canada: not only the theoretical man, but the practical Commercial Engineer, who has the spending of the money.

When the Engineer has a reputation for safe Engineering to maintain, why does he recommend the Belliss Engine?

BECAUSE—

It is absolutely reliable.

It will go right into service when started up; all its finishing and adjustments having been made in the builders Works.

Its running is ceaseless, noiseless, "cost less."

The first engine of the type built 20 years ago is still running 625 r.p.m. day in and day out all the year round and shows no sign of wear.

Is it surprising that Belliss Engines have been installed by such leading firms, institutions and Cities as Dominion Iron & Steel Co., Canadian Locomotive Works, Dominion Bridge Works; Universities of McGill, Toronto, Queens, Saskatchewan; Cities of Montreal, Edmonton, Lethbridge, Westmount, Verdun, Brockville, Renfrew.

Builders: Belliss & Morcom Ltd., Birmingham, England.

Canadian Agents: Laurie & Lamb, Engineers, Board of Trade Building, Montreal.

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just because it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



CHOOSE THE RIGHT DRILL
FOR YOUR PARTICULAR CONDITIONS.

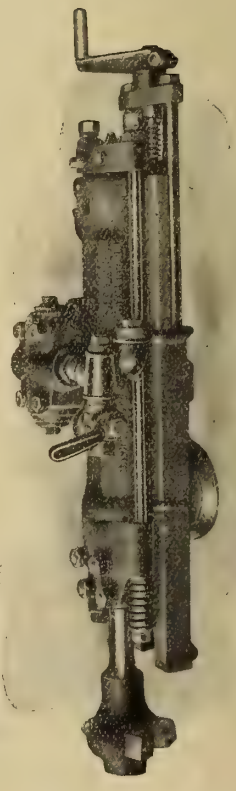
If too small, your drill holes will not be large enough or deep enough to shoot the rock economically; or your repairs will be unduly high.

If too large, labor and power will be excessive. Some valve-motions work well on heavy pressure, against hard even rock, others excel in soft or broken ground, on lower air pressure.

There is a Sullivan Drill which may be relied on to develop the highest possible efficiency and economy under any given set of working conditions.

As specialists in fitting drills to the service required, we solicit your inquiries.

ASK FOR CATALOGUE 660



Air Compressors Hammer Drills
Coal Cutters Diamond Core Drills

SULLIVAN MACHINERY CO.

CLAREMONT, N.H. CHICAGO, ILL., U. S. A.

BIRMINGHAM DENVER KNOXVILLE PITTSBURG COBALT, ONT. SAN FRANCISCO PARIS, FRANCE SALT LAKE
BUTTE JOPLIN NEW YORK ST. LOUIS NELSON, B. C. SPOKANE SEATTLE SYDNEY, AUS. EL PASO

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE

CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

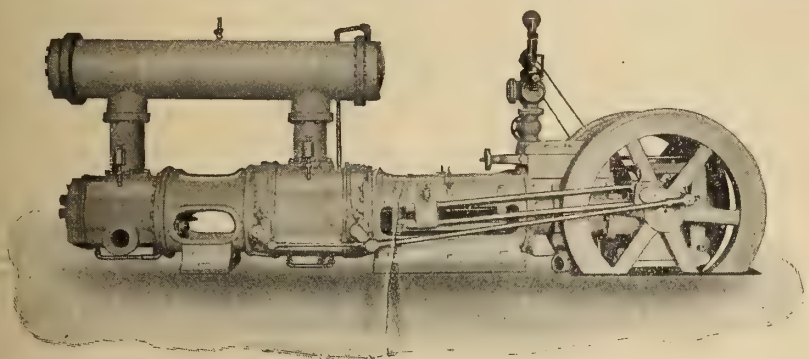
Address nearest office to-day.

THE PATERSON MANUFACTURING COMPANY, LTD.
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Straight Line, Steam Driven Compound Air Compressors

High *efficiency, simplicity* and ease of accessibility are distinct characteristics of the Class C-2 Compressor.

Corliss Inlet Valves on Low Pressure Air Cylinder, giving exceptionally large direct intake areas, practically unlimited life, quiet operation at all speeds and sustained high volumetric efficiency.



A simple direct Corliss Valve motion in which all complications have been eliminated and best efficiency obtained.

Sole Agency for B.C. Drill Steel in Cobalt Territory.

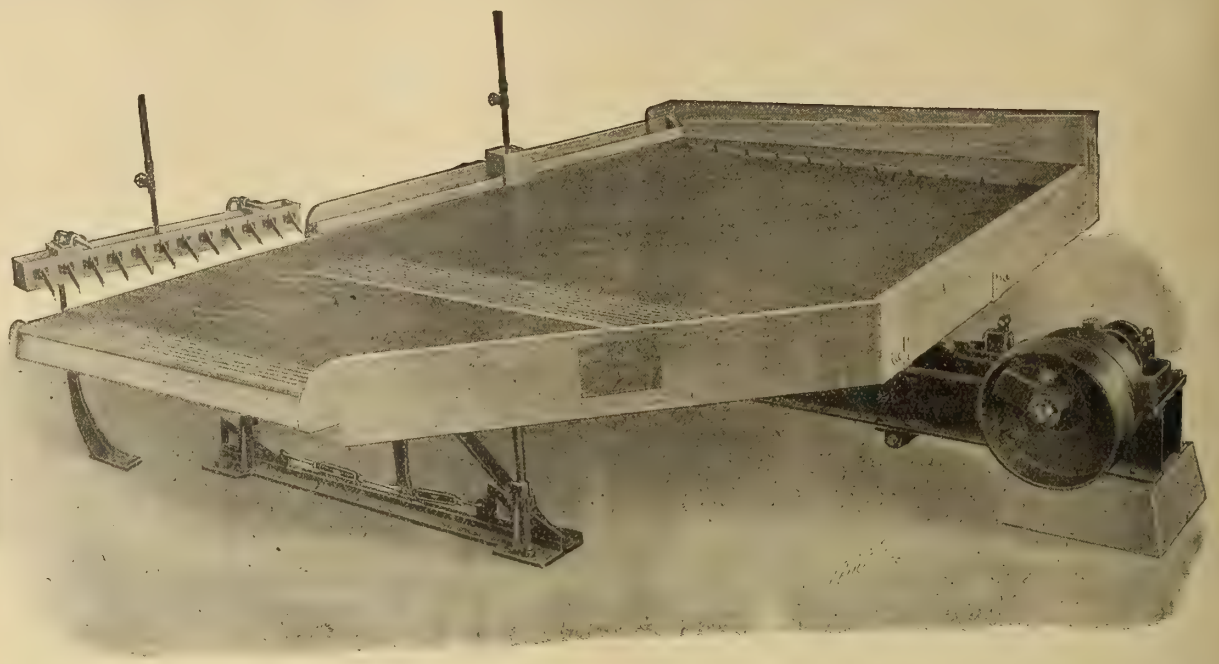
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

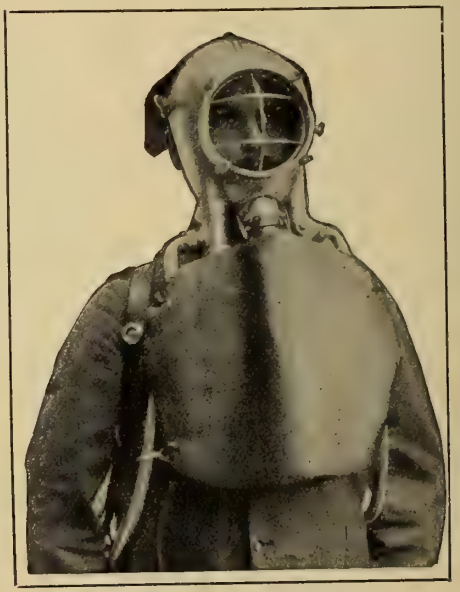
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON

70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

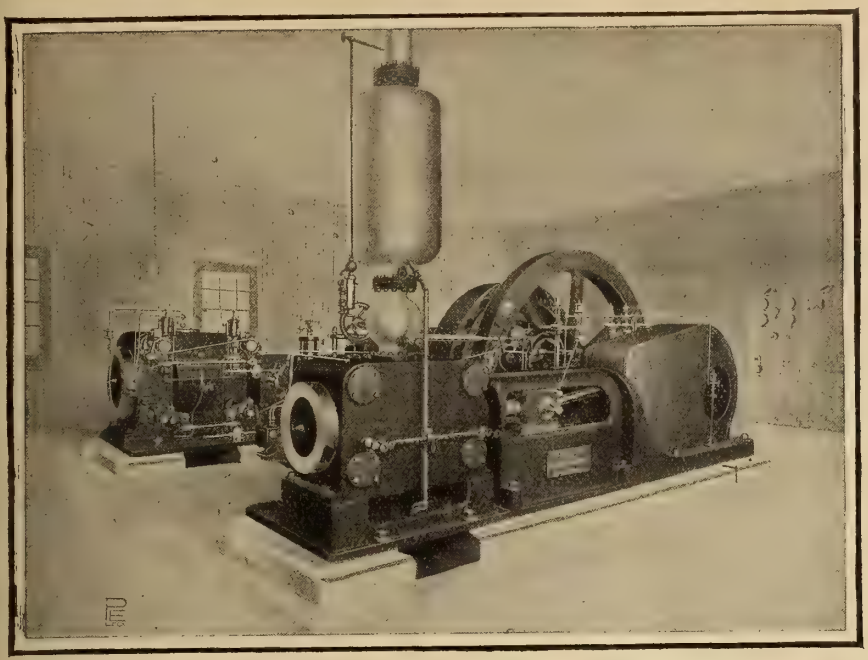
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Meriback	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



POWER PLANTS
FOR
MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

Ask for Catalogues, Prices and all Information.



If I Could Only See You

I could help you save money, oil, fuel and wear and tear on your plant.

Harris Heavy Pressure Bearing Metal

is the best for general machine bearings.

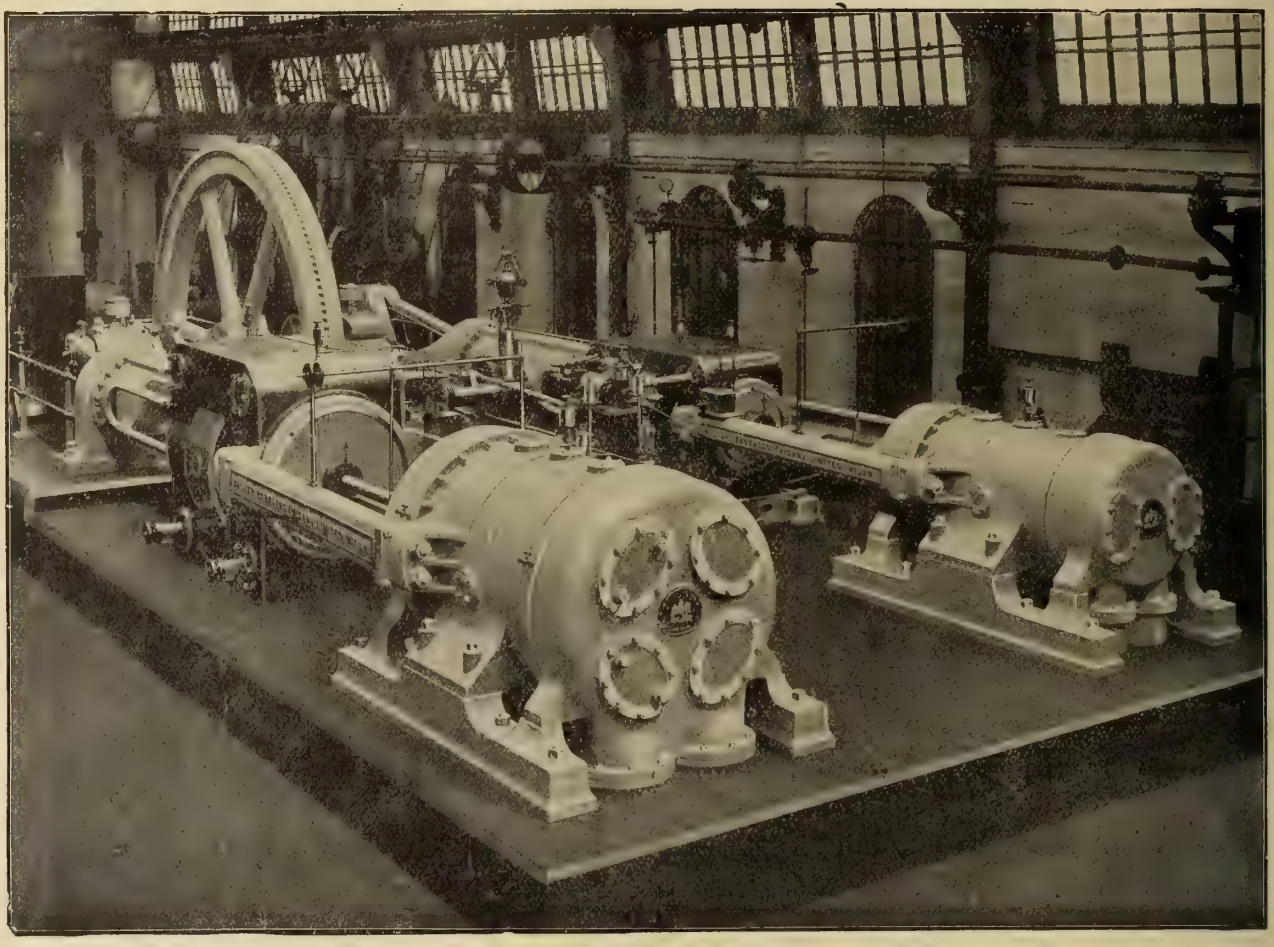
Will you write for price?

We will gladly quote and send you Booklet on Babbitt Metals Manufactured and guaranteed by

THE CANADA METAL COMPANY, LTD., TORONTO

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

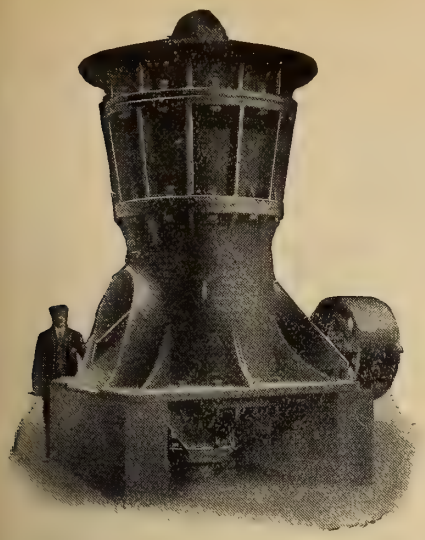
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

COAL MINING MACHINERY

Revolving Tipples, Screens, Picking Belts, Chutes, Car Hauls, Complete Plants Designed and Built, Mine Cars, Hoists, Pulleys, Transmission Machinery and Conveyors.

Correspondence Solicited

THE BROWN MACHINE COMPANY, Ltd.

ENGINEERS

NEW GLASGOW = NOVA SCOTIA

PURCHASING AGENTS for Mining Companies will find that they can secure the best goods and the closest prices by getting our quotations on

WIRE ROPE MINING WEBS PERFORATED METAL
HARD STEEL COAL SCREENING CHAIN, ETC.

We are operating the oldest and best equipped wire drawing and weaving mills in Canada. Our facilities are such that we can guarantee prompt shipment of standard goods from our large stocks, and can turn out special orders in record time. Write for Catalogues and quotations before placing your orders elsewhere.

THE B. GREENING WIRE COMPANY, LIMITED
HAMILTON, ONT. - - MONTREAL, QUE.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: **NEW GLASGOW, NOVA SCOTIA**

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

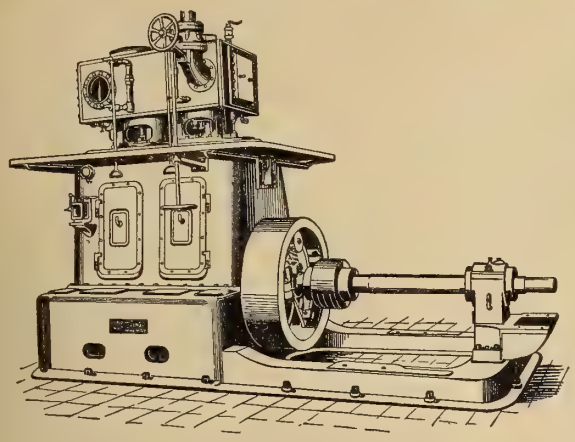
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

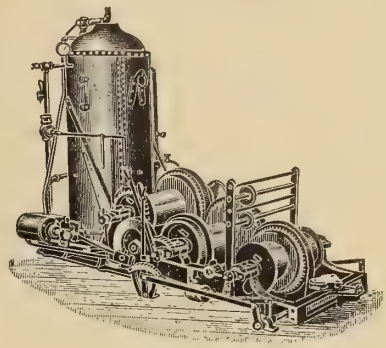
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



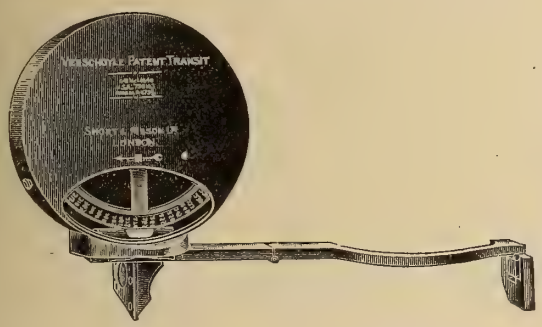
Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments
FOR
Civil, Mining Engineers & Surveyors

2½ INCH NEEDLE.



WEIGHT 15 OUNCES.

THE VERSCHOYLE POCKET TRANSIT
combines the useful features of the Abney Level, Prismatic Compass and Clinometer

For preliminary surveys of every description

Catalogue On Request

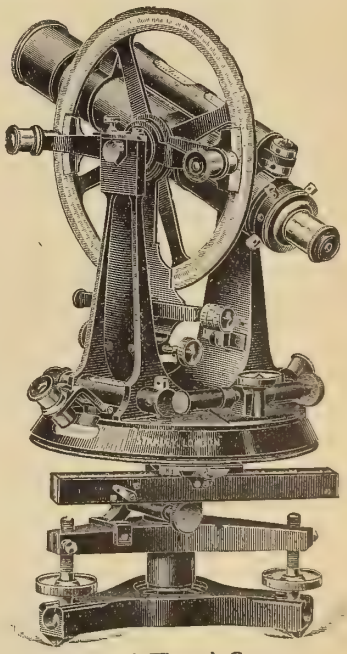
Eugene Dietzgen Co.
LIMITED,
TORONTO, - 10 SHUTER STREET

STANLEY, LONDON

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our J65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK



New Pattern Transit Theodolite with Through Compass

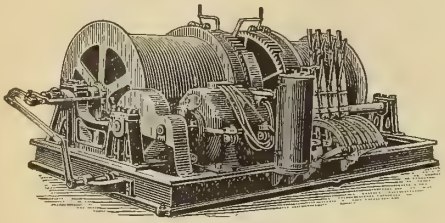
W. F. Stanley & Co., Limited
Great Turnstile, London, England

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

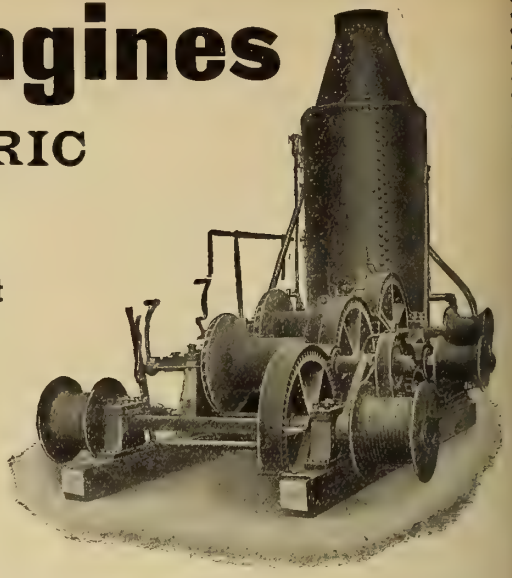
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.

MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.



WHERE IT'S ALWAYS COOL

Get away for the week-end for a rest, a comfortable fishing trip, or change of air and scenery.

ASK FOR A WEEK-END PAMPHLET

HAVE YOU TRIED

KAWARTHA LAKES
STONEY LAKE, ETC
Reached via Bobcaygeon, Peterboro or Lindsay — Immediate connection with C.P.R. trains.
ASK FOR ILLUSTRATED FOLDER

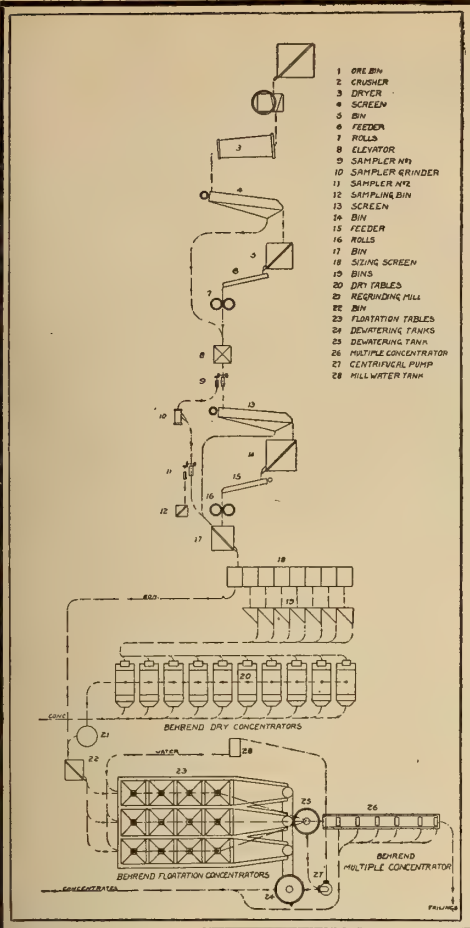
POINT AU BARIL
"THE FINEST SUMMER RESORT ON THE GEORGIAN BAY"
Steamer "Wanakewan" leaves C.P.R. Station wharf for Island Resorts—Immediate connection.
ASK FOR ILLUSTRATED FOLDER

MUSKOKA LAKES
BEST REACHED VIA BALA
Lv. Toronto:
9:40 a.m. daily 12:15 p.m. week days
6:05 p.m. week days 10:10 p.m. daily
ASK FOR ILLUSTRATED FOLDER

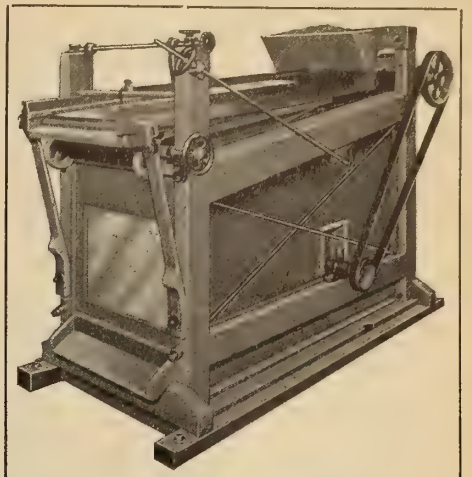
CANADIAN PACIFIC RAILWAY

THE LINE FOR ALL VACATION SPOTS

R. L. THOMPSON - - District Passenger Agent - - TORONTO



FLOW SHEET OF A MODEL PLANT FOR THE BEHREND SYSTEM OF DRY and WET CONCENTRATION



PATENTED
BEHREND DRY CONCENTRATOR

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED
32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,
108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

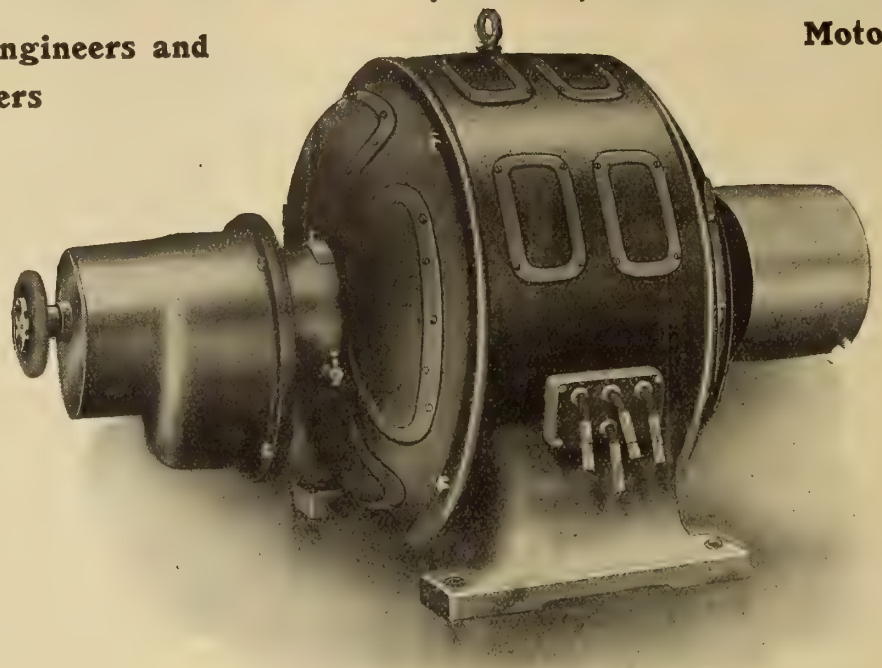
Scranton, Pa.	- -	314 Peoples Nat. Bank Bldg.
Duluth, Minn.	- -	710 Torrey Bldg.
Denver, Col.	- -	225 E. Maple St.

When wanting goods write nearest office.

Bruce Peebles & Co., Ltd., Edinburgh, Scotland

Electrical Engineers and Manufacturers

Motors for Mines a Specialty.



Peebles' Totally Enclosed Type Slipring Motor With Short Circuiting Gear.

La Cour Converters

A.C. & D.C. Motors and Dynamos

VANDELEUR & NICHOLS Sole Canadian Representatives DINEEN BUILDING, - TORONTO

The Davis Handbook of the Cobalt Silver District

Illustrated with Photographs

PRICE

Paper Cover = = $1.50

Stiff " = = = $2.00

by H. P. Davis

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

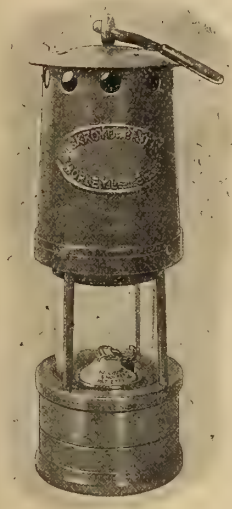
¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = *Canadian Mining Journal* = *Toronto*

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Safest and Best Quality.

Battersea Assay Goods

Battersea goods, clay and plumbago, have won for themselves a world wide reputation. They are manufactured for melting gold, silver, copper, iron, etc., etc., and are stocked by us in Montreal, ready for *immediate* shipment in an endless variety of shapes and sizes, crucibles, scorifiers, muffles, etc.

We carry a FULL LINE of THESE GOODS.

SOLE AGENTS

LYMANS, Limited

Wholesale Druggists

Importers and Dealers in Chemical and Assay Apparatus.

ST. PAUL STREET, MONTREAL.

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

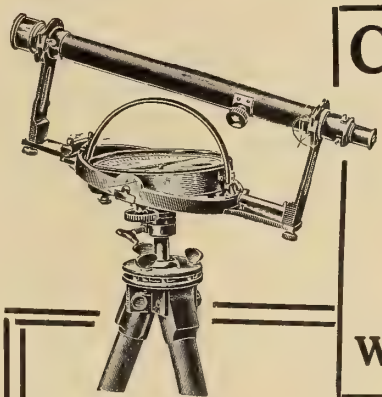
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Casartelli's Patent Mining Dial With Telescope

Sight limb moves on axes cast on the Compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indices attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Supplied without telescope if desired.

Tangent Motion fitted at slight extra cost.

Sizes 5 inches and 6 inches

Joseph Casartelli & Son

Scientific Instrument Makers

43 Market Street

Manchester, Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co, Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd- Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire-threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.
And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.
Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

Specify Distinctly  Allen's Stag Brand

"STAG" BRAND.



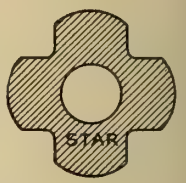


SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock





SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL

Jeffrey Coal Cutters



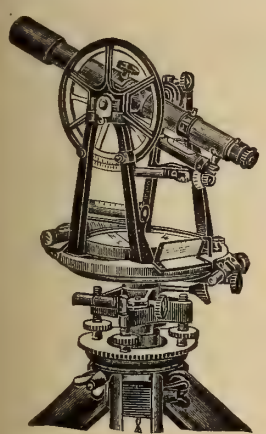
Cut faster, cost less for up-keep and will withstand more rough work than any other coal cutting machine made.

Jeffrey Coal Cutters are the very latest and most improved types and represent the highest standard of efficiency thus far attained in the construction of coal mining machines.

Bulletin X18 describes both Electric and Air Power Coal Cutters; it will be mailed on request to interested parties.

The Jeffrey Manufacturing Co., Columbus, Ohio

Chicago St. Louis Denver Montreal Pittsburg Charleston, W. Va.
Boston New York Birmingham



C. L. Berger & Sons

37 WILLIAMS STREET
BOSTON, - MASS.

SPECIALTIES:
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

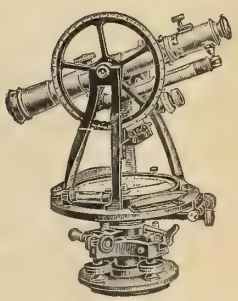
Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196

ANNOUNCEMENT

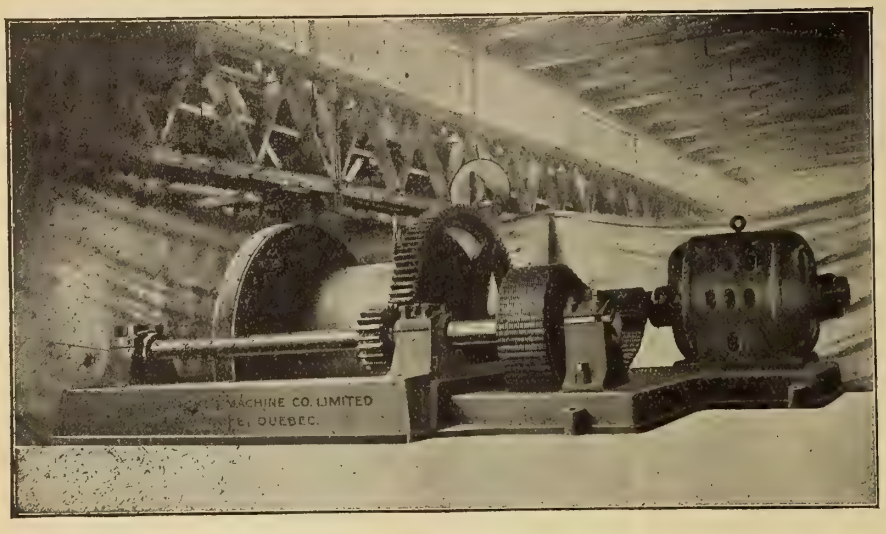


In order to render the most satisfactory service to the large and rapidly increasing number of patrons using our surveying instruments, etc., we have established a **Repair Department,** fully equipped to repair surveying instruments, drawing instruments, measuring tapes, etc., in the most careful and workmanlike manner.

We employ in this department mechanics trained at our works, experienced in the repair of a wide variety of instruments of every make, and we can assure our customers that any repair work entrusted to our care will be promptly and satisfactorily executed.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.
New York, Chicago St. Louis, San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes



OUR Hoists are compact in design, of heavy construction and sightly in appearance.

We now build electric driven hoisting machines having silent chain drives from the motor.

In all sizes, for every service.

FOR FURTHER PARTICULARS WRITE US

The Jenckes Machine Company, Limited

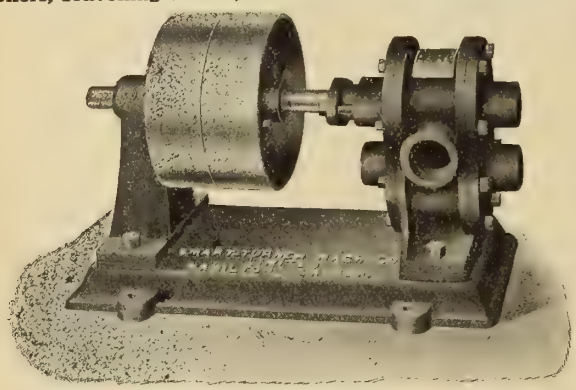
Mining Machinery, Pulp Mill Machinery, Steam and Water Power Plants

SALES OFFICES:

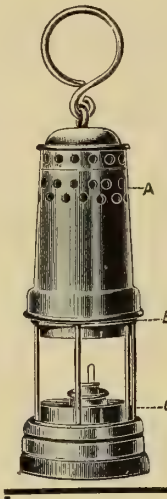
Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver

WORKS, SHERBROOKE, QUE. and ST. CATHARINES, ONT.

We Manufacture Power & Steam Pumps, Condensers, Engines, Boilers, Travelling Cranes, Etc. Write for our Catalogue.



THE SMART-TURNER MACHINE CO., LIMITED,
Hamilton, - Canada.



DAVIS DERBY.

Miners' Safety Lamps

GAS TESTING LAMPS

(STOCK AT MONTREAL)

SEND FOR CATALOGUES

PEACOCK BROS.

68 BEAVER HALL HILL

MONTREAL

Write for pamphlet No. 42 M.

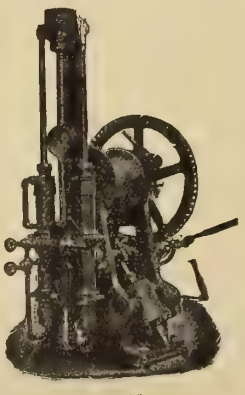
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins,
ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, July 15, 1910 No. 14

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 417
(a) The Royal Commission of Inquiry on Technical Education..... 417
(b) The Transvaal Stope Drill Contest..... 417
(c) A Wise Appointment 418
(d) Concerning Ourselves..... 418
(e) Editorial Notes..... 418
The Mechanical Charging of Blast Furnaces, by Edgar J. W. Richards and Thomas Lewis..... 420
Southern Part of Lunenburg County, Nova Scotia, by E. R. Faribault..... 428
Rambler-Cariboo Mine, Slocan, B.C., by E. Jacobs..... 431
Diamond Drilling in Nova Scotia..... 432
Electro-Pneumatic Apparatus for Removal of Dust in Mines, by F. C. Perkins..... 433
Electrolytic Copper Refining and Smelting in Australia.... 433
Notes on Recent Developments in Asbestos Mining in Quebec, by W. J. Woolsey..... 434
Address by F. H. Sexton, Director of Technical Education, Nova Scotia..... 435
Ore Production in British Columbia..... 436
Canadian Patents 438
Book Reviews 439
Correspondence 439
Personal and General 440
Special Correspondence 441
General Mining News 444
Mining News of the World..... 445
Company Notes 446
Statistics and Returns 447

THE ROYAL COMMISSION OF INQUIRY ON TECHNICAL EDUCATION.

Mining men have a just cause for complaint in the fact that the mining industry has been quite overlooked by the Dominion government in the recently-appointed Royal Commission on Technical Education. Of the five gentlemen appointed to the Commission, none is qualified to represent mining interests. This is a most regrettable oversight. The situation is rendered worse by the fact that some time ago the Minister of Labour was notified of the omission.

The mining industry is of such importance to Canada that a large department at Ottawa is kept up for the special purpose of promoting the development of Canadian mines. Five of our universities supply instruction in mining engineering. Very many young Canadians are devoting themselves to the study of this profession. In short, mining and its allied industries are every day becoming more and more essential factors in our national development. Where then can excuse be found for the deliberate failure of the Minister of Labour to see that the Commission included a representative mining man?

More than all other industries, mining requires special representation. Its conditions and its requirements are unique. In no other industry is specialized training so important. The lay mind is quite incapable of appreciating these facts. True insight into the meaning of the industry can only come through years of experience. No matter how admirably equipped the members of the Commission may be, they assuredly are not capable of sitting in judgment upon matters pertaining to technical mining education.

We believe that it is the duty of all Canadian mining men to protest against the manner in which the Royal Commission on Technical Education has been appointed. We believe also that the powers that be will hardly care to ignore such a protest.

THE TRANSVAAL STOPE DRILL CONTEST.

The stope drill contest, conducted under the joint auspices of the Transvaal Chamber of Mines and the Transvaal Government, has resulted in victory for two machines—the Holman and the Siskol. The first prize of £4000, was divided between the manufacturers of these two machines. The Chersen came second, winning a prize of £1000. Including these and other prizes the total cost of the contest was £17,500.

Of the nineteen original entries, only four survived the lengthy trial. The conditions were particularly severe. No changes were permitted to be made during the progress of the competition. The machines were tested

exhaustively over a period of eleven months. Whilst undoubtedly the failure of some of the drills must have been fortuitous, the success of the winners is altogether creditable.

The history of the contest we shall not touch upon. It is appropriate, however, to mention one or two of the lessons that are to be adduced. The first and most important conclusion is that the hammer drill cannot replace the reciprocating drill on the Rand. This conclusion must not be misunderstood. The Rand stopes are distinctive. They are characteristically regular. Usually they are wide. It pays, therefore, to employ a drill that has the advantage of strength and weight. Moreover, labour conditions on the Rand may have much to do with the conclusions reached. Coloured miners, supervised by Englishmen, do all the work. Thus it is probably the case that hammer drills, the efficient use of which demands more than ordinary intelligence, do not win proper recognition. All over Canada and the United States the hammer drill is proving its usefulness. It will be wise, therefore, to take South African experience with a grain of salt.

Another point particularly emphasized by the experience gained in the drill contest is that each drill works most efficiently at a certain definite air pressure. Some of the competing machines did their best work at a pressure of about sixty pounds. Others did not perform economically until higher pressure had been supplied.

The results of the contest may be summed up as indicating in general that the machine drills at present in use are susceptible of improvement only in incidentals.

A WISE APPOINTMENT.

It is a matter of much satisfaction to the mining fraternity that the Ontario Government has selected Mr. R. W. Leonard to succeed the late Dr. Goldwin Smith as one of the governors of the University of Toronto. The dignified participation by mining men in public affairs was never more necessary than at present. Mr. Leonard will prove a distinctly strong and capable member of the Board of Governors. As the only mining man on the Board, his position will be unique.

We have time and again adverted to the fact that the mining industry needs more representation on all our governing bodies. Whilst this is eminently true of our universities, it is even more true of our legislatures. Mining communities cannot hope to receive adequate assistance from governments, from railways, or from other public corporations, until such time as the mining industry has been recognized as an integral and vital part of our industrial life.

First and foremost the industry requires parliamentary representation. This is so obvious a fact that it is hardly necessary to dwell long upon it. Only thus can unwise legislation be choked, just tariffs be arranged, and numerous petty grievances be adjusted.

In the second place the profession of mining engineering and the industry of mining must be paid more attention by our educational authorities. Not one of our primary schoolbooks touches upon any phase of the industry. Our children grow up in ignorance of this supremely-important branch of professional and industrial activity.

In the third place our railways habitually ignore the claims of mining districts. Only through constant fighting can fair freight rates be secured. As a rule freight schedules, as applied to products of the mine, are arbitrarily fixed at the highest possible point. No rational basis has been developed. This is a vitally urgent problem. Upon its proper solution rests the whole future of mining in Canada.

In another editorial we have expressed our regret that mining received no consideration in the organization of the Royal Commission on Technical Education. The Dominion Government should lead in this respect. It has remained for the Ontario Government to set an example. We feel confident that the University will have every reason to congratulate itself upon the addition of a representative mining man to its Board of Governors.

CONCERNING OURSELVES.

Possibly because we are constitutionally modest we have been accused of erring in the direction of reticence concerning ourselves. Thus we hope that our readers will forgive one short excursion into the realm of self-congratulation.

Not very long ago the travelling representatives of a large Canadian manufacturing concern foregathered at their annual love feast. In comparing notes as to the merits of various media, there was found to be a singular unanimity of opinion regarding the CANADIAN MINING JOURNAL. One traveller went so far as to assert that the company's sales of mining machinery were in large part directly traceable to its advertisement in our pages. This sounds too pleasant to be true. Yet we accept it with surprisingly few qualms. In any case, it is delightful to meet this particular brand of candour. Too often the manufacturer and the sales agent prefer death to any admission of this kind.

Let us conclude this brief confession of faith with an invitation to all our advertisers to give us all the encouragement that they feel we deserve.

EDITORIAL NOTES.

Twenty-six tons of ore, sixteen tons of which was high grade, was shipped from the Wyandoh mine, on the Gillies Limit, near Cobalt. The ore was sent to the Coniagas smelter at Thorold.

Gold ore assaying $2.46 per ton is being milled at Cripple Creek at a profit of $1 per ton.

The market outlook for zinc is distinctly favourable. Supplies on hand have diminished until there is now not more than enough for forty days' consumption.

The Nevada Consolidated Copper Company, during the month of May, produced copper at a net cost of 5.91 cents per pound. This is probably the lowest figure being attained anywhere.

The purchase of a large coal mine in West Virginia by the Lake Superior Corporation is a piece of excellent commercial strategy. Coal of first quality can be landed at the Soo at a price substantially lower than was heretofore possible.

During the year ending March 31st, 1910, the Dominion Government paid $340,542 in bounties upon lead ore. The quantity of ore upon which this amount was 45,467,545 pounds. The corresponding figures for the previous year were respectively $307,432 and 42,533,287 pounds.

The Los Angeles Stock Exchange has adopted unusually stringent listing requirements. Henceforward no mining shares will be quoted upon its floors until the new regulations are complied with. In addition to a sworn statement of assets and liabilities, an engineer's report, certified and sworn to, is demanded.

The fire loss throughout Canada during the month of June is estimated at nearly seven million dollars. The use of mineral products instead of wood could easily have prevented this loss entirely. Canada loses at least thirty millions every year through fires in towns and cities. Surely it is time to prevent this calamitous waste.

Our leading editorial refers to the lack of mining representation of the recently-appointed Commission on Technical Education. A number of our readers have urged us to suggest the name of Mr. F. H. Sexton, Director of Technical Education for Nova Scotia. No name could be more suitable. Not only is Mr. Sexton admirably qualified to advise on the subject generally, but he also possesses special knowledge of mining. We doubt, however, if Nova Scotia can be persuaded to spare him.

Reports from London, England, indicate that passenger agents are attempting to profit by circulating exaggerated stories concerning gold finds in British Columbia. The tale of gold "reef," 25 miles long, near Stewart, is a fabrication. The region about Stewart is promising enough; but no good can come of such fairy tales. Incidentally, in the Portland Canal country the green prospector can not thrive. Only those who know something of hardship and of travelling over broken country can expect to "sit in."

A timely letter from Mr. F. C. Loring appears on another page. Mr. Loring touches upon the loss of time experienced in the mines of Cobalt because of insufficient ventilation. This is a subject that is too frequently overlooked by managers of metalliferous mines. As Mr. Loring points out, this neglect is attributable to the fact that the losses in efficiency are not noted . Their effect upon the balance-sheet is beyond question.

INDUSTRIAL SECTION.

While wire cloth has the advantage over perforated metal for sieving purposes, in many cases the rough or uneven surface of the former has been a great disadvantage. This has been overcome by passing the cloth between heavy rolls to flatten the crowns of the wire. The B. Greening Wire Company, Limited, has always done more or less of this work, and lately, finding the demand for same very largely increased, installed rolls to take care of the demand for medium weight screens. This proved such a success that the firm was encouraged to put in heavier rolls. These rolls are now installed, and are without doubt the heaviest rolls to be found in any wire cloth plant on the continent.

The installation of these rolls marks the completion of a wire-weaving plant that is equal to that of any concern in the world making the same class of work.

The main shaft of the Temiskaming Mine, Cobalt, will soon be the deepest in the district. It is now down more than 460 feet, and is being rapidly sunk to the 500-foot level. At this level the sixth station will be cut. At each hundred feet there is a level. There is also one at 350 feet. Below 425 feet there is no ore in the shaft itself. From the 500-foot station cross-cuts will be driven to explore for all the main veins.

Flourspar, as mined near Jamestown, Colorado, contains 70 to 85 per cent. calcium fluoride. Veins less than 1 foot thick can hardly be worked profitably. Few veins exceed 6 feet in thickness. The principal handicap to the industry is the absence of railways. Wagon hauls of 13 miles are not uncommon.

At the Ragged Chutes plant of the Cobalt Hydraulic Company, the "blow-off" rises to an enormous height when power is shut off from the mines. It is estimated that the fountain is fully 350 feet in height. It attains its maximum on Sundays when all the mines are idle.

Rumours of the discovery of large bodies of zinc-blende in the Thunder Bay district, Ontario, are current.

In Stewart, B.C., lumber costs $33 per thousand. Carpenters are paid as high as $6.50 to $7.00 per day. There is an enormous amount of building going on.

New Zealand intends to restrict the influence of the Standard Oil Company. Anti-trust legislation is being framed with this object in view.

THE MECHANICAL CHARGING OF BLAST FURNACES.

BY EDGAR J. W. RICHARDS AND THOMAS LEWIS, GLENGARNOCK.

(Abstract of paper read before the Cleveland Institution of Engineers, Middlesbrough, England.)

In our manufactures we have always been a conservative nation, and there has been a tendency to let other countries try experiments and develop new ideas, although there never has been a lack of inventive genius in this country. As in other things, so it has been in the matter of the mechanical filling of our blast furnaces, for although various classes of machines have been introduced, and their benefits proved almost in every other industry, yet at the blast furnace, which is in reality the prime factor in all our manufactures, we for the most part adhere to our old-fashioned methods.

We will show you later a photograph of a mechanically-filled furnace in operation at Lowmoor Iron Works, as far back as 1800, and we understand many years ago, the late Mr. Snelus had a mechanically-charged furnace at the West Cumberland works. It

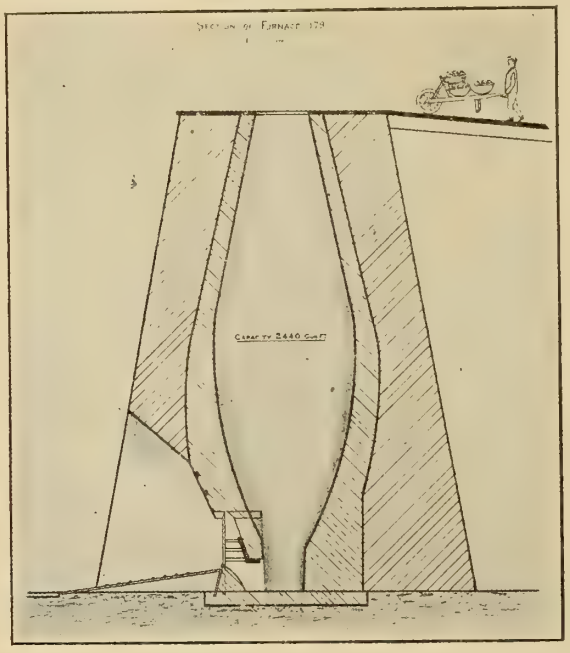


Fig. 1

is, however, in America and Germany that most attention has been devoted to the subject.

In America, mechanical methods were forced upon them, owing to the opening out of the famous Mesabi ore fields, the ore from which, being easily reduced, necessitated the charging to be conducted at such a high rate of speed as to be beyond the power of physical endurance. The engineer was called to the assistance of the furnace manager to supply a means of keeping the furnace full.

The full extent of the besetting difficulties of the subject were not at first realized, and it was thought to be merely a question of elevating and emptying on to the bell the required charge at the proper rate. They soon found they were labouring under a delusion; furnaces burnt down at one side owing to irregular distribution (the tipping of the skip shooting out the lumps across the hopper and dropping the fine on the near side), hot spots developed, linings were burnt out, casts were irregular in quality, slips occurred more frequently, and the furnace manager had a worrying time generally.

With such defects recognized, steps were taken to overcome them, the result being that we have now diverse methods to give a better distribution, such as deflecting plates, double bells, revolving hoppers, etc., but in spite of all this, many furnace managers still look askance at mechanical chargers, and consider that in the majority of cases, the benefits to be derived are more than counterbalanced by objections peculiar to mechanical charging, which are not found where hand filling is in vogue.

The last sentence seems to throw some light on the road to be followed if mechanical charging is to be a success. It is believed that almost no one will question the assertion that careful filling with barrows, conscientiously carried out by experienced labourers, is the most successful way to charge, and if such a

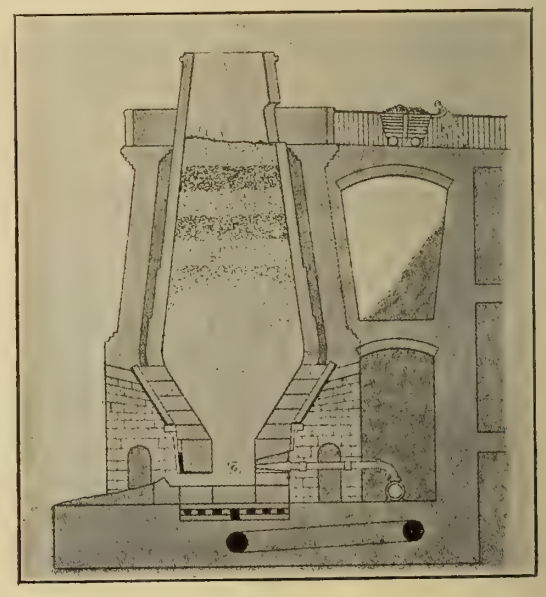


Fig. 2

charger, having the latter functions, could be got to work mechanically in an efficient manner, the initial objection would be removed.

Others contend that for large outputs exceeding say 1400 to 1500 tons per week from one furnace, mechanical methods may pay, if they are not indeed absolutely essential, but for makes up to this tonnage, there is no necessity for any other means than manual labour. We do not agree with such a contention.

Wherever there is the human element, there is the liability to err, and therefore, there is no assurance that the distribution is going to be perfect, however carefully the fillers are instructed.

Even for comparatively small makes, we are convinced that a machine can be found that will answer all requirements, work with precision and exactitude, handle the materials carefully, be under perfect control, be of course untiring, work with a steady regularity unattainable by manual labour, and generally be as

indispensable to the economical and regular working of the blast furnace as is the hot blast stove.

There is another point worth consideration. Any furnace is liable to work down quicker one day than another, and there is a difficulty in getting the fillers to keep the stock line up to the level, whereas, with me-

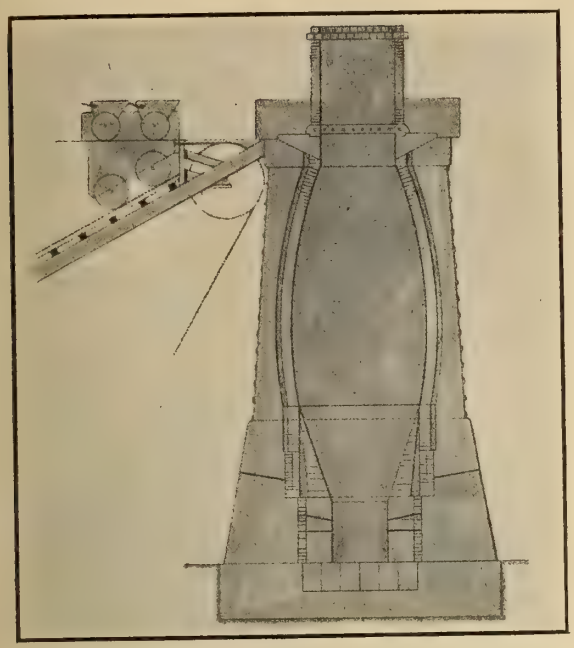


Fig. 3

chanical filling, the rate of charging can always be regulated to suit the requirements. Moreover, a much greater regularity of working of the furnace can be obtained when the funace is kept at one constant level; a difficult condition to fulfil with hand labour, but one which should always be possible with mechanical charging.

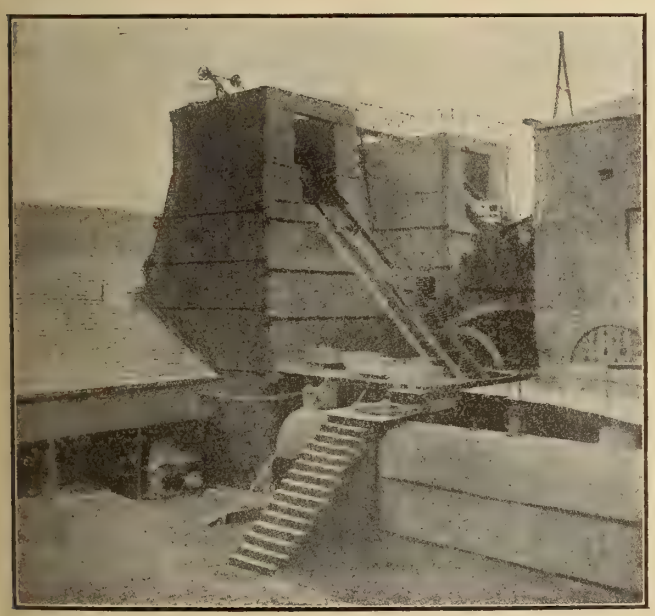


Fig. 4

It must also be remembered that everything that conduces to regularity of working of the furnace brings us nearer to that ideal state of perfection, which is the aim of every metallurgist, viz:—that, given the composition of the charge, the results of the cast can be foretold with as much exactitude as can be obtained in an experiment by the chemist in the laboratory.

Mr. Uehling has stated that in his opinion 90 per cent. of all blast furnace troubles are due to faulty charging apparatus, and he has been supported in this statement by many other authorities. The object of this paper is therefore to examine and discuss the points to be studied in the design of a suitable mechanical charger, and the faults which experience has shewn are to be avoided.



Fig. 5

We propose to summarize the chief points to be considered, to examine some of these points in detail, and then to show by diagrams typical of different designs, what has been done, and is being done, with regard to the question of mechanical charging.

The points of supreme importance which occur to us are:—

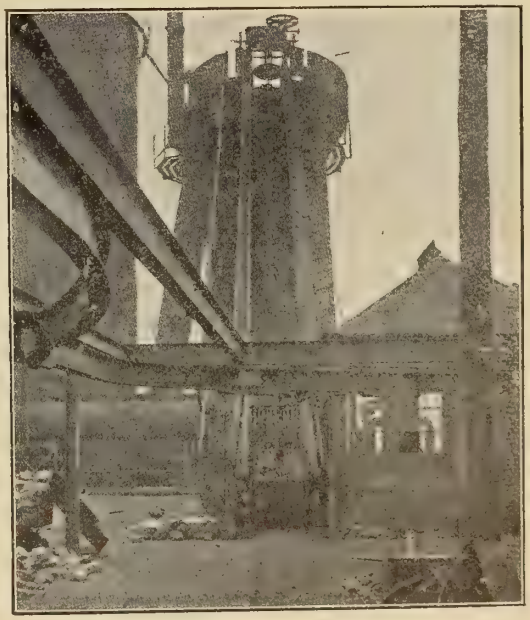


Fig. 6

1. That the material should be put into the furnace with as little breakage as possible.
2. That the material should be distributed evenly all over the surface of the stock.
3. That there should be as little machinery as possible on the furnace top.

4. That there should be no escape of gas during charging.

5. That all the movements of raising and discharging the material, the lowering of the bell, and the means of distributing the charge should be capable of being controlled from one point.

6. That the first cost and upkeep charges should be as low as possible.

7. That the design should admit of some flexibility in details to suit local conditions, and the different methods of charging.

Having summarized these points, let us refer for a little time to what is involved in the statements, and why we should consider them as essential.

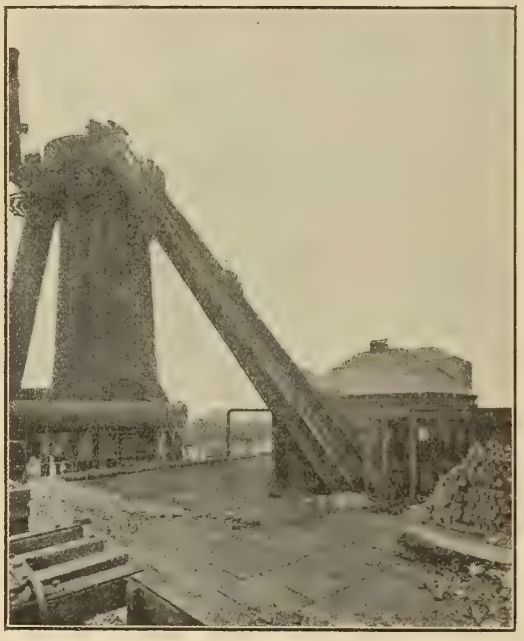


Fig. 7

Breakage of Materials.

One of the strongest objections to many of the systems of mechanical charging is the dumping and consequent breakage of the materials, particularly of the coke, and undoubtedly this is a very serious consideration, and one which has hitherto prevented many furnace managers from adopting mechanical means.

Some of the arguments in this respect appear, however, to be based on fallacious premises, and might equally well be applied to hand as to machine filling. Certainly there are chargers that do knock about the materials much more than is necessary, and we will again refer to this point when some typical designs have been illustrated, but in many cases this argument does not apply.

It is a common thing to find a furnace manager object to a charger because of the drop of from 5 feet to 10 feet on to the bell, but does it never occur to him that if the stock line were visible to his sight, the drop on to the bell would appear insignificant compared with the drop from the bell into the furnace?

On the other hand many mechanical devices err, not so much in the height of any one drop, but in the number of such drops, the material being thrown this way and that way several times in its passage from the stock ground to the furnace, with the idea of getting the materials well mixed, but greatly to the detriment of the more friable portions of the charge, and for this reason the double bell tpyes with connecting sleeve have fallen under a great deal of condemnation.

The ideal charger, then, must be one that eliminates as far as possible the breakage of materials by reducing the drop to a minimum, and especially by avoiding the multiplication of the number of such drops.

Distribution.

Furnace managers may have various opinions with regard to the method of charging, and as to whether the materials should be mixed or charged in layers—local conditions may require special consideration on these points—but on one point all are agreed, that the materials must be evenly distributed over the furnace.

This principle is recognized in charging with barrows into the ordinary cup and bell, where the charge is distributed evenly all round the hopper, so as to give an even distribution of fine and lump, and a good mixture of the materials of the charge.



Fig. 8

Several attempts have been made to get a better arrangement for distributing than Parry's cup and bell, but hitherto none has been very successful, and they require too much attention to be of much service in mechanical charging.

Although several of these devices are very ingenious, yet by studying the conditions in each individual case, the class of material, and the diameter of the furnace at the stock line, the authors are convinced that a size of bell can be got for any furnace, which can give quite satisfactory results so far as radial distribution is concerned, provided that other parts of the furnace are proportionate, and certainly nothing simpler than the cup and cone can be devised.

It is when we come to the circumferential distribution around the furnace that we have to give the matter more careful consideration, for with the high pressure and speed of working of the modern furnace, a very slight difference in the density of the materials at one point may cause an infinite amount of trouble. For example, a bell that swings slightly off the centre for a short period has been found to be sufficient to destroy the lining at one side, by leaving a freer passage one way than another. Might not this be taken as an argument for balancing a bell as carefully as one would balance a flywheel? Another case is on record of a furnace where the charge was deposited on four points of the bell continuously, and it was found that the

furnace lining burnt out to a rectangular shape, the four angles of the rectangle corresponding with the points midway between the points of dumping, where the percentage of lump was highest. Instances might be multiplied but the examples given above are sufficient to indicate the importance of the question of correct distribution. However carefully the charge is deposited, it may yet happen that the stock line becomes uneven, and it may be found necessary to fill up one part of the furnace, or, to use the furnaceman's phrase to "put in blanks." We must, then, in designing a charger, have such a method of control that we can do this, otherwise we are going to discount the advantage gained at the furnace top by introducing trouble in the furnace itself.

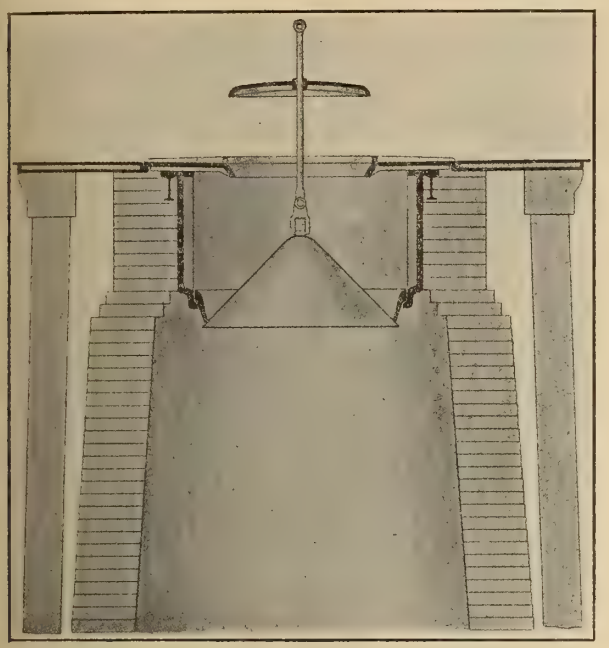


Fig. 9

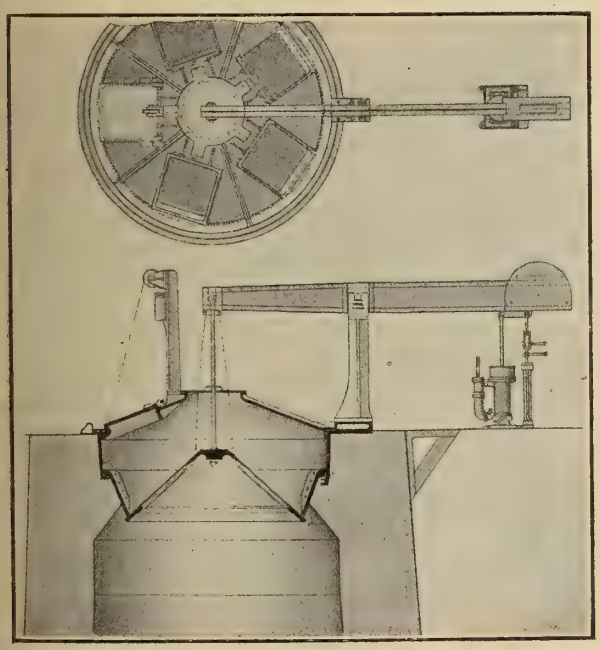


Fig. 10

As before mentioned, it is almost universally admitted that no better distribution can be got than by the system of filling by hand barrows, if it is carefully and conscientiously carried out, and the aim in mechanical charging should be to adopt methods as nearly as possible approximating to the conditions of hand charging.

Gearing on Furnace Top.

Under conditions such as prevail on a furnace top, exposed to the inclemencies of the weather, and to heat, dust and gas, the upkeep of elaborate gearing is a costly item of expenditure. To make a serviceable charger, some gearing is necessary in order to distribute the charge, but this should be reduced to a minimum, and be as much as possible protected from the deteriorating influence mentioned above. In several designs there is a great complication of gear wheels and shafting carried right over the furnace in the most exposed position, and it is a matter of no surprise that furnace managers condemn them. Unfortunately the sins of a few are visited on others to whom these strictures do not apply.

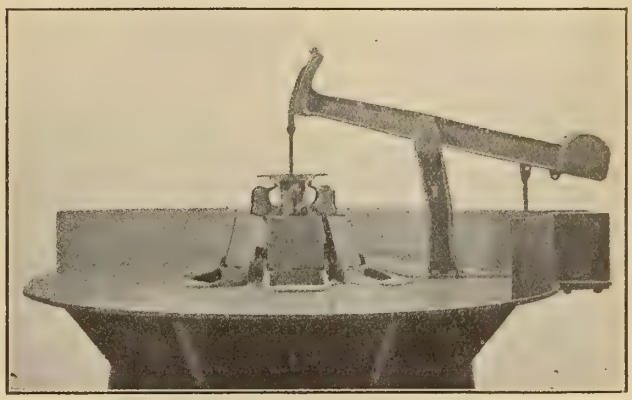


Fig. 11

Escape of Gas.

Now let us devote a little time to the question of the escape of gas from the furnace top during the lowering of the bell, if no means is used for preventing this.

Putting aside other considerations for a minute, look at what the loss of gas alone means in times when every cubic foot is either a valuable asset, or of considerable value in the works, whether for heating stoves, firing boilers, or driving gas engines.

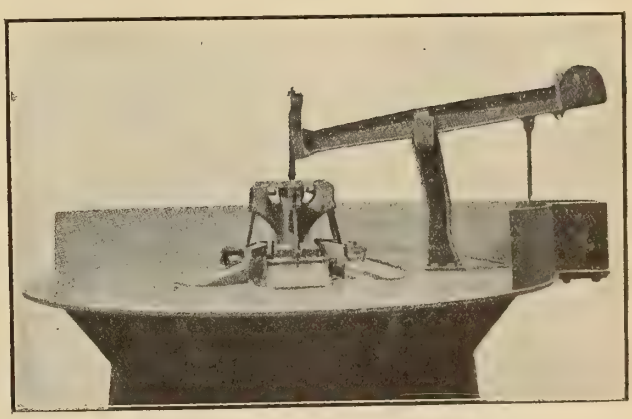


Fig. 12

Take the case of a furnace with an output of say 200 tons per day, or say with a burden of mine and fuel with fluxes of 800 tons per day, and let it be assumed that each hopper-full lowered into the furnace represents 15 tons, then in the course of a day the bell is

lowered 53 times, and gas is lost on each day's work to the amount of about 20 to 25 minutes' production. For larger outputs the loss would, of course, be proportionately greater. Besides the actual loss, we have to consider the effect on the works plant. This is so well known to you as to need no description.

It may be said that mechanical charging is not the only way to eliminate this evil, and the authors readily admit it. Several devices have been used to prevent the escape of gas, even with barrow charging; one of the authors of this paper patented such an arrangement some years ago, and a similar arrangement is in use on all the furnaces at one of the works of our firm.

One point of advantage in a closed top soon becomes evident when a bell sticks for any reason, as it prevents the far from beautiful pillar of fire and smoke which is too frequent a feature of our landscape.

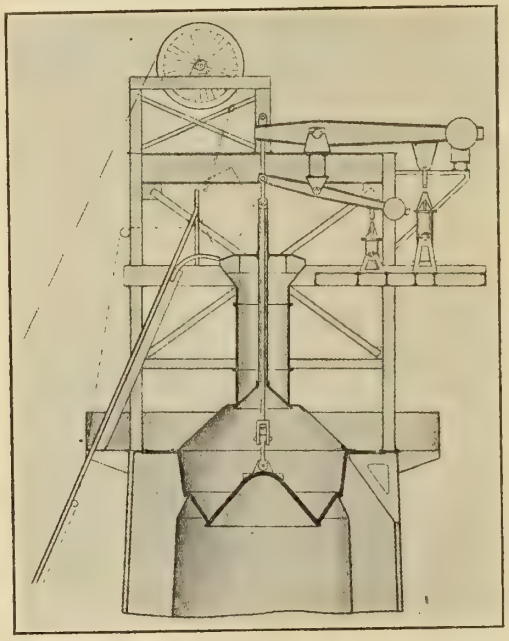


Fig. 13

The prevention of gas escape, which, even in barrow charging is advisable, to say the least of it, becomes absolutely imperative in many mechanical chargers where there is a head gear over the top of the hopper.

Control from One Point.

That the control of all the mechanism, raising and lowering of the bell, distribution, etc., should be concentrated at one point is so apparent as to need no arguments to support the statement, and the perfection attained by instrument makers in the manufacture of recorders and indicators, makes it a simple matter to arrange for a central control.

Capital and Upkeep Cost.

That the first outlay, and the cost of upkeep should be a minimum is also self-evident, and the charger which can combine efficiency with low cost is the one of the most commercial benefit. With the complicated gearing in use on some chargers, the gain effected to the manufacturing department is outbalanced by the extra labour devolving upon the engineering staff to keep the plant running.

Flexibility of Design.

As different ores may require different methods of charging, or managers may have their own ideas as to how the materials should be put into the furnace, it is advisable that a charger should be capable of being modified in details to suit local conditions. Thus, at one place it may be required to take a skip with about say a 6-tons burden, and at another place a smaller skip may meet the requirements, or it may be preferred to send up the ordinary barrow to be automatically

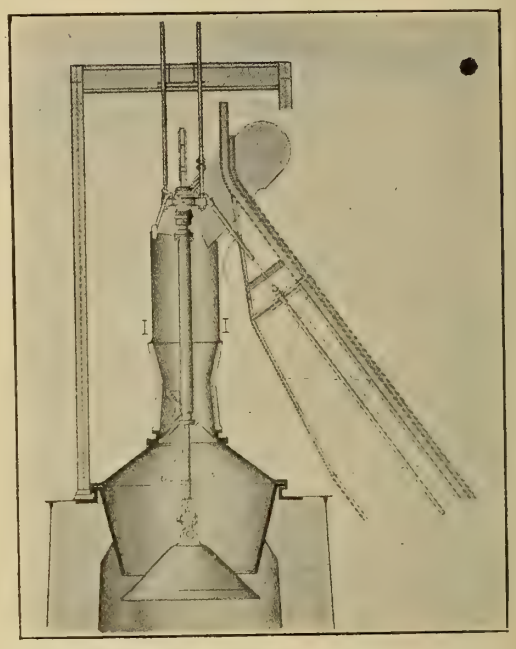


Fig. 14

discharged. Where so many works have their own coke ovens, it would also be an advantage to send the coke oven skip to the top without further handling.

It is preferable, therefore, that a charger should be capable of embracing these several requirements, and

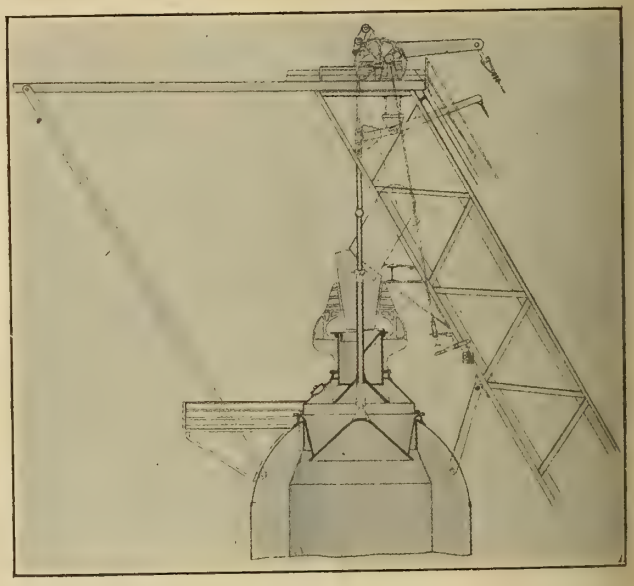


Fig. 15

not be designed to suit one particular form of charging only.

Having discussed the chief points of interest and importance in mechanical charging, we will now look at some illustrations of different methods of filling furnaces, mechanical and otherwise, which will show the progress that has been made in this direction.

By the kindness and courtesy of Mr. Woodcock, we are enabled to show (Fig. 1) a copy of an old drawing of one of the original Lowmoor furnaces, built in 1791, and the method of charging by baskets, in a manner similar to that in use at many cupolas at the present day.

We see here an old type of furnace filled by a four-wheeled bogie (Fig. 2). It will be noticed that the filling is effected from one side, a method in vogue in Staffordshire in the early seventies.

This system was altered by the late Sir Lowthian Bell to charging from four points, which effected a radical improvement both in economy and output, and is referred to by him in his papers on blast furnaces, published in the "Iron and Steel Institute Journal" of 1872.

Note also the bank behind the furnace, which was an essential feature of all blast furnaces at one time. As furnaces were raised in height, or built in localities where there was not a convenient hill, it became neces-

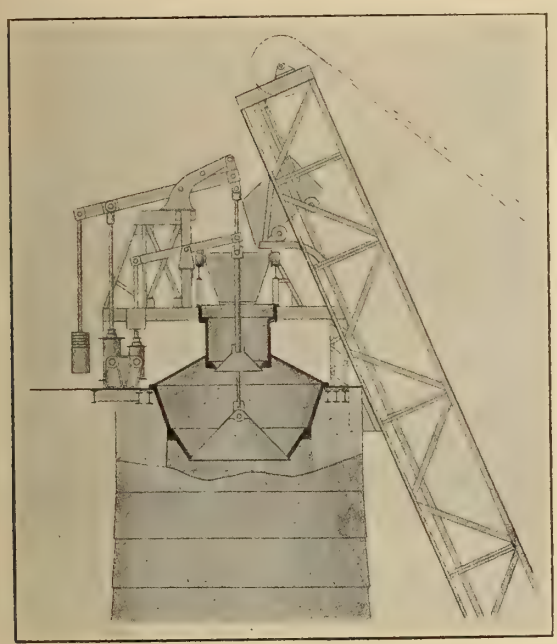


Fig. 16

sary to use some description of hoist, and here (Fig. 3) we see one type of hoist, viz.:—an inclined plane with a level staging on which the barrows were placed.

We show this type in place of the usual vertical hoist because in mechanical charging an incline is always used, and it is interesting to note the points of resemblance between this and the next view, (Fig. 4), viz.: the mechanically charged furnace at Lowmoor already referred to, and for the reproduction of which here we are also indebted to Mr. Woodcock.

This arrangement was adopted in 1800 in place of the basket filling, already described, and the method of working was as follows: The four-wheeled trucks seen in the photograph were filled with the charge and brought on to the lower staging, from which they were run on to the travelling carriage on the incline. This carriage has a frame running on four wheels on the track, and an inner swinging frame pivoted on the sides of the carriage, this inner frame receiving the truck which was secured in position. On running the carriage up the incline, two pulleys on the front of the swinging frame engaged with two projections on the rail, thus tipping the contents of the truck into the furnace.

Although not in chronological order, it is interesting for the purpose of comparison to see the next four views, (Figs. 5-8) which show a charger at present in use at the blast furnaces of the Langloan Iron & Chemi-

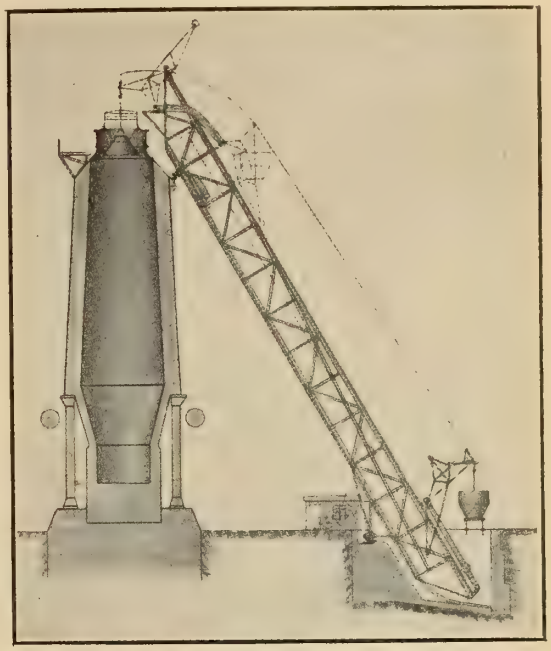


Fig. 17

cal Company, Limited, Coatbridge, this being the only mechanical charger in use in Scotland. The authors have to express their appreciation of the kindness of Mr. A. Moore, manager of Langloan, in permitting them to show you these slides.

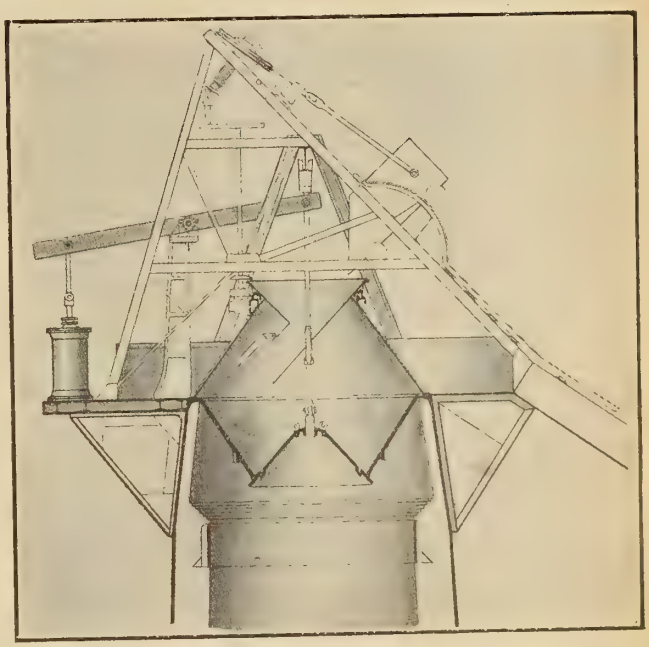


Fig. 18

The next two views show different methods of preventing the escape of gas in hand-filled furnaces at the Clyde Iron Works of Messrs. James Dunlop & Company, Limited (Fig. 9), and at the Ardeer Iron Works of the Glengarnock Iron & Steel Company, Limited, Ayrshire (Fig. 10). We have to acknowledge the kind-

ness of Mr. Rogerson and Mr. Main respectively in supplying us with the drawings.

The top shown in the next two, is one patented by the reader, and already referred to. (Figs. 11 and 12.)

To come now to what we might call the present era of mechanical charging, let us examine a few types, and try to find out the object in view in their design, and whether they fulfil the conditions we have formulated.

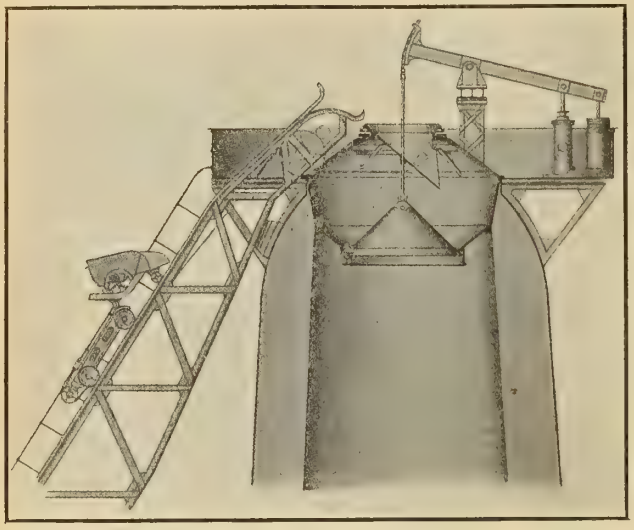


Fig. 19

The next illustration (Fig. 13), shows an early type as made in America, before the difficulties of the subject were realized.

It will be noticed there is no revolving mechanism—the charge is dumped into the long sleeve-like top hopper, discharged from that into the main bell, and thence into the furnace.

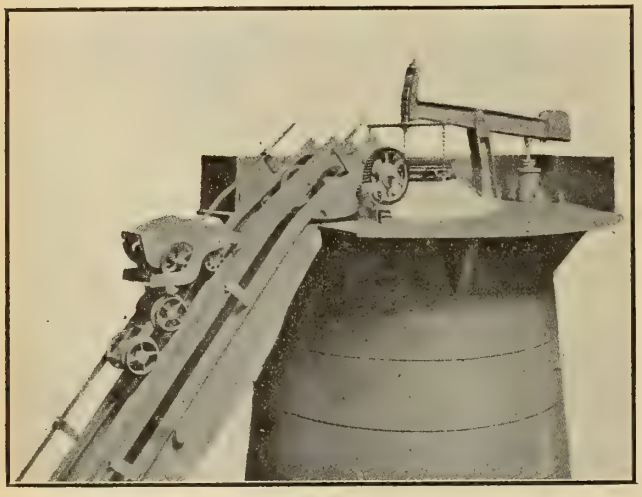


Fig. 20

The long sleeve was adopted in this type to concentrate the charge as much as possible on the centre of the main bell, with the idea of giving each part of the hopper its correct share of the charge. It was found, however, that this was not sufficient to mix the material, and it also caused considerable breakage of the coke. The fine and lump, separated owing to the action of the skip in discharging, kept their relative positions, more or less, in moving down the sleeve, and were discharged on to the main bell with the finer material collected, for the greater part, on the side next to the skip, and the coarser on the opposite side.

The natural result was that the furnace lining burnt out on the side where the coarser material was thrown, and as the blast was concentrated chiefly at that side, the life of the furnace was very much shorter than if there had been an even distribution, not to speak of the increased liability of slips and scaffolds.

It was after this was noticed that deflecting plates were introduced, and here is seen (Fig. 14) a typical charger with deflector and revolving hopper. This certainly is an improvement, so far as distribution goes, but in the majority of this type the long sleeve is retained, and the drop of the material before reaching the furnace is excessive. The top gear, too, is cumbersome, and makes the bell difficult of access for repairs, and also the mechanism for revolving the top, is, in most cases, too delicate for a blast furnace, and causes a great deal of worry and loss of time in upkeep.

That this type of charger still has its advocates is indicated by the adoption of it on the new plant of the United States Steel Corporation at Gary, though from the illustration here shown of it (Fig. 15) it seems to

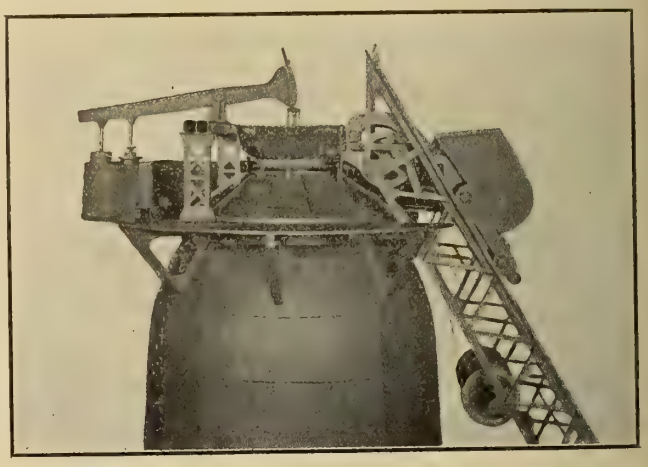


Fig. 21

us it would hardly recommend itself to managers in the Middlesbrough district, owing to the heavy top gear, and the levers and mechanism on the furnace top.

Another type of distributor for use with a double bell, and one which is known to the Middlesbrough district is here shown (Fig. 16). In place of revolving the top hopper, this is made in two pieces which can be drawn back, or inclined at various angles to effect a distribution according to the class of materials used. The idea is well worked out, but the objection seems to be that the material gets too much knocked about, and the distribution is not sufficiently positive.

This illustration (Fig. 17) may be taken as a type of charger greatly favoured in Germany, the method of raising and depositing the hopper varying somewhat in different designs, but it is typical of the general method employed. Here a hopper fitted with a bell on the under side is conveyed from the stock ground to the furnace top, and placed on a casing over the main bell and hopper, the material being thence transferred to the main bell by lowering the conical bottom.

This removes the distribution trouble from the furnace top to the ground, and does away with the necessity of gearing at the top of the furnace to revolve the hopper. There is still the difficulty of how to fill the hopper on the ground level. At some places the hopper is filled from bins placed on opposite sides of a

central railway along which the hopper travels, but we have already pointed out the effect of dumping at four points of the bell, and its bad effect on the furnace, and this would be aggravated in the case of filling from two points. Of course the hopper may be revolved during filling, but the arrangement is apt to be cumbersome, and in very few cases could it be applied to an existing plant.

The next type which you see reproduced here (Fig. 18) will be recognized by many of you as that made by The Brown Hoisting Company, and shows a distinct improvement on those preceding it. This is almost universally acknowledged to be the best system of charging hitherto in vogue, and the reason of it seems to be, that it is the nearest approach to barrow charging that is in use at the present time. There are still, however, in our opinion, one or two defects, such as the high top gear, and the mechanism above the hopper (though these details have been modified somewhat in later designs by this firm), we should also think that difficulty

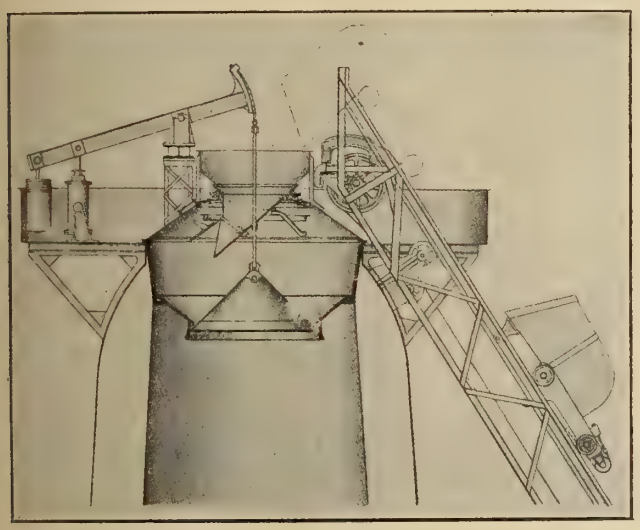


Fig. 22

might be experienced with the levers inside the furnace top for closing the door, and while it approaches very nearly to the method of barrow charging, it does not quite get there.

The next illustration (Fig. 19) is the charger which the authors have been experimenting with, and in the design of which are embodied all the points which we have enumerated as being essential to a satisfactory charging machine.

On first sight the charger seems to bear a certain facial resemblance to that last shewn, but on closer examination it will be seen that certain improvements have been introduced, which have effected a radical change in its efficiency. Let us study the charger more closely to see what these improvements are.

The revolving of the chute is actuated by an intermittent motion, the chute moving forward after every second skip is discharged, and the mode of operation is as follows:

There is provided a double track, so that one skip may take up ore and limestone, and the other one the fuel. The ore skip first ascends and deposits its charge on a point of the bell in accordance with the position of the revolving chute at that moment. The skip of coke is then discharged at the same point and over the ore, precisely as is done in hand filling. Before the next charge reaches the top, the chute has revolved through part of a revolution, so that the ore is placed slightly round the bell, and its lot of fuel placed on the top of it, and so on, until the round is completed, but notice that the gearing is so arranged that on the completion of the round the chute has travelled slightly more than a full revolution, and that therefore the dumping points are continually moving on round the bell in a gradual precession.

This disposes satisfactorily of the question of circumferential distribution, and as already stated, the question of correct radial distribution is one merely of the correct proportion between the size of the bell and the throat of the furnace, modified by the class of material in most constant use. This proportion is one that cannot very well be fixed by any formula, but is best arrived at by experiments on a model, the sizes of materials being proportioned to the scale of the model.

Another important feature of this design is the facility which it affords for the placing of "blanks" at any circumferential point of discharge into the hopper. The

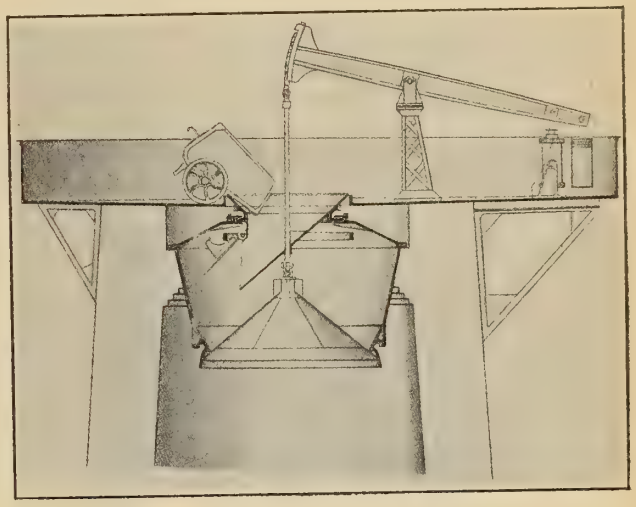


Fig. 23

intermittent motion of the chute already referred to is transmitted from the hoisting mechanism to the chute through a clutch (Fig. 20), therefore by throwing the clutch out of gear, as many skip loads as desired may be deposited at one point in the hopper.

To eliminate as far as possible the breakage of materials, the height of the charger is brought down to the minimum, and the changes of direction of the materials in passing from the skip to the bell are made as easy as possible. The charger can be used with an ordinary furnace barrow, avoiding the dumping into a skip, or the coke oven skip may be used, and thus one fruitful source of breakage in mechanical charging may be adopted as indicated in this slide (Fig. 21), where the movement of the chute is continuous instead of intermittent.

Let us now consider the question of gas escape. It has come to our notice that though means have been devised for this purpose, they have not always been successful, and we have therefore aimed at attaining a method at once simple and effective.

The means adopted by us consists of a ring encircling the chute, which, when lowered, engages with an arm on the door, and thereby closes it. The ring may be operated simultaneously with the lowering of the bell by attaching it to the bell lever as here shown (Fig. 22), or by means of a separate cylinder actuated by fluid pressure, an electric or otherwise driven winch,

or any other mechanical means. The use of the ring commends itself on account of its simplicity and positive action, irrespective of the position of the chute.

When the ring is worked by independent means the door may be closed before commencing to lower the bell. If, however, it is hung from the main bell lever, the bell travels a short distance before the door is closed. To minimize the escape of gas during this period, there is added to the lower edge of the hopper an extension or sleeve, which fits as closely as practicable to the bell. This retains the greater part of the charge on the bell till such time as the door of the chute is closed, and thus practically eliminates the escape of gas.

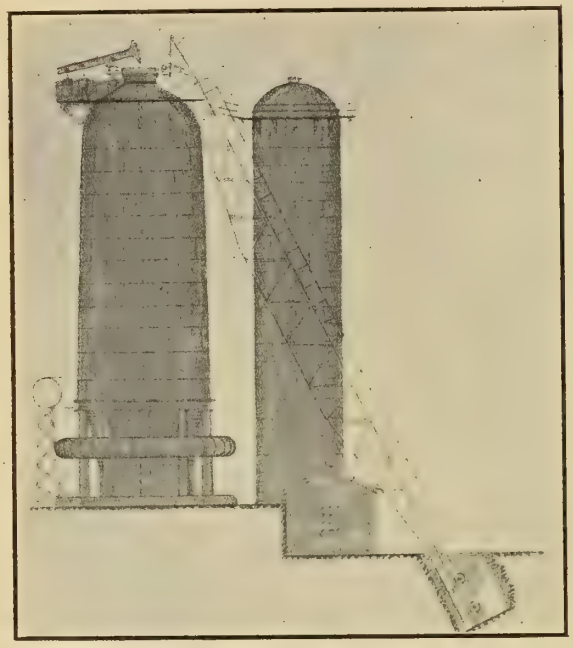


Fig. 24

If it should happen that a firm cannot see its way to make the outlay for an individual hoist for each furnace, but still wish to prevent gas escapes from the top while lowering, then the same type of top may be used without the hoist and automatic tip. This involves, of course, the use of barrows, but it is only necessary to wheel the barrow to the point nearest to the hoist, and the distribution may be effected by a crank handle worked by hand, or by mechanical means, the arrangement of the top for this purpose being shewn on the slide now before you. (Fig. 23.)

The simplicity of the whole design, the low height, the small amount of gearing, and this kept below the hopper lever, the consequently comparative low first cost and upkeep charges, do not require any words to commend them, as a look at the general view now shown, (Fig. 24), makes them apparent to the sight, and this can be confirmed by a study of the model.

We have now laid before you our views on the subject of mechanical charging, and we have endeavoured to make an impartial review of the chargers in use hitherto, none of which completely fulfils the conditions we have formulated, and we have placed before you a design of a charger, which, while we do not say it is the last word on the subject, appears to us to come closer than any other to that ideal charger which every furnace manager wants, that will keep his furnace working with steady regularity, cheaply and efficiently, and by putting a limit upon the vagaries of the blast furnace, will reduce the worries of that sometimes much harassed man, the furnace manager.

SOUTHERN PART OF LUNENBURG COUNTY, NOVA SCOTIA.

By E. R. Faribault.

(From Summary Report of the Geological Survey.)

Introduction.

During the past season, the writer was occupied in completing the geological and topographical mapping of the southern part of Lunenburg County, along the Atlantic Coast southwesterly from Mahone Bay to Volger Cove, and extending inland to Bridgewater. This completes the surveys and other field work necessary to finish the Malone Bay sheet, No. 88, and the Lunenburg, No. 89.

The assistants in the field were Messrs. J. McG. Cruickshank and M. Y. Williams.

For the purpose, particularly, of indicating the lines which prospecting should follow in the district, as well as to facilitate the work of operating mines, attention was given, in an especial degree, to the structural geology; since it has been established that the gold-bearing veins occur, almost exclusively, along anticlinal folds. The development in the rocks of a strong, slaty cleavage, obscuring the bedding planes, and the widespread drift cover, concealing the surface, made the accurate location of the various anticlines and synclines both difficult and tedious.

Character of District.

The district surveyed is for the most part covered by low, undulating hills of glacial drift, seldom over 300 or 400 feet high, having a general north and south trend and forming prominent headlands along the sea coast. The intervals between the hills are generally occupied by swampy land and chains of small lakes; or by rocky barrens affording good rock exposures; or they are strewn with granite boulders and debris from the north.

Lahave River crosses the area in a southeasterly direction, and occupies a marked depression; which is continued as an inlet of the sea, less than a mile wide, for 12 miles to Bridgewater; affording good navigation for large and small vessels. Petite Riviére, a stream of less importance, runs into the sea six miles farther west, and has several waterfalls along its course that are partly utilized for small mills.

Lunenburg and Bridgewater, the two chief towns of Lunenburg County, are situated in the area examined. Lunenburg, the most important fishing station in the province, has an excellent harbour, and has a large trade with the West Indies. Bridgewater is a progressing railway and lumbering centre at the head of navigation on Lahave River. Settlements of fishermen are scattered along the sea-shore of the mainland and islands; especially on many small, rocky coves and inlets which afford good shelter for boats.

In the vicinity of the coast there is little land suitable for agriculture. Small farms and gardens are successfully cultivated by the use of an abundant supply of fish refuse and seaweeds as fertilizers. Inland, between Bridgewater and Mahone Bay, there are good farms and several fine orchards.

Geology.

With the exception of a few small patches of lower carboniferous limestone and gypsum on Second Peninsula, and some of the adjoining islands, the whole area is occupied by the series. No rock exposure could be found on Second Peninsula, because of a heavy covering of glacial drift; but numerous angular blocks of shell limestone and grey compact limestone were observed at several places along the north shore, from the Government wharf to Bluff head, also on the north and south side of Mason Island lying between the two peninsulas. These deposits indicate the position of the outer edge of the lower carboniferous basin of Mahone Bay and St. Margaret Bay referred to in the Summary Report for 1907, page 79.

Several specimens of invertebrate fossils, obtained in 1907 and 1908 from various localities in the Mahone Bay basin, were examined by Mr. Lambe, who reports that they consist of one species of coral and two species of brachiopods; all characteristic of the lower carboniferous limestone. The respective species, together with the localities from which they were obtained, and Mr. Lawrence M. Lambe's descriptions, are as follows:

(1) Lithostrotion Cœspitosum, Martin.—Specimens from Sheep Island, Goat Island, and the south end of Stephen Island, in Mahone Bay. These specimens are of interest, as the species has not hitherto been recorded from this side of the Atlantic. L. cœspitosum was originally described from the carboniferous limestone of England.

(2) Dielasma Sacculus, Martin.—Half a dozen specimens, from Mahone Bay, belong to this species, which was primarily described under the name of Terebratula sacculus, also from the lower carboniferous of England, and was later recorded as occurring in rocks of the same general horizon by Sir J. William Dawson (see Acadian Geology) at a number of localities in Nova Scotia.

(3) Productus Cora, D'Orbigny.—Specimens of a large Productus from Goat Island, Sheep Island, south end of Stephen Island, Seaboyer's on the south side of Deep Cove, and north shore of Second Peninsula. The species represented appears to be an unusually large form of P. Cora, d'Orbigny, which is found abundantly, but of smaller size, in the carboniferous limestone of Nova Scotia, and is widely distributed in the carboniferous of Europe as well as America.

Gold-bearing Series.

Practically the whole of the district examined, with the exception of the small areas of lower carboniferous limestone and gypsum on Second Peninsula, is underlain by the quartzites and slates of the gold-bearing series. In the absence of fossils or other conclusive evidence, this great series of rocks has been referred to the lower Cambrian, though, possibly, it may be Pre-Cambrian.

The whole series falls naturally into two distinct lithological divisions: a lower one, called the Goldenville quartzite; and an upper one, called the Halifax slate.

The Goldenville division is mostly composed of thick-bedded, bluish and greenish grey quartzite, locally called "whin," interstratified with numerous beds of slates of different varieties and colours, and from a fraction of a foot to several feet in thickness. This division constitutes the productive gold-bearing rocks of the province.

The Halifax division is made up of argillaceous slates, generally of a dark grey colour, in many places graphitic and pyritous, and varying to greenish-grey or light grey in colour. Some beds are quite arenaceous with occasional thin layers of flinty, quartzose rock, generally heavily charged with iron pyrites.

The rocks of the Goldbearing series in the region examined have been forced into a succession of parallel folds, running northeasterly and southwesterly.

The greatest width of the area of the Goldbearing series in the district examined, measured at right angles to the folding, is 16 miles. A transverse section along a line from Bridgewater to West Ironbound Island gives eight major anticlines and seven synclines, with a few minor folds. The courses of the axes of folding were all located and traced across the area surveyed.

The following list of anticlines and synclines, gives the order in which they occur along Lahave River from West Ironbound Island to Bridgewater, together with the gold mines situated along the anticlines:

Moser Island anticline.
1. Spectacle Island syncline.
Dublin Shore anticline. The Ovens gold mines.
2. South Parks Cove syncline.
Park Creek anticline.
3. North Parks Cove syncline.
Pentz Section anticline. Indian Path mine and Somerset gold discovery.
4. Middle Lahave syncline.
Wentzel Lake anticline.
5. Pleasantville syncline.
Juniper Brook anticline.
6. Upper Lahave syncline.
Conquerall Bank anticline. Dares Lake gold discovery .
7. Dayspring syncline.
Bridgewater anticline. Leipsigate and Blockhouse gold mines.

As already stated, the greater part of the area is occupied by the Halifax slate division. The Goldenville quartzite is brought up to the surface only in the southwestern part of the Lunenburg sheet, where the Dublin shore anticline and the Pentz Section anticline have a pronounced pitch to the eastward, forming two prominent, broad domes of quartzite extending southwesterly beyond the limits of the area examined.

The southern dome of quartzite begins on the seashore half a mile east of West Dublin post-office, spreads out in a broad circle and extends southwesterly on both limbs of the Dublin Shore anticline, including Green Bay with the inner part of Cape Lahave Island on the south, and the mouth of Petite Riviére and the head of Broad Cove on the north.

The northern dome of quartzite begins 3 miles to the northwest of the southern one, on the eastern side of Petite Riviére, 1 mile east of Crouse Town post-office, where it circles around Brown Lake on the eastern pitch of the Pentz Section anticline; the south limb extends southwesterly toward Volger Cove, and the north limb westerly toward County Line station on the Halifax & Southwestern Railway.

On these two domes the interstratified slates, at certain horizons, are in much greater volume than the quartzites, especially near the top of the division, where they attain a great thickness. The line of demarcation between the two divisions is thus not nearly so well de-

fined in this district as it is in the eastern part of the province, the passage from quartzites to slates being more gradual.

Igneous Rocks.

The only igneous rocks observed were four dioritic dikes on the Ovens Peninsula. The dikes are well exposed on both the east and west side of the peninsula, at a distance of a quarter of a mile south of the Ovens gold mine, and immediately south of the old mill of the Acadia Gold Reduction Company, still standing on the eastern shore of the point. All four occur within a distance of 250 feet; they vary in width from 3 to 9 feet, and are generally conformable in strike and dip with the stratification of the slates, though in many cases, they distinctly cut across them. The only other instance of a basic eruptive occurring in the Goldbearing rocks along the coast is at Tangier, where a dike cuts across the sediments at right angles to their strike. In the Gaspereau Valley and its vicinity many similar dikes have also been observed intruding both the Goldbearing series and the Silurian.

Glaciation.

The entire area must have been covered with moving ice at the time of the glacial period. The general course of the ice, as indicated by striæ, was toward the south and southeast, conforming to the directions of the valleys of Lahave, Petite Riviére, and other main streams, and to the general trend of the hills. Glacial drift, largely made up of till, with granitic boulders, and of debris transported from South Mountain, covers most of the hills. Debris of amygdaloidal traps and other characteristic basic eruptives from North Mountain on the Bay of Fundy coast, was also observed at many places, showing that at some period, at least, the ice field moved across the whole province.

Economic Geology.

Gold.

The slates of the Halifax division of the Goldbearing rocks are generally considered by the miners to be much less likely to bear auriferous veins than the quartzites and slates of the Goldenville division, because, so far, no important mine has been located on them anywhere within the province; except at Caribou. Rich veins have been found in them, but these were generally small and irregular, and without the uniformity and extent of those occurring in slate belts lying between rigid walls of quartzite. It may be remarked, however, that in the eastern part of the province, on account of the deep glacial erosion, the slates of the upper division seldom occur along the anticlines, and much less often on the domes which are the only favourable places for the formation of gold-bearing veins.

In the region under study, every one of the eight anticlines occurs in the slate of the Halifax division, and only two of them have brought the quartzites to the surface, namely, the Dublin Shore and the Pentz Section, where these rocks occur at the southwestern end of the anticline. The Dublin Shore anticline passes through the "Ovens" gold district, and the Pentz Section anticline passes through the Indian Path gold district and the Somerset gold discovery. Special detailed surveys have been made of the gold mining districts of the Ovens and Indian Path, but a report on the structure of these districts must be deferred until all the surveys are plotted and compiled.

Somerset Gold Discovery.—On May 20th, 1905, rich "float" gold quartz was discovered by Nathaniel Slaughenwhite of Italy Cross, at Somerset, on the west side of Petite Riviére, one mile south of A. Slaughenwhite's house, at the south end of Beach hill. The quartz is dark, ribboned, and striated, indicating that it came from an interbedded vein having a thickness of about 10 inches. During the following two summers a surface pit was sunk 63 feet north of the first discovery through 26 feet of drift to the bed-rock, and a tunnel was driven north for 57 feet, on the bed-rock. No float of the rich ribboned quartz was found in this exploratory work. This may have been due to the fact that the discovery is situated on the eastern pitch of a broad anticlinal dome of quartzite and slate, where the veins, conforming to the stratification, have a general north and south directon. East-west, or at right angles to the probable direction of the vein, should, therefore, be the more promising direction for exploratory tunnelling .

The same rule should be applied in prospecting at the Augustus Reinhardt discovery of rich gold float, similarly situated on the same anticlinal dome, about one mile west of the Slaughenwhite discovery.

Iron Ore.

Some of the dark, rusty-weathering slates of the Halifax division are heavily charged with iron pyrites, generally occurring in small cubes distributed through the rock, or in massive form along the bedding planes. From the decomposition of these slates have originated deposits of bog iron ore found in various low, swampy places, along rivers, and about lakes. Several such deposits were observed, notably along both banks of Lahave River, and on the hill extending to the north of Kingsbury to Rose Point. It is doubtful if any of these deposits are of sufficient extent and depth to be of commercial value, but they might be worth investigating as they are nearly all situated within easy reach of good shipping points.

Limestone and Gypsum.

The presence of limestone on Second Peninsula appears to have been generally overlooked by the present inhabitants, though it was certainly known to the earlier French settlers, who had a limekiln on Limestone Hill, opposite the Government wharf, and one on Goreham point, once thickly settled by the French.

Gypsum was not observed anywhere, but several large funnel-shaped "sink-holes" were located on the Second Peninsula, on the farms of John Young, George Acker, and Freeman Berringer, testifying to the occurrence of deposits under the heavy drift covering. As these deposits of limestone and gypsum are quite close to the Government wharf, where good shipping facilities are available, they may prove of commercial value.

Clay.

Extensive deposits of alluvial clay occur at many places along the low, swampy intervales, and glacial clay, largely made up of granite debris, is abundant on many hills. Samples of some of the more promising clays were collected for examination as to their value for brick making.

A brick-yard was in operation about 65 years ago near Lunenburg, at the Saltpit wharf on the south shore of Back harbour. It is reported that bricks were also made by the early French settlers on Brick Hill, situated on Goreham point on Second Peninsula.

Archaeology.

Indian implements, including arrow-heads and spear-heads, flint, and pieces of earthenware, have been found on Backman beach on the north side of Second Peninsula, and at other places along this part of the coast. Specimens of these are on exhibition in a small museum in the town hall at Bridgewater, and in the archæological collection of the provincial museum at Halifax.

RAMBLER-CARIBOO MINE, SLOCAN, B. C.

BY E. JACOBS.

In the course of a recent trip through the Slocan district of British Columbia, I visited the Rambler-Cariboo mine, among others. As reports of discoveries of ore in that mine during the last few months have renewed interest in it, the following information relative to the property is contributed:

The Rambler-Cariboo group embraces five mineral claims, having a total area of 175 acres, situated in McGuigan Basin, Slocan mining division, West Kootenay, and distant from the Kaslo & Slocan Railway about three miles by wagon road. It is owned by a company incorporated on July 31st, 1899, as the Rambler-Cariboo Mines, Limited, with British Columbia office in Kaslo. Mr. W. E. Zwicky is general manager.

Prior to 1904 development work consisted chiefly of a shaft with levels opened from it. This shaft was sunk 500 feet from what is known as the 300-foot level, the original workings, down to 300 feet, having been adits in the mountain-side above it. Levels were opened from the shaft at each 100 feet down to what is known as the 800-foot level, below which it was found to be impracticable to work the mine with the power plant with which it was then equipped, for in the spring of each year pumping especially would have been too heavy for the available power. By that time much ore had been extracted, and from the profits earned, $230,000 had been paid to stockholders as dividends.

At the beginning of 1904 the directors found themselves in this position—they had to choose between buying and putting in a larger power plant, with its necessary increased cost of pumping and hoisting; driving a long adit to cut the vein at greater depth and thus provide for the drainage of the mine at little or no cost after the vein should have been intersected by such deep level working, and, too, keep the hoisting costs down; or abandoning the mine. Another important consideration was the altitude of the surface works—concentrating mill, mine buildings, etc. — which was about 6,000 feet above sea-level, and in a place where snow-slides were troublesome every spring.

Mr. Zwicky strongly recommended the driving of a deep-level adit. At first this proposal did not meet with favour, for it involved a large expenditure of money, and the work, while it would take a comparatively long time to carry out, would not bring in any revenue until after its completion and the mine had been opened at levels below the old workings. Eventually the directors recognized the wisdom of adopting their general manager's recommendation, and financial arrangements were made to carry out his plans. My recollection is that $75,000 had to be provided for the work, but whatever the amount, the money was found and the work proceeded with. This was the most important deep-level work that had been undertaken in the Slocan, and it was known that if success should result, other mines would be opened in a similar way.

The work of driving the adit was commenced on July 9th, 1904; it was completed on April 16th, 1906. The portal is at a level 1,450 feet below the highest point at which the vein had been opened, and 2,400 feet lower than the apex outcrop on the summit of the mountain; it is 650 feet lower than the 8th or former bottom level of the mine. At 4,523 feet from the portal, driving the adit was discontinued. Allowance having been made for running off water, the depth at the face of the adit is 1,425 feet below the highest point at which the vein had been opened. I have stood at the breast of the adit and from there seen daylight at the portal, distant nearly seven-eights of a mile. The excellence of the engineering and workmanship in driving this adit, which is 7 feet by 7 feet 6 inches in the clear, was therefore plainly evident.

Writing of conditions as he found them about the close of 1907, Mr. Robert R. Hedley, in his description for the Dominion Department of Mines' Report on the Mining and Metallurgical Industries of Canada, 1907-1908, observed: "The manager of the Rambler-Cariboo mines states that owing to some disturbance or fault at or about the point to which the vein had been projected on this level, the vein was not found, though the tunnel was driven for some 90 feet beyond. He consequently concluded to cut the vein at the nearest possible point under the main shaft. A diagonal drift was then run, and from this drift a raise made to the upper workings. In 200 feet of raise the 1,250-foot level was reached, and a cross-cut started, which, after being driven 47 feet, cut the vein. It was there 8 feet wide and showed several streaks of clean galena. Raising was continued, and some driving done at the 1,150-foot level. Stations were established at the 9 and 10 levels. Some stoping was then undertaken in the upper levels, and the work of connecting the tunnel by a suitable shaft proceeded with. The requisite equipment of the portal was installed, and suitable cottages, bunk-houses, etc., for the new camp near the mouth of the tunnel, were erected."

When in the Slocan last January I was informed that the 900, 1,000 and 1,100 levels had been opened, and ore had been found in several places down to the 10th level. The ore was silver-lead, with but little zinc. Here it may be mentioned that during the period from 1893 to 1906, inclusive, shipments of ore from the mine aggregated about 14,500 tons, having average metal contents as follows: Lead, 37 per cent.; zinc, 14 per cent.; silver, 127 ounces per ton. The output in 1909 was in excess of 1,000 tons of a somewhat lower grade than the average above stated, yet sufficiently high to pay mining costs and, as well, provide enough money for cost of the exploration included in the 1,200 to 1,300 feet of development work done in that year. Latterly production has been maintained at the rate of about 100 tons per month, and it is well known that recent discoveries of ore have been such that a larger output could be regularly made without difficulty were it considered advisable to increase production at this time, when prices of silver and lead continue comparatively low.

The ordinary annual meeting of stockholders in the Rambler-Cariboo Mines, Limited, was held in Kaslo on June 14th, but little, if any, publicity was given to the proceedings thereat. One of the directors, however, was reported to have made the following statements at Nelson to a press representative:

"The new ore shoot has been opened on three levels —the 700, 800 and 900; these have been connected by a raise in ore all the way. On the 700-foot level the ore-shoot has been opened for a length of 40 feet; it has an average width of two feet of solid galena. On the 800-foot level the ore-body is 82 feet long, and the vein varies in width up to 18 feet. The 900-foot level has been in ore for more than 90 feet; the vein ranges in width from 8 to 12 feet, and an estimate shows 18

inches of clean shipping ore. This ore shoot is entirely distinct from any other heretofore found or worked in the mine, being a long way to the south of the old workings. It contains native silver, which had not previously been found in the mine. A general average of the ore thus far developed gives a value of 65 per cent. lead and 174 ounces silver per ton. Practically all the ore is of excellent grade, but there is some concentrating ore on all three levels, especially on the 800-foot. We have still about 150 feet to drive on the 1,000-foot level to reach the ore shoot; when that shall have been done we shall raise in it to the 900-foot level. After that work shall have been accomplished, two still lower levels will be driven to find the ore shoot at greater depth. Meanwhile stopes are being opened above the 900-foot level, and then production will be increased. The last round of drill-holes on the 900-foot level fired while we were at the mine broke down nearly a carload of ore.

"Lessees are now working the company's concentrating mill on the dumps from the old workings, and from this source there will be shipments of concentrates made, in addition to the ore from the lower levels. We are now employing 35 men at the mine."

To the foregoing it may be added that before any considerable increase in output shall be regularly made more development work will be done, so that later a proportionately larger tonnage can be produced. It is characteristic of Mr. Zwicky that he keeps his development work well ahead of his ore-stoping, which policy has proved a prudent one.

There is no doubt the Rambler-Cariboo is now in better condition to return substantial profits above ordinary operating costs than at any other time for years. The successful outcome of the enterprise planned six years ago by Mr. Zwicky, whose wise foresight was not at that time generally recognized, is of much moment to the Slocan district as a whole; indeed, this has been proved by the subsequent action of other mine-owners, for at least two other deep-level developments have been carried out, one with success and the second with good prospects of also justifying the enterprise with which it has been undertaken. Recognition of the pluck of the directors of the Rambler-Cariboo Company, themselves large stockholders, in financing what at first seemed a somewhat hazardous as well as costly undertaking, is also merited. They had full confidence though in their manager's skill and good judgment, and the sequel has proved that it was well grounded.

DIAMOND DRILLING IN NOVA SCOTIA.

Written for THE CANADIAN MINING JOURNAL.

The government of Nova Scotia has for some years encouraged diamond-drill prospecting by keeping a number of drills in commission for bona-fide prospectors. Last year, or, rather, during the twelve months ending September 30th, 1909, eight drills were operated.

Four of these were diamond steam drills, three were Calyx steam drills, and the remaining two were hand drills, diamond and Calyx respectively. The core dimensions ranged 15/16-inch to 7 inches, the latter being the diameter of the core drilled by a Calyx steam drill. The range in depth is from 400 feet up to 3000 feet.

In the twelve months mentioned above, the total number of holes put down was 14, their combined depth being 5,577 feet. More than half of this footage was done by diamond drills, which have 3,378 feet to their credit, leaving 2,198 feet put down by Calyx drills.

No. 8 drill, a light steam diamond drill with a capacity of 1,500 feet, was purchased and operated during the year. It has the latest type of hydraulic feed, and produces a two-inch core.

The total expenditure during the year for maintenance of drills, store-house, repairs, wages, etc., including the purchase of No. 8 drill, was only $6,012.55. Since the year 1899, when the government purchased the first drill, the total expenditure has amounted to $71,385.47.

No holes were lost during the year. The average cost per foot for all boring was $1.405. The average cost per foot for boring by diamond drills was $0.79; by Calyx drills, $2.166. The carbon-cost per foot for boring by diamond drills was $0.037; while the shot-cost for Calyx drills was $0.055.

The following comparison of costs is useful:

	1908.	1909.
Cost per foot for all boring	$1.06	$1.405
Cost per foot for all boring by diamond drills	0.845	0.79
Cost per foot for all boring by Calyx drills	1.34	2.166
Shot-cost per foot for all boring by Calyx drills	0.056	0.055
Carbon-cost per foot for all boring by diamond drills	0.077	0.037

Drill No. 1 was employed from September 28th, 1908, to November 17th, 1908, putting down a hole for the Nova Scotia Steel & Coal Company, near New Glasgow. No. 1 is a 6-inch core, steam Calyx. The mineral sought was coal. The total depth of the hole was 361 feet 3 inches. Shales and sandstones, the former often very hard, alternated irregularly. Fireclay was encountered at 177 feet. The total cost of this hole was $647.54, or $1.80 per foot, made up as follows:

Labour	$277.18
Management	170.82
Fuel	147.50
Light ,oil, waste, etc.	5.13
Shot	6.75
Lumber	16.66
Casing-pit	14.00
Shot-bits	7.50
Gravel	2.00
Total	$647.54

The average rate of boring was 0.7 of one foot per hour. The fastest rate of boring was 5 feet 10 inches in one hour. Double shift was worked.

Drill No. 2, a steam diamond drill producing a 15/16-inch core, capacity 850 feet, operated from September 26th, 1908, to October 15th, 1908, in No. 1 Allan shaft of the Acadia Coal Company, Pictou County. The mineral sought was coal.

Banded gray shales and dark gray shales with bands of hard brown ironstone were encountered. A total depth of 318 feet 9 inches was reached. The hole cost $189.21 or $0.595 per foot. The average rate of boring was one foot per hour. The fastest rate of boring was 4 feet 4 inches in one hour. Another hole put down by the same drill in the same locality cost $109.70 for 191 feet, or $0.574 per foot. This hole was stopped in 14 feet of coal. In one other hole sunk by a hand diamond drill, a considerable amount of conglomerate was cut. In this instance the cost per foot went up to $1.38.

Drill No. 6, a 6-inch core steam Calyx, sunk a hole at River Inhabitants. The total depth was 851 feet 6 inches. Boring double shift, the average rate of pro-

gress was 0.4 foot per hour. The fastest rate of boring was 11 feet 5 inches in one and one-half hours. The total cost was $2,832.23, or $3.33 per foot. Coal was the mineral sought. Blue and black shales, and hard gray sandstones made up the strata drilled.

Drill No. 8, a two-inch core diamond drill, 1,500 feet capacity, sunk a hole 710 feet on the property of the Intercolonial Coal Company, Stellarton. The average rate of boring was 2 feet per hour. The fastest rate was 3 feet 8 inches in one hour. The total cost was $643.87, or $0.906 per foot.

The department supplies and maintains drills. Applicant pays all operating expenses, including freight.

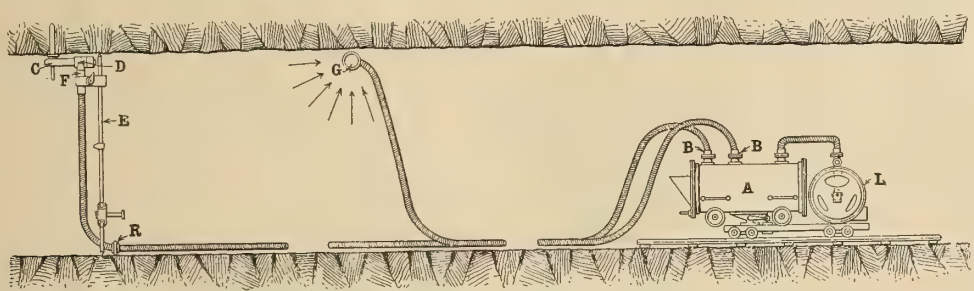
WEAR ON FILTER LEAVES.

When transferring vacuum filter leaves into the wash tanks the heaviest wear is at the corners, which scrape on the sides of the tanks. As soon as the canvas is worn through the leaves become useless. To avoid this heavy canvas patches should be sewed over the corners. This will considerably prolong the life of the leaves.

ELECTRO-PNEUMATIC APPARATUS FOR REMOVAL OF DUST IN MINES.

By Frank C. Perkins.

The accompanying drawing shows the construction of an English design electric fan apparatus for the removal of dust in mines and indicates its method of operation. The use of percussion rock drills on hard stones in mining has the disadvantage that the miners in charge of the drills are obliged to inhale the fine particles of rock giving rise in some instances to a disease known as "Miners' Phthisis." The electric-driven apparatus noted in the drawing has been successfully used to overcome this difficulty and remove the dust which caused the trouble by utilizing a small cylindrical tank indicated at A, this being partially filled with water and chemical absorption agents if required.



This apparatus mounted on a truck has two or more branches, BB, to which rubber hose are coupled by means of patent rapid couplings; at the end of one hose is fixed a light aluminium sucker C, which fits around the drill hole, and is held in position by an adjustable arm, D, and stretcher bar E, which are made very light and portable, and of very easy adjustment; into the second hose is fixed an arrangement for clearing the gases produced by blasting. Into the sucker the dust and small particles of rock, as they are ejected by the action of the drill, are drawn by powerful air suction, the heavier particles being caught in a separator to trap at F, and in another at R, from which they can be conveniently removed, the dust-laden air being conveyed through the hose into the tank A. The attachment for use in clearing the fumes created by blasting, consists of a slotted pipe shown at G, which can be rapidly fitted across the drive, into which the noxious air and dust are quickly drawn and passed away to the tank, the atmosphere being thus very rapidly cleared.

It will be noted that the tank, with its motor and fan, is carried on a carriage running on rails. Partitions are fixed inside the tank, carrying on their lower ends hinged flaps pierced with holes. The dust-laden air enters the tank through the branches, BB, and by reason of the partitions is compelled to pass through the water on its way to the outlet branch, thus leaving behind it all dust and impurities. It flows through the fan and is discharged as pure air. The fan is of the small compound centrifugal type, driven by an electric motor.

The whole apparatus is compact and portable, the tank itself being provided with wheels, so that it can be lifted off the carriage by means of handles, placed on the rails, and moved to any convenient place for filling or emptying.

The Portland cement output of Canada during 1909 was 2,303,263 barrels.

According to statistics published by the Mines Branch, Ottawa, the value of gold won from the placer deposits of the Saskatchewan River (the only gold with which Alberta is officially credited) totalled $299,458 during the period 1887-1908, inclusive. During the three years 1895, 1896, and 1897, the annual outputs were respectively $50,000, $55,000, and $50,000. The output for 1908 was $1,037.

ELECTROLYTIC COPPER REFINING AND SMELTING IN AUSTRALIA.

Electrolytic copper refining and smelting plants are at work in Australia at the Great Cobar mine, and at Port Kembla in New South Wales. The latter plant is largely owned by the Mount Morgan mine. The multiple system is employed at both plants, and at Port Kembla double tanks are used, and an adaptation of the three-wire system is employed. At the Port Kembla works during 1909 some 5,850 tons of electrolytic copper, valued at £350,000, and bullion to the value of £124,000, were produced. Most of the blister copper treated came from the Mount Morgan mine. In former years the Mount Morgan's blister copper was electrolytically treated in America, but local treatment means a great saving in time and expense. It is surprising that the Mount Lyell mine does not send its blister copper to the local companies instead of continuing to send it to America. Probably a long contract stands in the way. As so much more of the red metal is produced in the United States of America than is consumed, to continue to send Australian copper there is like sending coals to Newcastle.

NOTES ON RECENT DEVELOPMENTS IN ASBESTOS MINING IN QUEBEC.

By W. J. Woolsey, Thetford Mines, Que.

(Abstract from the Journal of the Canadian Mining Institute.

It is generally conceded that the asbestos industry is now better established than ever before, and with stable conditions of trade must, in the near future, greatly increase in volume. Financiers have shown more than ordinary confidence in asbestos mining, and the various propositions offering have been accepted only too readily, especially if vouched for by competent authorities. Some have very severely deprecated, with justice in some cases, this recent great optimism prevailing in regard to asbestos. On the other hand, however, it must be recognized that asbestos is coming into much more general use. The increased demand, therefore, coupled with the adequacy and eminent suitability of most of the Quebec mineral, seems a sufficient reply to any who may be unduly pessimistic.

The present prices for the various grades of asbestos are from five to fifteen per cent. lower than in 1907 and accordingly shipments have been less than in that year. The outlook for the coming year is for increased shipments and a gradual improvement in prices.

The decision on the part of the operators in the Black Lake and Thetford districts to establish an Asbestos Bureau to keep the public advised of any new uses for asbestos, and the development of asbestos properties the world over, should afford the very greatest assistance in the industry.

Geological Features.

The geology of the asbestos area has lately received considerable attention from the Canadian Department of Mines, and an effort is being made to work out fully the important features as rapidly as possible. During the past thirty years many papers have been presented, and many theories advanced to explain the peculiarities observed in the district, having reference more especially to the questions of the true origin of the serpentines, the contrast between the growth of the chrysotile deposits throughout the world, and the origin and manner of growth of these fibres. Thus, valuable data bearing on these problems have been presented by Ells (a), Merrill (b), Low (c), Cirkel (d) and Dresser (e). The serpentines of the district are conceded to be of igneous origin, derived principally from rock of the peridotite class, though there are frequent instances where pyroxene appears to have been an important original mineral. The formation of the chrysotile veins has been discussed by Merrill (b), who states, "Cavities are due to shrinkage and the vein filling to processes of crystallization, extending from either wall inward." The subject is also well treated by Low (c), who states that "The cracks were probably formed by shrinkage of the mass. . . . The asbestos appears to the writer to have been deposited in the cracks under great pressure from superheated waters . . . . masses and dykes have been intruded into the serpentines, and these probably account for the necessary pressure and heated waters to form the asbestos there."

A good opportunity for studying the relations of some of the rocks containing and associated with the asbestos deposits may be found on the property of the Robertson Asbestos Mining Company, on Lot 16, Range IV, of the Township of Thetford. Here the surface outcrop measures 1,400 feet along the strike, northeast, by 600 feet in width, and consists of serpentine and a greenstone, probably diabase. The rocks lie between two beds of sedimentary rock, and all dip to the southeast at an angle of about 50 degrees. Both contacts are well marked, an interesting feature of the upper one being those fragments of the sedimentary found in the igneous rocks.

Another significant feature is that the serpentine is found along the lower or foot-wall side, while the diabase, which is a lighter rock, is near the hanging or upper wall.

Following out these observations, the purest serpentine should be found along the footwall. The writer has kept careful watch for change in the amount of asbestos, but has not found any noteworthy change towards either wall, in the amount of asbestos contained in the serpentine. The crystallization of serpentine to form chrysotile seems to be affected by other agencies than the quality of the serpentine alone. These might be pressure, heat or intrusion of dykes.

Mining Methods.

The use of cable ways is very general throughout the district. This method has been much criticised, but has, nevertheless, proved very efficient in removing material from the pits. To it may also be largely ascribed the fact that the cost of mining has been maintained at the low rate of between twenty and thirty-five cents per ton of rock delivered and loaded on the cars. The variance in costs referred to is dependent on the extent of crushing and separation of rock material in the pits. All the mines are very completely equipped. This equipment usually comprises an air compressing plant and cable ways, provided with steam, air or electric hoists. In general, electric power is in use. It is especially well adapted, when continuous service can be maintained, for the operation of the mills, as well as for mine plant. It has also been successfully applied in the operation of drills, although an electric drill has yet to be devised in which the drawback of abnormal wear of certain parts shall be overcome.

Underground mining, although successfully carried on by Bell's Asbestos Company for the past four years has not been adopted at other mines by reason of the increased cost. It is, meanwhile, interesting to note that the Bell's Asbestos Company is now installing a steam shovel plant. Mining by this method promises to be effective in the case of large holdings. A level bottom, of course, is desirable.

Milling Methods.

The question of efficiency of milling plant is one of paramount importance to those engaged in the production of asbestos fibre; but there is great divergence of

(a) Bulletin on Asbestos, 1903, Geological Survey of Canada.

(b) Mining World, 1905.

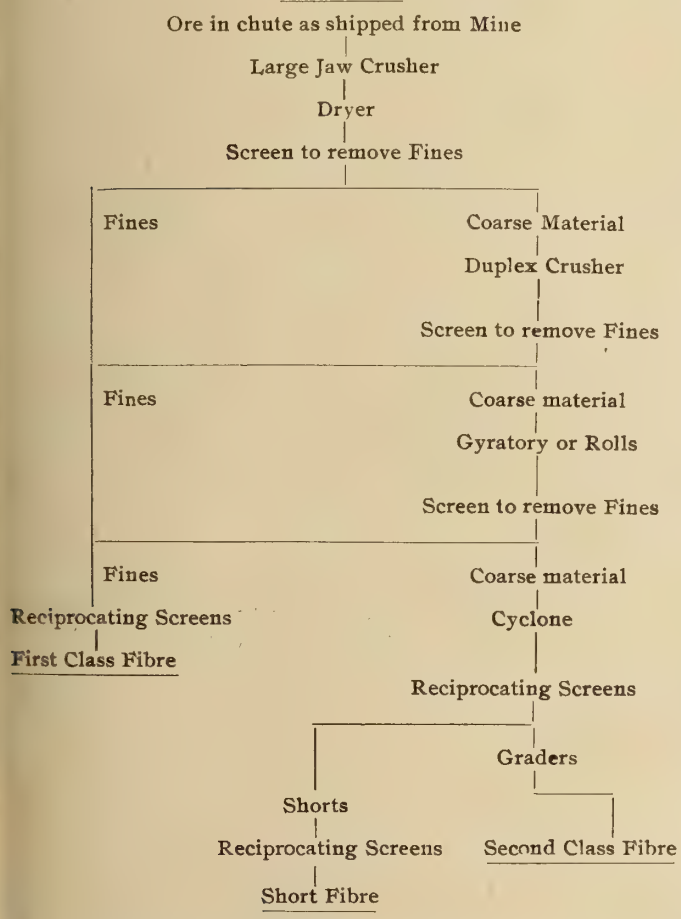
(c) Geological Survey of Canada, 1906.

(d) Asbestos, its Occurrence, Exploitation and Uses, 1905.

(e) Journal of the C.M.I., Part of Vol. XII.

opinion in the matter of mill design. There is, nevertheless, much truth in the contention that the processes necessary for producing the best results vary considerably according to the class of rock to be handled. In the opinion of the writer, however, much benefit would accrue if the designing of mill plants were standardised, so far as practicable, by the adoption in all plants of the several methods which experience has taught constitute the best practice. Thus, there are several mills in the district which possess distinctive and desirable features; but it is quite possible that none is in itself absolutely perfect in design. For example, rolls have proved very efficient, since they preserve the qualities of the fibre excellently well; at the same time these machines have not yet been installed in such a manner as to provide a maximum production in proportion to the cost per ton. Again, the cyclone has proved invaluable, considered from the point of view of large production and low cost, but in determining the most desirable class of mill, the question of preserving the more valuable qualities of the fibre must, of course, be considered, and in the writer's opinion only low-grade materials should go to the cyclone, the superior grades having been saved before this stage of milling shall have been reached. The accompanying flow sheet illustrates a mill design, which in the judgment of the writer would afford the best results in respect of efficiency and simplicity of operation.

FLOW SHEET
SHOWING ASBESTOS TREATMENT THROUGH MILL



A new machine has been designed by Edward Torrey and installed by the Asbestos & Asbestic Company, of Danville, Que., to overcome the difficulties met with in the old style cyclone. In the new machine the reduction of the ore is effected more directly by impact than by pulverization, which is the principle of the old style cyclone, where the beaters revolve in opposite directions. It is claimed for the Torrey cyclone that the injury to the fibres occasioned by the old style cyclone is largely overcome, and that the operation of the new machine is less costly.

ADDRESS BY F. H. SEXTON, DIRECTOR OF TECHNICAL EDUCATION, NOVA SCOTIA.

At the recent sessional closing of the Nova Scotia Technical College, Halifax, N.S., an address was read by Director F. H. Sexton. Part of this appears herewith. Mr. Sexton has accomplished much for the cause of modern and sane education in Nova Scotia:

"This is the first commencement day of the Nova Scotia Technical College—an event that is bound by the mere circumstance to be important in the educational annals of Nova Scotia. For this is the People's College, established by the people, maintained by the people and for the purpose of offering special opportunities to the children of the people. Its motto is "Science for the common weal" and it is to be dedicated to the advancement of science and industry. It stands primarily for applied science and its aim is to give the people that scientific knowledge which shall give them such power over nature that by industry their leisure and well-being may be advanced. This college will grow into an inspiration and bulwark of the highest industrial life of this province if its motto and dedication are adhered to, and to-day we stand at the first milestone.

"The mere presence of the college is fraught with import to the community in which we live. It is of great value to the ten or twelve thousand homes that constitute this community to have such an institution where their boys—or girls, either (applause)—can secure an engineering training of the highest order, for a mere trifle and still be at home. It means much to have a staff of experts in engineering who may be consulted on specific questions. It is important to have in the midst of a city, a college with well equipped scientific laboratories and libraries for the purpose of experimentation and research. It is also no mean advantage to the community to have placed within it a large imposing expensive building with ample lawns. The fact that students gather from other points in the province and spend eight months of every year, besides many hard-earned dollars, is no serious menace to the city. There are other advantages that I could enumerate if I had not already far trespassed into the confines of modesty. I honestly think that the people of this community do not give the educational institutions such as Dalhousie College, St. Mary's College and Technical College, and the many other ones with which the city is blessed, half the consideration and appreciation that they deserve.

"The college will also mean much to the industrial life of the whole province. It will turn out young men thoroughly trained to eventually become our captains of industry. These men will be the ones who will conserve our natural resources and turn the wastes of manufacture into dividends. It his been stated by a competent designer of power plants, that if the installations were all built on the most approved design, a saving could be made on the production of the average plant of ¼ cent. per H. P. hour. This would mean a saving of nearly $400,000 yearly in Nova Scotia alone. Somebody has figured out the true value of a trained engineer to the community and it is a fabulous amount over and above the amount it cost to educate him. Nova

Scotia shall train Nova Scotians to manage Nova Scotia industries and we shall not have to import trained men to occupy the least servile position. The college will also carry on industrial research as applied to the special needs existing in Nova Scotia, and will eventually be of the greatest service in developing the future industries of the province.

"It is interesting for us to note that the establishment and maintenance of this institution by the provincial legislature is in harmony with the growth of the state universities of the United States. Some of the universities are bidding fair to outstrip even the most ancient and honoured of the privately endowed institutions such as Harvard and Columbia, both in number and income. Universities like Wisconsin, Michigan and Minnesota, recently received grants of between one and two million dollars for a two-year period. People are also leaving large bequests to state universities at present, a practice that was not nearly so frequent in the early history of these institutions. It is to be hoped that some large-minded patriot will realize the sphere of usefulness that this technical college is striving to occupy and will assist in some handsome way the efforts to train men for a practical useful life, either as a captain or non-commissioned officer of industry. The state university idea has spread eastward during the past year and President Schurman, of Cornell University, whom we are all proud to acknowledge and honour, has secured a change in the charter looking toward state control, and, consequently, aid by state appropriations. Thus we see that the establishment of the Technical College by and for the people is in entire accord with the most significant movements of the times in university support and control.

"Again, it is interesting to see how the Technical College in its relation to the secondary schools under its direction has reached the same solution of an educational need as the most advanced policy of the University of Wisconsin, which has led the other colleges of the United States. The fact that correspondence schools as private corporations were so successful in giving practical instruction to men in different trades pointed to a great need for such instruction. The university, in striving to be of as much educational service to the state as possible, started a whole series of correspondence courses of its own. These were based on the soundest educational principles, and were not conducted on a money-making basis, as were the private correspondence schools. The success of these courses in Wisconsin startled even the men who had charge of them. It was found necessary after a short time for the greatest success of this work to hire local or travelling teachers to explain the correspondence work. In this way local classes and schools have been formed.

"In Nova Scotia it is estimated that a sum of $60,000 or $70,000 went out of the province every year for correspondence courses. This showed the great need that existed for secondary technical instruction. This need was met by the establishment of local technical evening schools for workingmen. These have been most successful, but it has been found that all the needs cannot be filled without establishing correspondence courses under the Technical College. Equal needs are ultimately satisfied with equal measures.

"In establishing secondary technical schools under the direction of a college, the University of Wisconsin and the Technical College were leaders in America. The tendency of most universities in Canada and the United States has been too conservative. They have consulted their own interests selfishly in their requirements for entrance. They have constantly raised these, as more and more was demanded of the college graduate in order to keep the course in college the same length. The high schools and academies have strained to make the graduation requirements the same as the entrance into college. This was to the great detriment of most of the students in the academies, because only a small percentage entered college at all. Thus the college was responsible for the fact that by far the largest portion of the pupils in the higher grades of the public schools were being trained to go to college instead of being trained primarily for actual life.

"I think it was the agricultural college which set the example of greatest educational service to the people whom it was intended to serve. They were the first who went to the people to find out exactly what was needed and then to try to make every effort to supply the needs. They were the pioneers who took the education right to the door of the man who should have it. Their methods of travelling dairies, lectures from the rear ends of trains, and many more organized efforts were looked on askance by other more conservative faculties of the university. Now that the state universities have taken the cue from the agricultural colleges it is possible that we shall see the application of the principle of carrying the higher and more special kinds of training to the whole people. We shall also see the university guiding and inspiring the whole work instead of autocratically dominating it for the special ends of the University. It is right that the highest end and aim of the university should be the same as that of the leader and followers in the Christian church service."

ORE PRODUCTION IN BRITISH COLUMBIA.

The total quantity of ore produced in British Columbia in 1909 was 2,057,000 tons. This includes ore put through stamp and concentrating mills as well as that smelted. It is not practicable at this time, when returns available for the purpose are necessarily incomplete, to judge how the figures for the half year just closed compare with those of the last calendar year, and even an estimate would be little more than a guess so far as the production of mines in Ainsworth, Slocan and the Coast district are concerned. Yet it is practicable to make a fairly reliable comparison of the tonnage of ore produced by mines in two or three of the more important camps in the first half of 1909 and 1910, respectively, and since this will serve to indicate in a general way that progress has been made this year, it will be done.

Taking first the larger mines of the Boundary district, which produced about 70 per cent. of the total tonnage of ore mined in the province last year, the following approximate figures are shown:

Mines.	Tons. To June 30, 1909.	Tons. To June 30, 1910.
Granby Company's	478,000	625,000
B. C. Copper Company's.....	139,000	170,000
Snowshoe	60,000	85,000
Totals	677,000	880,000

The figures for the first half of 1908 were: Granby, Company, 533,000 tons; B. C. Copper Company, 50,000; Dominion Copper Company, 2,000; total 585,000 tons. It should be noted that the B.C. Copper Company's mines were closed for several months in 1909, and for a shorter period in 1910, owing to labour difficulties. It is noteworthy that the tonnage for the first half of

1910 shows an increase of 30 per cent. as compared with the corresponding period of 1909, and of 50 per cent. with that of 1908, and this notwithstanding the long-continued low price of copper, which is the chief marketable metal contained in the ores of the mines under notice. Further, the indications are that the increased production will be continued.

Turning now to Rossland mines, it is gratifying to find an increase this year as compared with the first half of last year, though the position is not favourable in comparison with the corresponding part of 1908. The decreased tonnage has been in the production of the Le Roi mine only, the two other important producing mines of Rossland camp, showing increases. The tonnage for the three half years, respectively, is shown in the following round figures:

Mines.	Tons. To June 30, 1908.	Tons. To June 30, 1909.	Tons. To June 30, 1910.
Centre Star Group	84,500	83,000	97,500
Le Roi	39,000	9,000	7,500
Le Roi No. 2.....	15,000	15,000	16,500
Others	500	500	500
Totals	139,000	107,500	122,000

The second-class ore milled at the Le Roi No. 2 concentrating plant, about 1,550 tons per month, is not included in the figures given in the table, which shows an increase of 13 per cent. this year over last.

The production figures for East Kootenay mines do not exhibit similar progress, for the quantity of lead-silver concentrate received at the Trail smeltery during six months of 1910 was but 9,000 tons, as compared with approximately 11,000 tons for the corresponding period of 1909, and 10,000 tons for 1908. However, this decrease is in part compensated for by receipts of about 6,000 tons crude ore from the Sullivan group mine; only in part, though, for there is of course considerably less lead and silver in crude ore from the Sullivan mine than in a similar quantity of concentrate from the St. Eugene, The North Star mine, also, has this year produced less ore than last. On the whole, then, East Kootenay's ore production shows a decrease for the expired portion of the current year.

In Ainsworth mining division, the mines that were the largest producers last year have not made so good a showing this year. In the Slocan there has been improvement, to some extent, in production, in much larger degree with development that gives promise of a substantially larger output of ore. The most noticeable increases were those of the Standard and Van Roi, on Slocan Lake, and the Richmond-Eureka, near Sandon. The figures for the Standard are about 600 tons of high-grade silver-lead ore this year, as against 400 tons for the first half of last year; those for the Van Roi are 700 tons of silver-lead concentrate shipped to Trail, and last winter's mill output of silver-lead concentrate (about 1,200 tons) in course of shipment to Oklahoma, U.S.A., as compared with no production at all during the first half of 1909. Then the record for the first half of three years, respectively, for the Consolidated Mining & Smelting Company's Richmond-Eureka group was as follows: To June 30, 1908, 900 tons; to June 30, 1909, 1,700 tons; to June 30, 1910, 2,200 tons; all of silver-lead ore, shipped to the company's smeltery at Trail.

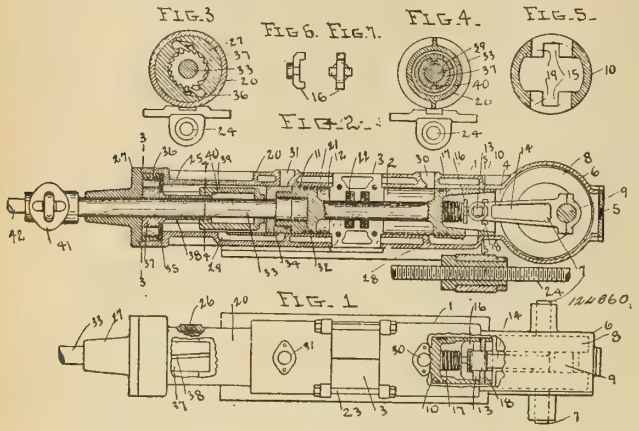
Incidentally, it may be mentioned, that the Silverton Mines, Limited, developing the Hewitt-Lorna Doone group, and the Van Roi and Standard, all in Silverton or Four-Mile Creek camp; the Ellis Silver Mining Company's Westmont, on Ten-Mile Creek, Slocan Lake; the Richmond-Eureka, Slocan Star, and Ruth-Hope groups, all near Sandon; the Surprise and Sunset, above Cody Creek; Rambler-Cariboo, in McGuigan Basin; Lucky Jim, near Bear Lake, Eastern Slocan; Whitewater group, in Whitewater camp, and Cork, on the south fork of Kaslo Creek, have each done development work which has made available more ore, and consequently considerably improves the prospect of increased tonnage during the latter half of the current year. In two or three instances the outlook is distinctly gratifying, so that it appears quite reasonable to look for a marked advance as a direct result of development work done in the mines.

In Nelson division there have been several increases in tonnage shipped, while the total quantity of ore put through stamp mills may also have been larger. The Queen Victoria, near Nelson, shipped about 700 tons of copper ore to Trail, as against none last year; the Silver King's production fell off 200 tons—1,600 as against 1,800 tons; the Yankee Girl, at Ymir, has 3,000 tons to its credit this year as compared with 500 tons to June 30th, 1909. Reliable statistics of gold-quartz ore milled are not available at present.

Other interior producing mines are the Silver Cup, in Lardeau district, owned by the Ferguson Mines, Limited, which usually maintains an average monthly production of about 140 tons of high-grade silver-lead ore, also containing gold, and the Hedley Gold Mining Company's Nickel Plate mine, which last year milled 31,000 tons of ore of an average value of between $12 and $13, and is now paying a quarterly dividend of 3 per cent. on its issued capital. Coast metal mines, as a rule, are not shipping ore; exceptions must be made in favour of the Marble Bay and Cornell mines, on Texada Island, both of which are stated to be returning profits to those operating them. There is development work in progress in other parts of the Coast district—on Howe Sound and in the country behind it; Valdes, Lasqueti and Queen Charlotte Islands; in several widely-separated parts of the Skeena River country, and elsewhere in the extensive region comprising what is comprehensively known as the Coast district. The part now attracting most attention is Portland Canal, in which district there are two mines sufficiently developed to give promise of proving productive, namely, the Hidden Creek Copper Company's big copper mine, on Observatory Inlet, an arm of Portland Canal, and the Portland Canal Mining Company's gold-silver-lead mine on Glacier Creek, a few miles from the head of the canal. The former has about 300,000 tons of copper ore in sight, and Mr. M. K. Rogers, of Seattle, Washington (well-known as the man who developed the Nickel Plate mine, near Hedley, Similkameen) states that $400,000 has been expended on the property and that it is intended to erect a 500-ton smeltery there before long. The latter has also had much development work done on it during the last two or three years, under the supervision of Mr .C. H. Dickie, of Duncans, Vancouver Island, director, who early obtained the advice of Mr. W. J. Elmendorf, M.E., of Spokane, Washington, who has since been engaged as resident manager. A concentrating mill is being equipped with the requisite machinery, and an aerial tramway, to connect mine and mill, is now in use. These two companies have done much work and little talk, and have consequently made material progress towards proving whether or not mining on a commercial basis, not on paper only, can be made a profit-earning industry in the Portland Canal district.

CANADIAN PATENTS.

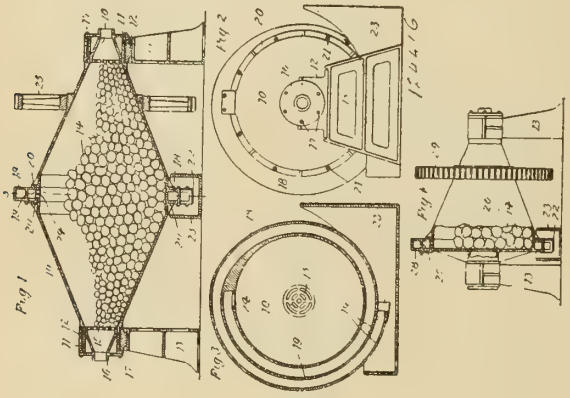
No. 124,360. Internal Combustion Rock Drill.
Foret à roc à combustion interne.



Lewis L. Scott, Joplin, Missouri, U.S.A., 8th March, 1910; 6 years. Filed 3rd November, 1909. Receipt No. 176,002.

Claim.—A motor drill comprising a pair of opposed two-cycle explosive engines including pistons mutually connected, a crank shaft connected with one piston, a drill rod connected with the other piston, and means for rotating the drill rod, said drill rod projecting from the corresponding engine, and the remaining removable parts of the motor drill being entirely enclosed within the cylinders thereof, etc.

No. 124,416. Pebble Mill. *Moulin à galets.*



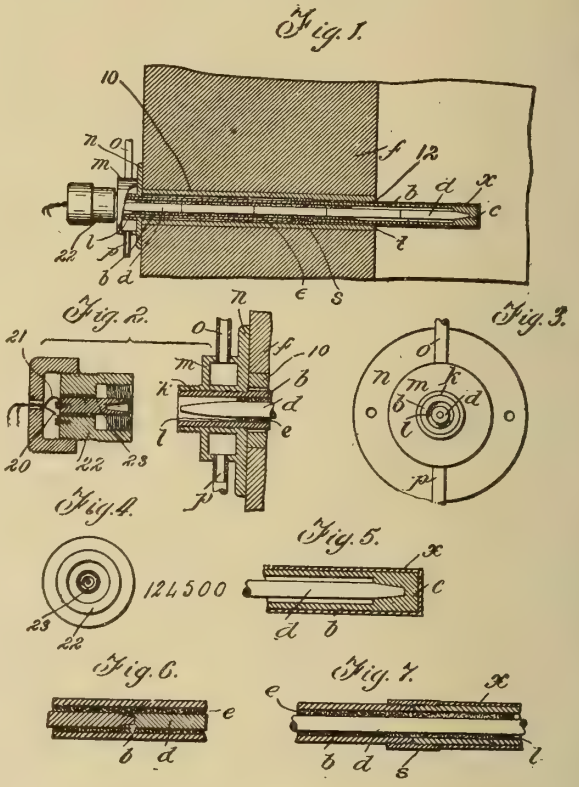
Max Frans Abbé, New York City, New York, U.S.A., 15th March, 1910; 6 years. Filed 10th February, 1910. Receipt No. 179,598.

Claim.—1. A pebble mill comprising a coniform shell having a peripheral inlet opening at the widest portion thereof, a pair of supporting bearings, means for axially rotating the shell, grinding bodies inclosed within the shell, a casing encompassing the shell at the widest portion thereof, a spiral conveyer within the casing and communicating with the inlet opening, and trough into which said conveyor is adapted to dip.

2. A pebble mill comprising a coniform shell having a peripheral inlet opening at the widest portion thereof, a pair of trunnions, one of which is hollow, means for axially rotating the shell, grinding bodies inclosed within the shell, a casing encompassing the shell at the widest portion thereof, a spiral conveyer within the casing and communicating with the inlet opening, and a trough into which said conveyer is adapted to dip.

3. A pebble mill comprising a coniform axially rotatable shell having a peripheral inlet opening at its widest portion, grinding means inclosed within the shell, and a spiral conveyer encompassing the shell at its widest portion and communicating with the peripheral inlet opening.

No. 124,500. Thermo-Electric Pyrometer.
Pyromètre électrique.



Alfred Stansfield, Montreal, Quebec, Canada, 15th March, 1910; 6 years. Filed 21st December, 1907. Receipt No. 154,070.

Claim.—1. A thermo-electric couple comprising a graphite tube having therein an amorphous non-graphic carbon rod, substantially as described.

2. A thermo-electric couple one member whereof is of tubular form and the other a suitable conductor thermo-electrically different from and located within the tube, and a suitable electrical connection between such members, substantially as described.

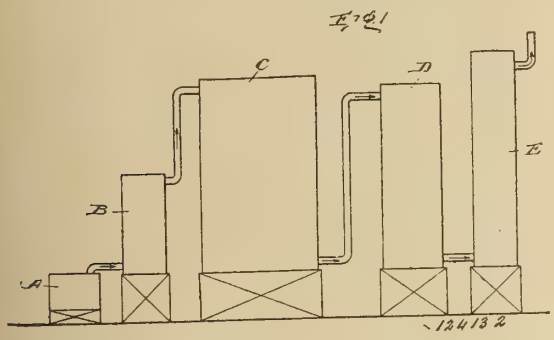
3. A thermo-electric couple one member whereof is of tubular form and the other a suitable conductor thermo-electrically different from and located within the tube, the electrical connection between such members being within the tube, substantially as described.

4. A thermo-electric couple one member whereof is of tubular form and the other a suitable conductor thermo-electrically different from and located within the tube, such tubular member having its fire end closed and the inner member being supported at one end by the said fire end and at another point by an insulating device within the tube and spaced from the fire end, substantially as described.

5. The combination with a thermo-electric couple and the terminals thereof, of a portable plug containing the terminals of a pair of conductors, such plug being adapted to be attached at the end of the couple and effect electrical contact between the respective terminals, substantially as described, etc.

No. 124,132. Apparatus for the Manufacture of Sulphuric Acid.

Appareil à fabriquer de l'acide sulfurique



Frederic J. Falding, New York City, New York, U.S.A., 1st March, 1910; 6 years. Filed 19th November, 1909. Receipt No. 176,551.

Claim.—1. In an apparatus for the manufacture of sulphuric acid the combination of a source of sulphurous acid, a Glover tower, a lead chamber, having its vertical axis considerably exceeding any horizontal axis, cooling means for the reaction products and a Gay-Lusac tower, substantially as described.

2. In an apparatus for the manufacture of sulphuric acid the combination of a source of sulphurous acid, a Glover tower, a lead chamber having its vertical axis in the proportion of 3 to 2 for any horizontal axis, cooling means for the reaction products and a Gay-Lusac tower, substantially as described.

3. In an apparatus for the manufacture of sulphuric acid, a source of SO_2, a Glover tower, a lead chamber having a height so far exceeding its length and breadth as to allow relative zones of reaction and inaction to be formed therein, cooling means for the products of such reaction and a Gay-Lusac tower, substantially as described.

4. In an apparatus for the manufacture of sulphuric acid, a source of sulphurous acid, a Glover tower, a lead chamber having its vertical axis in the proportion of about 3 to 2 over any horizontal axis, and a Gay-Lusac tower, substantially as described.

5. In an apparatus for the manufacture of sulphuric acid, a lead chamber having a vertical axis substantially in the proportion of 3 to 2 over any horizontal axis.

6. In an apparatus for the manufacture of sulphuric acid, a single lead chamber having its vertical axis greater than any horizontal axis.

Carload lots of fluorspar from localities in Colorado, Kentucky, and Illinois, consigned to steel manufacturing centres, range from 96.01 per cent. calcium fluoride down to 60.9, the average being about 85 per cent. Silica contents range from 1.22 per cent. up to 27 per cent., although usually the percentage of this impurity is below 12.

BOOK REVIEWS.

THE COAL AND IRON INDUSTRIES OF NOVA SCOTIA, BY C. OCHILTREE MACDONALD; THE CHRONICLE PUBLISHING COMPANY, LIMITED, HALIFAX, N.S., 1909.

No question can arise as to the usefulness, timeliness and authoritativeness of this book. The author, Mr. C. Ochiltree Macdonald, has long been identified with Nova Scotia's mining development. He has for some years collected material. The volume before us is the result.

In Mr. Macdonald's review of the coal-mining and iron industries, he traces historically the growth of each. He also touches sufficiently upon the geology of the coal and iron ore deposits, upon present industrial and social conditions, and upon the general possibilities of the province. The investor will find much miscellaneous information that can be found in no other collected form. The general reader will discover many interesting bits of history. Except for the fact that the book is execrably printed, it is worthy of commendation.

CORRESPONDENCE.

Home Life Bldg, Toronto, Ont.,
July 6th, 1910.

Editor CANADIAN MINING JOURNAL,
Confederation Life Building,
Toronto, Ontario.

Sir,—The discussion in the Journal of July 1st with reference to the reduction of the percentage of oxygen in compressed air furnished by the Cobalt Hydraulic Power Company for power in mines, calls attention to the general question of mine ventilation.

In every mine in Cobalt, considerable time is lost by miners waiting for the workings to be cleared of fumes and gases produced by blasting. The amount of time thus lost is often considerable. There is also the loss in decreased efficiency of the miners because of constant bad air. Were these losses noted and itemized, the result would in many cases astonish the management, but like rich ore thrown over the dump, they are not accounted for and consequently are ignored. A system of ventilation by fans, or otherwise, is inexpensive to install and to operate, and would be paid for many times over during the year in increased efficiency and amount of labour, were the air pure.

Aside from the question of economics, the miner has a natural right to breathe pure air. Undoubtedly consumption and other diseases of the respiratory organs are contracted or stimulated by this impure air. It is little known how many men are carried to the surface unconscious because of breathing the poisonous gases incident to blasting, and many a man has been killed thereby.

In some mining districts compulsory ventilation is established by law, and I advocate that this be done in Ontario. No liberal-minded mine manager would oppose legislation which yields profit to his company, and is but justice to the miner.

Yours truly,

FRANK C. LORING.

Imports into Canada of ferro-manganese and spiegel amount yearly to about 18,000 tons, having a money value of considerably more than half a million dollars.

PERSONAL AND GENERAL.

Mr. R. B. Brinsmade, professor of mining engineering, University of West Virginia, examined several mining properties in the Lake of the Woods district during the latter part of June.

Mr. A. Erskine Smith, managing director of the Red Cliff Mining Company, Portland Canal, is now at the mine arranging for the development of a local water power to operate the plant.

Professor F. A. Thomson, head of the department of mining engineering of Washington State College, Pullman, Washington, lately sampled a "dry ore" silver mine in Slocan district, B.C.

Mr. A. J. McMillan, managing director of the Le Roi Mining Company, early in July, left Rossland, B.C., on a business trip to England. He will probably return to British Columbia in August.

On Wednesday, June 29th, Dr. W. G. Miller left Toronto on his way to Stockholm, Sweden, to attend there the International Geological Congress. Dr. Miller will first visit Scotland. He will probably join the excursion to Spitzbergen arranged by the Congress.

Mr. Charles T. Mitchell, who for several years has been construction engineer at the Granby Company's smelter at Grand Forks, B.C., at which large and important additions and extensions have been made, is now with the Canadian Copper Company, at Copper Cliff, Ontario.

Our readers will be interested to learn that Messrs. Keuffel and Esser have established a repair department at the Montreal office, 252 Notre Dame Street, West, Montreal. The new department will be fully equipped to undertake the repairing of all classes of surveying, drawing, and measuring instruments.

Mr. Peter Christianson, until recently one of the district mine superintendents of the Dominion Coal Company, has been appointed general superintendent of the operations of the Pacific Pass Coalfields Company, in northwestern Alberta. It is with genuine and unanimous regret that the workmen and officials of the Dominion Coal Company see Mr. Christianson depart. His record in Cape Breton is a remarkable one. Mr. Christianson is a Dane, and when he landed from a Norwegian sailing vessel over twenty years ago he was not acquainted with the English language. From the lowest position in a coal mine, Mr. Christianson has worked himself from overman to manager and from manager to superintendent, gaining at the same time a reputation for modest integrity which any man might envy. While Mr. Christianson's departure from Cape Breton will be a distinct loss to the mining community, he will be an acquisition to our western colleagues in his new position, and the good wishes of Cape Breton friends will follow him. Mr. Alexander MacDonald, for many years manager of Dominion No. 4 (Caledonia) Colliery, has been appointed as superintendent of No. 3 district in Mr. Christianson's stead. The new collieries at Lingan, now rapidly becoming an important part of the Dominion Coal Company's operations, are not included in the district allotted to the new superintendent, and it is said they will be constituted a new and separate district.



R. W. LEONARD.

Mr. R. W. Leonard, St. Catharines, Ont., has been appointed by the Ontario Government to fill the vacancy on the Board of Governors of the University of Toronto, caused by the death of Dr. Goldwin Smith. Mr. Leonard is the only mining man on the Board. The choice is a good one. For years Mr. Leonard has been closely identified with mining. He is a graduate of the Royal Military College, Kingston. Always an enthusiastic member of the Canadian Mining Institute, last winter he was elected to the position of vice-president. Fortune has smiled substantially upon him. He is one of the chief owners of the Coniagas mine, Cobalt, from which something more than travelling expenses is received annually. As president of the company, and of the subsidiary smelting concern at Thorold, Mr. Leonard has moulded the policies of both. Incidentally, he is a prominent member of the Canadian Society of Civil Engineers, a military enthusiast, an inventor in a mild way, and an all-round good citizen. The University is warmly to be congratulated.

Mr. H. Harris, formerly superintendent, under Mr. R. Hedley, of the Hall Mining & Smelting Company's smeltery at Nelson, B.C., and of the Brown Alaska Company's smeltery at Hadley, Prince of Wales Island, Alaska, is now general manager for the Tasmanian Smelting Company, Limited, at Zeehan, Tasmania, where he also has charge of two mines.

Dr. T. L. Walker, of the University of Toronto, was in British Columbia recently in connection with an investigation of the molybdenum deposits of Canada he is making for the Mines Branch of the Dominion Department of Mines, for the purpose of completing and publishing a monograph on this subject.

Professor Milnor Roberts, dean of the school of mines of the Washington State University, Seattle, lately again visited the coal mining district in Nicola Valley, B.C.

Mr. J .B. Woodworth has returned from a professional visit to Newfoundland, during which he inspected a large number of promising mining claims.

Mr. W. L. Coulson, of Somerset, Pennsylvania, formerly in charge of coal mines in Virginia, Kentucky and Pennsylvania, respectively, has been appointed general manager for the Canadian Collieries (Dunsmuir) Limited, which recently acquired the Wellington Colliery Company's collieries on Vancouver Island B.C.

Mr. James Ashworth, of Fernie, B.C., general manager of the operating department of the Crow's Nest Pass Coal Company, Limited, has been giving expert evidence at Victoria in connection with an action for damages brought on behalf of the widow and children of one of the 32 miners who lost their lives in the Wellington Colliery Company's Extension coal mines, Vancouver Island, when an explosion took place there last October.

Mr. E. Hibbert, for several years superintendent of the mines of the Le Roi No. 2, Limited, at Rossland, B.C., has succeeded Mr. Paul S. Couldrey as superintendent of the British Columbia Copper Company's Mother Lode mine, near Greenwood, Boundary district, B.C.

The annual consumption of coal in Canada is approximately 20,000,000 tons. Of this quantity the United States supplies slightly more than 50 per cent.

The annual consumption of coal per capita has risen in Canada from 0.758 ton in 1886 to 2.83 tons in 1908.

Since the year 1895, Canada's coal production has shown a steady annual increase. Since 1876, only during four years, namely, 1883, 1885, 1892, and 1895, has there been a falling off in annual outputs.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Output.—The output of the mines for the month of June exceeded all expectations, being over 359,000 tons. This is 4,000 tons in excess of last June, and is a record for this particular month. Only on one previous occasion has the monthly output ever been larger than was obtained in the past month. This was in July, 1908, when the tonnage reached 368,000 tons. The prediction made in a recent letter that 16,000 tons would be reached in one day was justified in the last week of the month, for which the daily figures were as follows:

	Tons.
Monday, 27th	14,263
Tuesday, 28th	16,541
Wednesday, 29th	16,289
Thursday, 30th	13,824

These figures constitute a record for continuous production over several days. On one occasion, in 1904, the output for a day reached 16,600 tons, and in July, 1908, the figure of 16,359 was reached, but no four days in the company's history ever before yielded as much coal as the ones detailed above.

The output of the individual collieries was as follows:

	Tons.
Dominion	50,056
Number 2	67,944
Number 3	34,703
Caledonia	42,030
Reserve	33,904
Number 6	23,789
Hub	20,036
International	16,450
Number 9	35,357
Emery	13,876
Number 12	16,742
Number 14	3,476
Number 15	758
	359,121

It will be noticed that the new collieries at Lingan, namely Nos. 12, 14, and 15, contributed the respectable total of 20,000 tons to the general output. Owing to the incidence of the Dominion Day holiday with pay day, and Saturday the beginning of July showed much smaller outputs, and as there are fewer working days in July than last month it will be difficult to exceed the figures which were obtained in June, and the output will probably be about the same.

The Colliery Relief Societies.—The consolidation of the Colliery Relief Societies is now an accomplished fact, the Dominion Coal Company Employees' Benefit Society having commenced its corporate existence on the 1st of July. The election of officers and the details of organization will be completed at the first general meeting of the society, which is to take place on the 5th of July. The new scale of contributions and benefits becomes effective from the first of the month. Further details of the completed scheme will be communicated to the Journal probably in the next issue.

ONTARIO.

Cobalt.—The Beaver quarterly report for the period ending May 31st shows a cash balance of over $22,000. On May 4th a car of high-grade ore, assaying over 3,000 ounces, was shipped, but the returns are not included in the cash balance shown.

The annual statement of the La Rose will show a production for the past year of 3,150,000 ounces, which is a slight increase over 1908. In view of the action of the directors in cutting the dividend rate from sixteen to eight per cent., this production is, however, very encouraging. The company is paying dividends at the rate of $600,000 a year, so that there will be a very considerable amount to put into the cash reserve, which will ,it is believed, amount to nearly $600,000. Developments on the different properties are encouraging, particularly on the Lawson and Princess. On the former there are now two good ore shoots, on the No. 11 and No. 2 veins, that are producing high-grade ore. The Princess shows signs of becoming a steady producer, and is now in much better shape than formerly.

The Nipissing Company will sink two new shafts on veins discovered this season. One of these will be near the boundary of the Chambers Ferland, and the other near the Gillies Limit line, in the vicinity of Cart Lake. The latter is in the Keewatin formation, and very good silver values were found a short time ago. This company has declared its regular quarterly dividend of five per cent., with a bonus of two and one-half per cent.

The Little Nipissing has received word from the Peterson Lake Company that it has been granted a five-years' extension from the present date of expiry of its lease. This will mean that the Little Nipissing will have over seven years ahead of it, and the management will have more encouragement to go ahead and develop their holding. A decided improvement has taken place in the vein at the bottom of the winze at a depth of 225 feet. The vein is under and is carrying better values.

The management of the Haileybury Frontier Company has ordered a five-drill Canadian Rand power-driven compressor for its property in South Lorrain. This will be installed as soon as possible, as the work is badly handicapped for lack of power. The shaft is now down 125 feet, and will be sunk to the 150-foot level before a cross-cut is run to top the vein. Several promising leads have been found on the surface, and it was on one of these carrying good values in silver that the shaft was sunk.

Some time ago the Right-of-Way dump was purchased by several local people, and the first shipment from it has been made to one of the concentrators. The returns were very satisfactory, and the owners have decided to have the whole dump, which amounts to about 6,000 tons, treated.

In the Gillies Limit the Wyandoh is getting high-grade ore above the 110-foot level. Some values have also been encountered in a winze, on the same vein, to the east of the shaft. Some good ore is also being taken from the Waldman, and a winze is to be sunk on the vein from the bottom level.

The new Victoria vein, of the Crown Reserve, which was found on May 24th, promises to be one of the best yet opened upon the property. It is of good width, and carries remarkably high grade ore. From the 200-foot level a crosscut is being run parallel to the Kerr Lake line, which it is expected will open up the veins located by the diamond drill. The German government has become a buyer of Crown Reserve ore, and has contracted with the company to supply it 1,000,000 ounces. The ore will be very high grade, assaying approximately 4,000 ounces to the ton, and it will take about eight carloads to make up the required amount. The German government is operating a smelter and treating low grade ores, but as these were found to be too low to be profitable, they will be used in combination with that produced by the Crown Reserve.

A cross-cut from the bottom of the winze at the 280-foot level of the Cobalt Lake, has opened up the Morrison vein, When first cut it showed a number of small stringers, but when drifted on for about twenty-five feet, four inches of high-grade ore was encountered. It is expected that the Pellatt vein will also be caught in a short cross-cut from the 280-foot level.

The annual report of the Chambers-Ferland states that on May 15th, which is the end of the fiscal year, the company had cash on hand and ore in transit to the value of $117,217. Of this $14,400 has to be paid to the Ontario government as royalty. The gross value of ore produced during the year amounted to $130,968.24, and the total cost of production was $83,689.85, leaving a total profit of $47,278.39. On May 15th there were thirteen cars of ore ready to ship. These were medium grade,assaying approximately 250 ounces to the ton. The ore reserves are estimated at 240,000 ounces.

A very satisfactory report, issued by the Buffalo Mines, Limited, shows a general increase. During the year 33,708 tons of ore were hoisted, and all of this went to the concentrator. The average assay was 40 ounces to the ton, and an extraction of 78.60 per cent. was made. The production from the cyanide plant was 54,872 ounces, bringing the total extraction up to 82.67 per cent. Thirty cars of ore were shipped during the year, containing 654 tons of concentrates and 115½ tons of high grade. The concentrates averaged 1,570 ounces to the ton, while the average for the high grade was 3,126 ounces per ton. The total production for the year was 1,491,750 ounces, being an increase of 559,761 ounces over the previous year. The increase in profits was $197,723.89, while $142,000 in excess of the previous year was paid in dividends. There was also a very large increase in the ore reserves.

The following dividends will be payable during the month of July: McKinley-Darragh, three per cent. regular and two per cent. bonus, $112,348.85; Nipissing, five per cent. regular and 2½ per cent. bonus, $450,000; Right of Way, two per cent. regular, $29,971.08; Buffalo, five per cent. regular, $50,000; Crown Reserve, six per cent. regular and nine per cent bonus, $265,322.10.

Some rich ore has lately been found on the No. 16 vein of the O'Brien. On the 150-foot level the vein was practically barren, so it was decided to sink still further. When the winze was down a short distance, it passed into the diabase formation, and the values came into the vein again. The new shaft sunk through the mill, through which all the ore will eventually be hoisted, is practically completed, and will be in operation when the electric hoist is installed.

There are at the present time three cyanide plants in operation in this district, at the Buffalo, O'Brien, and Nova Scotia. The former was started last August and treats only the slimes from the concentrate. Since it has been in operation it has treated 6,424 ons of slimes, assaying about thirteen ounces to the ton, and containing a total of 83,034 ounces of silver. The total ounces recovered were 54,872, giving an extraction of 66 per cent. The Nova Scotia plant has been in operation only a short time, and, although good results are believed to have been obtained, no official figures are as yet available.

The Dominion Reduction Company has decided to erect a 100-ton custom concentrator on Kerr Lake ,to treat the low grade ore from that section of the camp. It is understood that arrangements have been made to erect the plant on the property of the Crown Reserve, and that this company's ore will be the first to be treated. The Cobalt Central mill in that section also treats custom ores, but the location is against its being used to any great extent.

The Lucky Godfrey Company, at Elk Lake, has lately been the victim of a most sensational high-grading case. Last April a car of ore was shipped from the property to the smelter at Thorold. It was supposed to have a value of approximately $40,000, but when the sacks were opened at the smelter they were found to contain low grade ore and waste rock, the whole car being worth a very small sum. It appears that several employees of the mine were implicated, and that before the ore left the property, the worthless material was substituted for the high grade ore. By this time it is probable that the ore is scattered all over the country and it is very doubtful if the company will be able to recover much of it.

At the Temiskaming mine high-grade ore is now being produced from two veins on the 400-foot level, one of the veins having been opened up from the shaft, while the other was picked up in a winze from the 350-foot level. The shaft has now reached a depth of 475 feet, and it is probable that another level will be opened up at this point. The new concentrator is running steadily, and is treating about 90 tons a day.

Ore is now being hoisted from the No. 3 shaft of the Trethewey, which was put down near the boundary of the Hudson Bay. The new concentrator is operating to full capacity, and is putting through between 80 and 90 tons a day.

Gowganda.—The first full thirty tons of ore to be sent out of this district by water, were shipped a few days ago from the Millerett Mine. This is somewhat in the nature of a trial shipment, and whether or not more will be sent out depends on the cost and the ease with which is can be handled. The ore had to be hauled over thirty miles by wagons, and then was transported down the river by boat. The roads are in very bad shape and teams can only haul from a thousand to fifteen hundred pounds a trip. No repairs have been made on the road since it was first built, but it is now expected that some of the prisoners from the jails at North Bay and other places will be sent in to keep it in shape. This high cost of transportation and the slight possibility of a railroad being built into the district makes it imperative that some method of concentrating the low and medium grade ores be used. The management of the Reeves Dobie has decided to put in a small plant, including two Nissen stamps. These will have a capacity

equivalent to an ordinary five-stamp battery, and will effect an important saving. It is probable that the Millerett will also install a somewhat similar plant in the near future.

Porcupine.—Excellent results have recently been obtained on the property of the Crown Chartered Company, and they now have better showings of free gold at a depth of seventy feet in the shaft than were originally obtained on the surface. As the different properties develop and larger plants are installed, as will be the case with several mines next winter, the question of power will have a more and more important bearing. The only fuel is, of course, wood, and the immediate supply of this will naturally decrease rapidly. In order to provide against this difficulty a syndicate of Montreal men has obtained the right of a water-power about forty miles distant from the centre of the district. Several engineers are at present engaged in making a survey of the power and an estimate of the cost of putting in a plant. The work of getting in supplies is becoming more difficult every day, on account of the low water. The rivers and lakes are falling rapidly, and it is thought that the gasoline launches will have to stop running very shortly, and that transportation by canoes will be the only method available. It is understood that New York capitalists are negotiating for a sixty per cent. interest in the Timmins-McMartin properties. They offer the present owners $1,000,000 and further agree to put $500,000 in the treasury for working capital, the only stipulation being that the owners complete the payments that are still due on the properties. It is doubtful, however, if this offer will be accepted, as the Timmins' contemplate forming a company of their own.

BRITISH COLUMBIA.

Mr. John B. Hobson has been preparing for hydraulicking on his placer-gold claims on the north fork of Quesnel River, in Cariboo district. He has been constructing a pipe-line about 3,000 feet in length, for the purpose of bringing in water for gravel-washing.

Zinc ore and concentrates are being shipped from Slocan mines to the United States. The Lucky Jim, Whitewater group, and Van Roi are the shippers. Mineral claims on Pingston Creek, in the Arrow Lake division of West Kootenay, are being prospected by New York men, who have bonded a group on which there are large showings of zinc ore.

A wagon road is being made from Phoenix to the No. 7 mine, Central camp, Boundary district. The Consolidated Mining and Smelting Company has between 40 and 50 men at work on the No. 7, to which a four-mile aerial tramway is being constructed, starting from the railway near Boundary Falls. A 10-drill air compressor, recently put in to supply power for this mine, is now in operation.

The "Fernie Free Press" lately published the statement that "the largest tonnage of coal in the history of the Crow's Nest Pass Coal Company's mines, at Coal Creek, was being mined there. On several recent days more than 3,000 tons of coal were taken out during twenty four hours."

The West Kootenay Mining Corporation, Limited, has been registered in London, England, with a capital of £125,000 in £1 shares, to adopt an agreement with Emissions Minieres, Limited, a French company, which had acquired the Joker and other mineral claims situated at the head of the south fork of Kaslo Creek, in Ainsworth mining division.

Announcement has been made that the Canadian Collieries (Dunsmuir) Limited, will open four new mines on Vancouver Island, two at Extension and two at Cumberland. Mr. Wm. Mackenzie, of Mackenzie and Mann, president of the new coal-mining company, has been credited with the statement that the company will, two or three years from now, be producing coal at the rate of 2,000,000 tons annually. At no time durnig the Dunsmuir (Wellington Colilery Company) ownership of these mines has their annual total production been as high as 1,000,000 tons—of late years it has been 700,000 to 800,000 tons.

At the first annual meeting of the New Dominion Copper Company, held a short time ago in New York, a statement was presented showing that wages claims against the old company, totalling $13,389, had been paid, and that diamond drilling in the company's Rawhide mine, and other expenditures during the fiscal year ended March 31, together with $26,938, had also been paid.

The lowest tunnel in the Lucky Jim mine, Slocan, which last December entered one of the large shoots of zinc ore that had been mined at higher levels, is now in the second big shoot of ore, distant between 800 and 900 feet from the portal of the tunnel. This development will largely increase the tonnage of ore available for shipment to the smelter. An aerial tramway from this low-level adit to the railway below, is being constructed, and other preparations for shipment of ore on a larger scale than in the past are also being made.

Slocan Lake.—In the western part of Slocan district, about Slocan Lake, mining is being carried on in several camps. The Mollie Hughes, near New Denver, has been sold to Vancouver, British Columbia, men. A recent discovery of ore on the Madonna claim, about three miles from New Denver, has been reported. The California, situated up on a mountain near the same town, has again been leased, and development work commenced; this mine gave a former lessee profitable returns from his operations.

There are some of the finest showings of ore at present to be seen in the Slocan in the faces of two drifts in the Standard mine, on Four-Mile Creek, near Silverton. In one level the lode is large—up to 30 feet in one place, with 4 to 5 feet of galena, in which also occurs fahlerz carrying high value in silver. The remainder of the lode is chiefly quartz with silver-lead and zinc through it. After the best ore is sorted out the remainder is placed on the dump to await the provision of concentrating facilities. Another level has a 12-foot lode, about one-third of which is shipping ore, and the rest of it concentrating material. Another level is being opened, at greater depth, and in this adit there are indications of the occurrence of ore which encourage the expectation that the valuable ore-shoot cut in the two levels above will also be found in this working.

About 100 men are regularly employed on the Van Roi, ore from which is concentrated at the Wakefield Company's mill, leased by the Van Roi Mining Company. Approximately 30,000 tons of ore have been mined and milled during the nine expired months of the company's fiscal year. Last year, to September 30, the output was 11,127 tons, but operations did not extend over a full year. Some 1,200 tons of zinc-silver concentrate, which accumulated at the mill during the winter months, is being shipped to Oklahoma, U. S. A.; it is expected this will bring the company $25,000, after payment of freight and smelting charges. The other mill product, a high-grade silver-lead concentrate, is sent to the Consolidated Mining and Smelting Company's smeltery, at Trail. The chief work being done in the Van Roi mine is on levels Nos. 3, 4, and 5, on the main vein, and on No. 4 in the south vein. The latest and most important and satisfactory results have been those from development work in the south vein. This was only recently reached, by a cross-cut from the main vein on No. 4 level. The ore has been found to be of good width, and assay returns from it have been excellent, so it is thought this vein will prove as valuable as the main vein from which latter a large tonnage has been mined and which has heretofore been the mainstay of the mine. More development work will have to be done, though, before it can be regarded as reasonably certain this hope will be realized. The work now in progress is further development preparatory to opening stopes. All the ore taken out in the course of drifting on this vein has been milled, but

stoping has been in the main vein only, and that above No. 4 level. There is equally good ore ready for being stoped on No. 5 level, but, as the portal of that adit is on the east side of the mountain, from which as yet there is no tramway connection with the Wakefield mill, no stoping has been done here. Nos. 3 and 4 levels are entered from the west side of the mountain, and the upper terminal of the tramway connecting with the mill is near the portal of the latter, while a "baby" tram provides a means for bringing the ore down from No. 3 to the terminal.

This mine gives employment to more men than any other in the Slocan, and its development is proving the existence in this part of Silverton camp of extensive and valuable shoots of ore, as has also been shown to be the case in other mines in the vicinity.

No ore has been shipped from the Hewitt-Lorna Doone group for several years, the policy of the Silverton Mines, Limited, the present owner, being to do much development work and block out much ore before commencing to ship. There is much silver-lead-zinc ore blocked out already, and lower levels are being opened to ensure a still larger tonnage before milling operations shall be undertaken.

Higher up Four-Mile Creek development work is also being done on the Fisher Maiden property, at which a tunnel is being driven at a lower level than that of the old workings.

The Westmont, on Ten-Mile Creek, is being worked by the Ellis Silver Mining Company. Some 25 men are employed, and the work in progress is reported to indicate that a productive mine will be established here. The Ottawa and Neepawa, both also in the Slocan Lake section of the district, are having work done on them, but with only a few men each.

Mr. Alfred McMillan has again leased the Velvet mine, near Rossland, to Mr. Ed. Ehrenberg, of Spokane, Washington. Some time ago Mr. Ehrenberg had a lease of this property, but, owing chiefly to the bad state of the road to the mine and consequent difficulty and expense of getting supplies in and ore out, he threw it up. Arrangements having been made to repair the road, he will try again to make the mine a profitable producer, and is sanguine he will succeed. Already men have been put to work, and development will be vigorously proceeded with. The ore is gold-copper, and the value of that shipped in earlier years was generally good.

A revival of interest in mining in the northern part of Fort Steele mining division, and in Windermere mining division, both in East Kootenay, is looked for as likely to result from the building of the Kootenay Central Railway, the construction of 30 miles of which is to be undertaken shortly. The Cranbrook Prospector expects the opening of a large mineral territory on the west side of Kootenay River, from Elk River north to Windermere. Along the route the new railway will take there are a number of mining properties on which much development work has been done and which have ore on the dump awaiting the provision of railway transportation facilities. It is quite probable a considerable improvement in matters connected with mining in the upper Kootenay and upper Columbia valleys, and along the valleys of creeks tributary to those larger streams will follow the opening of a railway through the district.

Up to May 10 the chief development work done on the Portland Canal Mining Company's Gipsy claim was as follows: No. 1 tunnel was in 225 feet; No. 2, 180 feet; and No. 3, 540 feet. An incline raise, 100 feet, connects Nos. 2 and 3. This constitutes the most development done on any claim in the camp. An aerial tramway, 8,500 feet in length, and 2,100 feet difference in altitude of its terminals, is in use. The first unit, nominal capacity 75 tons per day, of a concentrating mill is being equipped with the machinery and plant usually put in for concentrating ores containing silver and lead. This mill will be in operation before the end of August, unless something now unforeseen delays completion. A 6-drill air compressor is also being installed; it will be direct-connected to a Pelton water wheel. Water will be brought in a distance of 1,000 to 1,200 feet, and will furnish about 270 h.p. The Portland Canal Mining Company was the first to do much development work in the camp, and its management has from the first shown its bona-fide by mining in the ground rather than on paper only. It is satisfactory to know that with Mr. W. J. Elmendorf as resident manager, the property is under the direction of a competent and experienced mining engineer, so that it may be expected to be worked to best advantage.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Mr. Justice Drysdale has granted an order in the case of the Cumberland Railway and Coal Company vs. McDougall and others, restraining the defendants and all members of the U. M. W. A., resident in Nova Scotia, from intimidating employees, and from watching places of business. The order holds until final judgment shall have been given in the trial of this action.

Halifax.—A lease of the Cumberland Railway and Coal Company's coal areas in Cape Breton, with option of purchase within that time for $500,000 to the Dominion Iron and Steel Company has been recorded. It is understood negotiations were opened when there was trouble between the Dominion Steel and Coal Companies over the coal supply for the steel works, and it was thought possession of the Cumberland Company areas would make the Steel Company independent as to its coal supply.

ONTARIO.

North Bay.—The property of the Montreal Reduction and Smelting Company, at Trout Mills, Ontario, is offered for sale by the liquidator. It is stated over $275,000 was spent on the smelter. It is not stated how much was spent in selling the stock of the company, which was being boomed here not so very long ago.

Sudbury.—The new stamp mill at Long Lake, belonging to the Canadian Exploration Company, was started at the beginning of last week and everything is running in a most satisfactory way. Ten stamps are in operation, and these, with the cyanide plant, will be experimented with and any desirable modifications noted. As the ore deposit is very extensive, the crushing capacity of the mill will be increased as required. Sudbury already feels the benefit of this new enterprise in its neighbourhood.

Long Lake.—The Canadian Exploration Company, Limited, made its first mill run at the plant at Long Lake during the month of June. As this is a private corporation details are not furnished, but it is understood that the new metallurgical process was very successful and that an extraction of 92 per cent. was obtained.

ALBERTA.

Coleman.—A discovery of platinum is reported near Coleman. The report has not been substantiated.

BRITISH COLUMBIA.

Hosmer.—The daily output of steam coal from the Hosmer collieries is 250 tons.

Phoenix, B. C.—It is probable that the Granby Consolidated Company will take options on some of the properties in the Franklin camp and develop them with a view to adding to the Granby ore reserves. O. B. Smith, superintendent of the Granby mines, has just completed an examination of several

properties on the north fork of the Kettle River, particularly those in Franklin camp.

The McKinley and Glouster are the particular groups of claims which Granby interests have under consideration. The McKinley has a tunnel in about 250 feet at a depth of 175 feet, and 115 feet of drifting. The property is owned by the McKinley Mines Company (Ltd.), which claims to have secured assays running up to 10 per cent. copper, 10 ounces silver, and $1 in gold. Close to the McKinley are the Ajax, Jumbo, I. X. L., Manhattan, and Gold King, all of which have good indications of ore.

The Glouster property is on the Banner Mountain, close to which are the Banner, Bullion, Mountain Lion, Alpha and Home Stake claims. The Glouster has a 50-foot shaft, and is said to have ore running 13 per cent. copper with $2.50 in gold and silver.

Franklin camp contains numerous deposits of self-fluxing sulphide ores, with values running from $8 to $40, and with the Granby smelter only 45 miles away there are good prospects for a flourishing camp.

Vancouver.—Material for the largest gold dredge in the world is now being shipped from Vancouver to Dawson. The plant will be installed on Bear Creek, at the mouth of the Klondike River. It is planned to have the hull of the dredge assembled and the machinery in place in time to make some test runs before the end of the present season, so that everything may be in shape to start permanent operations as soon as Bear Creek opens next spring. The dredge is owned by the Canadian Klondike Mining Company, which controls a large area of ground on Bear Creek. All the material entering into the construction of the hull of the dredge is being purchased in Vancouver. Over 500,000 feet of lumber will be contained in the hull of the dredge.

Victoria, June 30.—That the plaintiffs, Henry Croft et al., are entitled to registration of their option on certain coal lands was the ruling of Chief Justice Hunter to-day upon a point of law arising out of the suit of the aforenamed against Hon. James Dunsmuir, Whiting, Percy et al., for $4,600,000 damages. The suit stands over until after the vacation.

It is alleged that the defendants persuaded the owners of the lands in question to break their contract with the plaintiffs, and give a second option to Whiting which he attempted to register before the plaintiff's options were registered.

The lands in question are included in those ceded to William MacKenzie in the purchase of the Dunsmuir coal interests for $11,000,000.

Victoria.—Mr. R. W. Riddell, until recently manager of the British American Trust Company, with headquarters in this city, has been promoted to the position of managing director of the International Coal and Coke Company, Limited.

Mr. Riddell is well known locally, having for several years been manager of Saunders' grocery establishment and other commercial concerns here. He will now be stationed at Coleman, Alberta, the headquarters of the International Coal and Coke Company, in which concern A. C. Flumerfelt, of this city, is largely interested.

MINING NEWS OF THE WORLD.

UNITED STATES.

Los Angeles, Cal.—The bringing in of three more gushers in the Midway district has further complicated the oil situation and assures the further congestion of conditions in the field. With a few months in which to complete the storage and pipe line projects, together with the entering into new contracts with the railroads and other large consumers of fuel, who are inquiring into the merits of California oil, there is little doubt but that the present situation would be greatly clarified. But with the bringing in of more gushers the production is advancing with such gigantic bounds that many of the best informed oil experts are freely admitting that a policy of curtailment must be immediately inaugurated if the present price of the fuel is to be maintained.

Los Angeles, Cal.—Latest advices are to the effect that the Navy Department is considering the more extensive use of fuel oil for the American navy, now that a practically inexhaustible supply has been demonstrated in the California fields. The battleships Delaware and North Dakota, the two biggest fighting craft in the world, consumed oil for fuel in their trial trips, and the results have proven eminently satisfactory to the naval officers. The battleship Utah, the monitors Florida, Wyoming, and Arkansas, and some destroyers, have been equipped with oil burners in addition to their coal bunkers. Those in a position to know regard it as certain that the American warships will largely use fuel oil in the future, particularly when on the western coast. The recent completion of the Producers, Associated and Standard lines insures prompt deliveries of the oil to the government stations.

Cripple Creek, Colo., July 2.—The Cripple Creek gold district for June produced 61,515 tons of ore of the value of $1,249,302. The month was featured by the commencement of operations at the new mill of the Portland company on Battle Mountain. This plant uses the secret process invented by the company's employees and is handling the low-grade dump ores with success. Ore of as low an average grade as $2.46 per ton was put through the mill during the month, and the profit is said to exceed $1 a ton. No official figures as to the actual saving have been made public, though the amount handled is placed at 8,863 tons.

Boston, Mass., July 2.—What is believed to be the first move on the part of the Amalgamated Copper Company in an extended plan for the curtailment of its output has just been made in the discontinuance of all Sunday work upon its properties. Heretofore the mines have been working from one-half to one shift on Sunday, but now both shifts are laid off and the action taken means practically a 10 per cent. reduction in output.

Ely, Nev.—Since the inflow of water in the lower pit of the Nevada Consolidated last week two steam shovels have been working on ore on the level above, extracting on an average of nearly 9,000 tons of ore per day. A survey has been made for a new line of churn drills on the south of the pit, which will bring the machine to within 200 feet of the north line of the Chispa, owned by the Ely Central. The overburden in that section is heavy, and is growing heavier as the work progresses. But it is stated that the best grade of ore is now coming from that section of the pit. All of the ties and most of the steel have been laid for the railroad at the new steam shovel pit on the Liberty claim, a half-mile west of the old pit, but the shovels have not yet arrived.

Salt Lake City, Utah.—A body of ore 10 feet wide, which carries values of $28 a ton in copper and gold, has been cut by the long tunnel of the Utah Mines Coalition Company. It is the first material result to be obtained from the systematic campaign of development started by the company about 16 months ago, and its importance is not so much in the direct result itself as it is in the promise these indications afford.

Spokane, Wash., July 2.—Miners' Protective Association of Pine Creek has been organized by 30 operators and prospectors on the north side of the Coeur d'Alenes in Shoshone County, Idaho, to save the standing timber on mineral ground at its harvesting would injure the mining industry.

SOUTH AFRICA.

A cablegram from Johannesburg states that during May the mines of the Rand alone (i.e., excluding outside mines) crushed 1,785,821 tons. The average yield per ton was 28s. 3d., the working costs per ton were 17s. 6d., the profit per ton was 10s. 9d., and the aggregate profit 958,347 pounds. Compared with April (which contained one working day less) 22,717 tons more were crushed, the yield improved 2d. per ton, and as costs remained the same the profit was 2d. per ton more, and the aggregate profit was 31,103 pounds greater.

The annual report of the Transvaal Chamber of Mines for the year ended December, 1909, shows that while the number of stamps at work on the Rand only increased from 9,035 to 9,252 during the year, some 148 tube mills enabled the average duty per stamp to be increased from 4.86 tons per 24 hours in 1902, when there were no tube mills, to the average daily duty of 6.85 tons in 1909. The tonnage milled was equal to the capacity of 13,161 stamps of the 1902 capacity. In eight years the crushing capacity has increased by nearly 41 per cent, largely through the use of tube mill auxiliaries. Another feature of the return is the reduction in working costs. In January, 1908, the average for the Rand was 19s. 5d. per ton, and the average profit was 12s. 7d. per ton. In December, 1909, working costs had declined to 17s. 2d. per ton, while profits had only declined 1s. 5d. to 11s. 2d. per ton.

COMPANY NOTES.

NIPISSING'S DIVIDEND RECORD.

With the payment of the recent 7½ per cent., the Nipissing Mines Company will have disbursed to its stockholders the sum of $5,040,000 in cash since July 20th, 1906.

This does not include the amount paid by the operating company, the Nipissing Mining Company, Limited, to the syndicate prior to the above date, which amounted to about $400,000 between October 20, 1905, and June 20, 1906. Adding the amount to the surplus being carried by the company, of about $1,000,000, makes a total of $5,440,000 taken out of the property in less than five years, or more than the entire capital stock of the company at par.

While the company is in a position to increase its quarterly disbursements to stockholders, no such action is contemplated, but it is probable that interim dividends will be declared from time to time. It is stated on reliable authority that another interim dividend will likely be declared the latter part of the year, bringing the total amounts disbursed for 1910 up to 40 per cent.

The production of the Cobalt camp is expected to show a substantial increase over that of last year, which, in view of the advance in the price of silver, will mean gratifying increases in earnings of all of the producing companies. The output of both the Nipissing and the La Rose companies for 1910 are expected to be the largest in the history of the properties.

For the five months ended May 31 last the Nipissing Mines Company makes the following exhibit:

	Expenses.	Shipments.
January	$40,591	$187,114
February	35,966	174,528
March	47,300	214,785
April	37,371	216,192
May		208,537
Total, five months	$161,318	$1,001,156

THE NEW DOMINION CO.'S FIRST REPORT.

At the first annual meeting of the New Dominion Copper Company, held in New York recently, Newman Erb, vice-president, made a report for the fiscal year to March 31, 1910, as follows:

"The New Dominion Copper Company, on June 17th, 1909, acquired the property of the Dominion Copper Company, from the reorganization committee together with $347,999 cash. There having been no net earnings during the period, no payments were made on the income bonds on April 30.

"There was paid off $13,389 labour claims outstanding against the old company, while other expenses totalling $26,936 were incurred through diamond drill operations on the Rawhide mine for five months.

"An experimental contract has been entered into whereby the British Columbia Copper Company will treat 25,000 tons of our ores. Indications are that the New Dominion cannot furnish from 1,000 to 2,000 tons of ore daily, so that the erection of a new mill would not be justified."

John A. Sleicher has been succeeded as director by Clifford A. Chaffee, while at the first annual stockholders' meeting the following were reelected for the ensuing year: Newman Erb, N. Bruce Mackelvie, F. L. Sommer, Charles A. Starbuck, Lucius W. Mayer, who will be elected president, and W. W. Foster.

Le Roi No. 2 has paid $1,033,200 in dividends. This sum includes the dividend of 50 cents per share payable on July 8.

NEVADA CONSOLIDATED COST RECORD.

The Nevada Consolidated Copper Company, in the month of May, established a new record in cost per pound of copper produced. The net cost was 5.91 cents per pound, which bears out the contention of the management that the Nevada Consolidated can produce copper cheaper than any other mine in the United States.

The net earnings of the Nevada Consolidated for that month were $400,000, after depreciation deductions, which were at the rate of $4,800,000 a year. Nevada Consolidated is now paying at the rate of $3,000,000 a year in dividends.

Nevada Consolidated's world-breaking record in low copper costs was made in the face of the fact that only seven-eighths of the plant was in operation during the month of May. Production for the month amounted to approximately 6,000,000 pounds, which was at the rate of 72,000,000 pounds a year. Had the plants operated full, production for the month would have exceeded a rate of more than 80,000,000 pounds a year.

VAN-ROI MINING CO., LTD.

The following cable has been received by the London office from the company's managers at Rossland:

"Shipped during May, 220 tons concentrates.

"Received from smelter, $15,651 for 151 tons concentrates.

"Mill report for the month of May: Total amount crushed, 2,709 tons, yielding 120 tons lead concentrates, assaying 167.9 ozs. silver, 61.4 per cent. lead, 13.7 per cent. zinc; and 100 tons zinc concentrates, assaying 56.6 ozs. silver, 2.7 per cent. lead, 44.3 per cent zinc. Total approximate value, $14,169. Mill ran 533 hours.

"Estimated expenditure for corresponding period including mining, milling, development, and other expenses, $15,975.

"No. 4 level (main reef) advanced eastwards 70 feet. South reef: Near the hanging wall west of crosscut, advanced 70 feet, of which the first 40 feet, 6½ ozs. silver, 2 per cent lead, 11 per cent. zinc; width of 2 feet. For the last 20 feet ore in footwall. End of drive 66 ozs. silver, 3¾ per cent. lead, 14¼ per cent. zinc; width of 2 feet. Near the footwall 20 feet to the south, advanced east 22 feet and west 18 feet—promising.

"Zinc shipments delayed, shortage cars. Diamond drills finishing soon. Expenses will be less."

STATISTICS AND RETURNS

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending July 1, and those from January 1, 1910, to date:

	July 1. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	60,167	180,617
Buffalo	51,900	1,015,268
City of Cobalt	58,900	422,735
Chambers-Ferland	59,600	773,200
Cobalt Central		293,286
Cobalt Lake		260,900
Cobalt Townsite		68,000
Colonial		148,900
Coniagas		745,176
Crown Reserve	171,000	3,313,238
Drummond		664,200
Hargraves		101,800
Hudson Bay		241,435
Kerr Lake	300,600	4,920,416
King Edward	46,330	221,296
La Rose	79,800	6,315,541
McKinley-Darragh	135,440	1,623,639
Nipissing		5,407,337
O'Brien	110,040	758,086
Peterson Lake		330,710
Provincial		65,000
Right-of-Way		818,247
Silver Cliff		159,990
Timiskaming	120,000	921,830
Trethewey		503,950
Waldman		63,992

Ore shipments for the week ending July 1 were 1,193,777 pounds, or 596 tons.

Total shipments from January 1 to July 1 were 30,338,789 pounds, or 15,169 tons.

Following are the shipments from the Cobalt Camp for the week ending July 8th, and those from January 1st to date:

	July 8. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver		180,617
Buffalo	55,400	1,070,668
City of Cobalt		422,735
Chambers-Ferland	64,000	837,200
Cobalt Central		293,286
Cobalt Lake		260 900
Cobalt Townsite		68,000
Colonial		148,900
Coniagas	120,480	865,656
Crown Reserve	213,420	3,526,658
Drummond		664,200
Hargraves	78,000	179,800
Hudson Bay	56,400	297,835
Kerr Lake	300,000	5,279,816
King Edward		221,296
La Rose	231,000	6,546,541
McKinley Darragh	55,830	1,679,469
Nipissing	347,930	5,755,267
O'Brien		758,086
Peterson Lake		330,710
Provincial		65,000
Right-of-Way	63,500	881,747
Silver Cliff		159,990
Timiskaming	80,740	1,002,570
Trethewey	87,900	591,850
Waldman		68,992
Wyandoh	48,300	48,300

Ore shipments for the week ending July 8th were 1,802,900 pounds, or 901 tons.

Total shipments from January 1st to July 8th were 32,201,089 pounds, or 16,100 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

Nelson, June 25.—The ore shipments for the past week are decidedly satisfactory. Both the shipments and the smelter receipts for the first half of the year are now well over the million ton mark, an excellent showing indicating steady progress in the mining all over the Kootenay.

Appended are the details.

Property.	Week.	Year.
Boundary.		
Granby	23,014	609,092
Snowshoe	4,074	86,547
Mother Lode	4,200	153,905
Oro Denoro	376	6,389
Jack Pot	378	1,361
Nickle Plate (Hedley)	116	364
Other mines	—	163
Total	32,158	857,821
Rossland.		
Centre Star	3,403	94,801
Le Roi	241	7,283
Le Roi No. 2	667	16,137
Le Roi No. 2 milled	300	7,500
May Flower	16	25
I. X. L.	2	131
Other mines	—	268
Total	4,629	126,145
Slocan-Kootenay.		
St. Eugene, milled	2,775	69,375
Whitewater, milled	600	15,000
Van Roi, milled	800	20,000
Kootenay Belle, milled	70	1,750
Granite Poorman, milled	250	6,250
Queen, milled	420	10.500
Nugget, milled	110	2,750
St. Eugene	282	8,604
Richmond Eureka	84	2,182
Yankee Girl	125	2,838
Sullivan	218	5,889
Standard	33	562
Second Relief	27	64
Queen Victoria	133	658
Ottawa	20	20
Other mines	—	24,246
Total	5,949	170,689
Smelter Receipts.		
Granby, Grand Forks	23,014	609,212
Consol. Co., Trail	9,057	241,290
B. C. Copper, Greenwood	4,954	121,655
Total tons	37,475	1,012,157

The Consolidated Mining and Smelting Company of Canada, Limited, Trail Smelter statistical statement for May, 1910:

Tons ore received: Month, company's mines, 31,031; other mines, 7,993; total ore received, 39,024; eleven months to date, company's mines, 376,824; other mines, 73,332; total ore received, 450,156.

Tons ore smelted: Month, copper furnaces, 35,687; lead furnaces, 5,446; total, 41,133; eleven months to date, copper furnaces, 398,903; lead furnaces, 51,656; total, 450,559.

Metals produced: Month, gold, 13,691 oz., $279,171; silver, 282,727 oz., $152,182; copper, 473,480 lbs., $59,615; lead, 3,119,639 lbs., $84,614; total, $575,582; eleven months to date, 125,451 oz., $2,566,355; silver, 2,019,464 oz., $1,057,991; copper, 5,464,157 lbs., $715,622; lead, 38,624,422 lbs., $1,080,769; total, $5,420,737.

Month, value of gold, 48.5 p.c.; value of silver, 26.4 p.c.; value of copper, 10.0 p.c.; value of lead, 14.7 p.c.; total 100 p.c.; eleven months to date, value of gold, 47.4 p.c.; value of silver, 19.4; value of copper, 13.3 p.c.; value of lead, 10.0 p.c.; total, 100 p.c.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—July 8th, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	21
Dominion Coal Co.	..	..
Dominion Steel Co.	56⅝	56¾
Nova Scotia Steel	..	78
Granby	25	26
Consolidated Smelting	60	75
Crow's Nest Pass	..	88
Dominion Steel & Coal Corp.	58⅛	58½

Cobalt Stocks—July 8th, 1910.

Amalgamated	.03¼	.04½
Beaver Consolidated	.23⅛	.23¼
Buffalo	2.20	2.60
Chambers-Ferland	.17	.18
City of Cobalt	.20½	.21
Cobalt Central	.09	.10
Cobalt Lake	.14½	.15
Coniagas	4.40	5.50
Crown Reserve	2.70	2.74
Gifford	.06½	.07½
Foster	.09¾	.14
Green Meehan	.01½	.02
Great Northern	.05½	.06½
Hudson Bay	96.50	102.00
Hargraves	.16¼	.17
Kerr Lake	8.05	8.20
La Rose	4.10	4.25
Little Nipissing	.14¾	.14⅞
McKinley Darragh Savage	.90	.91½
Nancy Helen	.03	.05
Nipissing	10.55	10.90
Nova Scotia	.29	.35
Ophir	.15	.30
Otisse	.03⅝	.04½
Peterson Lake	.19¾	.20
Right of Way	.23	.25
Rochester	.14¾	.15
Silver Leaf	.07	.07⅛
Silver Bar	.03	.06
Silver Queen	.05	.10
Timiskaming	.62¼	.63½
Trethewey	1.15	1.20
Watts	.05	.10
Wettlaufer	.65	.71

New York Curb—July 8th, 1910.

Boston Copper	15	20
British Columbia Copper	4⅞	5
Butte Coalition	17	17½
Canadian Mines	6¼	6⅜
Chino Copper	10¼	10⅜
Davis-Daly Copper	1	1⅛
Ely Consolidated	.45	.50
Gila Copper	..	..
Giroux Mining	6¾	6⅞
Goldfield Consolidated	8 15/16	9
Greene-Canadian	6⅞	7
Harcuvar Copper	..	..
Inspiration Copper	6 15/16	7
Miami Copper	18⅝	18⅞
New Baltic Copper	5	9
Nevada Con. Copper	..	..
Ohio Copper	1⅝	1 11/16
Rawhide Coalition	15½	16
Ray Central	2 5/16	2⅜
Ray Consolidated	16⅝	17
Union Mines	1 3/16	1 15/16
Yukon Gold	4	4 1/16

SILVER PRICES.

		New York cents.	London pence.
June	21	53¾	24¾
"	22	53¾	24¾
"	23	53⅝	24¾
"	24	53½	24 11/16
"	25	53⅜	24⅝
"	27	53½	24 11/16
"	28	53⅜	24⅝
"	29	53½	24 11/16
"	30	53½	24 11/16
July	1	53¼	24⅝
"	2	53	24½
"	4	Holiday	24⅝
"	5	53¼	24⅝
"	6	53⅞	24 15/16

TORONTO MARKETS.

July 8.—(Quotations from Canada Metal Co., Toronto).
Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 34.00 cents per lb.
Copper, casting, 13.15 cents per lb.
Electrolytic, 13.15 cents per lb.
Ingot Bross, 9 to 12½ cents per lb.

July 8.—Pig Iron. (Quotations from Drummond McCall Co., Toronto).
Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee No. 2, $23.00 (f.o.b. Toronto).
Midland No. 1,off the market.
Hamilton No. 1, $20.50 (f.o.b. Hamilton).
Hamilton No. 2, $20.00 (f.o.b. Hamilton).
Clark's, $20.25 (f.o.b. Toronto).
Cleveland, $20.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

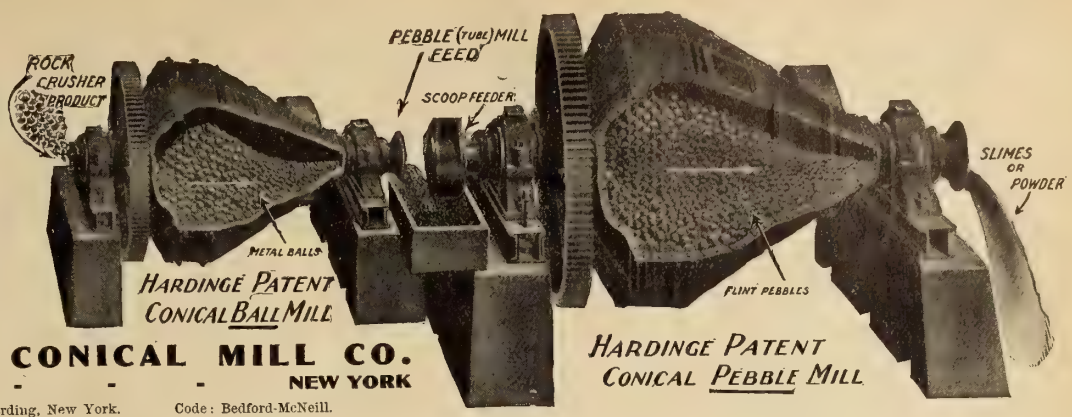
July 6.—Connellsville Coke (f.o.b. ovens).
Furnace Coke, prompt, 1.75 to $1.80 per ton.
Foundry Coke, prompt, $2.10 to $2.25 per ton.

July 6—Tin (Straits), 32.87½ cents.
Copper, Prime Lake, 12.60 to 12.70 cents.
Electrolytic Copper, 12.30 to 12.40 cents.
Copper Wire, 14.00 cents.
Lead, 4.45 cents.
Spelter, 5.35 cents.
Antimony, 22.25 to 23.00 cents.
Sheet Zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.25 cents.
Aluminium, 22.25 to 23.00 cents.
Nickel, 40.00 to 47.00 cents.
Platinum, ordinary, $34.00 per ounce.
Platinum, hard, $36.00 per ounce.
Bismuth, $2.00 per lb.
Quicksilver, $47.00 per 75-lb. flask.

STEP REDUCTION

Wet or Dry

A mining Co. that has paid over $109,000,000 in dividends and is now mining 10,000. tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of."



HARDINGE CONICAL MILL CO.

37 Wall Street, - - - NEW YORK

Cable Address: Halharding, New York. Code: Bedford-McNeill.

MEN OF WEALTH



Are almost invariably the greatest believers in Life Insurance because they recognize the value of a "Cash" estate absolutely secured, and therefore they aim to maintain a considerable portion of their estate in the form of Life Insurance.

The North American Life Assurance Company appeals to business men because of its long record of success and its able and progressive management.

Assets, over $10,500,000. Net Surplus, over $1,000,000. Good Agency openings for energetic men.

HOME OFFICE, TORONTO ONTARIO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

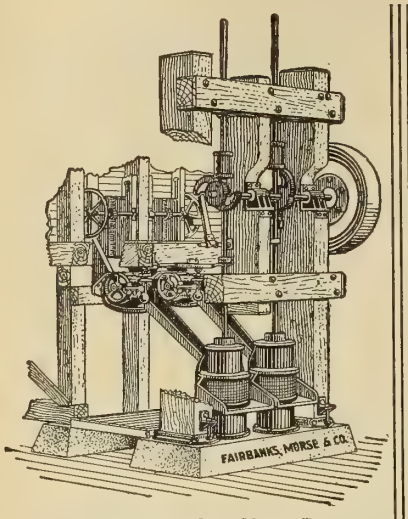
900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

J. S. CARTER, General Agent, 217 McDermott Ave. Winnipeg.

I. E. SUCKLING, General Agent, S. E. Cor. King & Yonge Sts. Toronto

A Better Advertisement Than We Could Write!



Descriptive Pamphlets Upon Request.

ON

NISSEN STAMPS

The Modern Independent Circular Mortar Gravity Stamp.

NORTHERN CUSTOMS CONCENTRATORS, Limited
COBALT, ONT., December 31st, 1909,

The Canadian Fairbanks Co., Toronto, Ont.

Dear Sirs :—

In answer to your inquiry regarding the Nissen Stamps supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one inch hole.

The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening .018. With a coarser screen the tonnage would of course be larger.

The shoes and dies wear even, and the splash is well distributed over the screen.

The arrangements for keeping up the weight of the stamps are very good.

I can recommend the Stamps.

Yours truly,

(Sgd.) F. J. Bourne, Superintendent.

The Canadian Fairbanks Company, Limited.

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults

Montreal, Toronto, St. John N. B. Winnipeg, Calgary, Vancouver.

CONSTANT-HERZIG COMPANY

SUCCESSOR TO

C. L. CONSTANT COMPANY

MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS

42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management

Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office. P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,
Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. Sc.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYERS, E.M., B. SC.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

GROCH & GROCH
Consulting Engineers and Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B. Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

E. B. Ryckman Charles W. Kerr
C. S. MacInnes J. W. Mahon
RYCKMAN, KERR, MACINNES & MAHON,
Barristers, Solicitors, Notaries, Etc.
Cobalt, Canada.
Toronto Offices,
Ryckman, Kerr & McInnes,
Canada Life Building, Toronto

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

W. D. MCPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office; MCPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

S. F. KAVANAGH
Assayer
Minning Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Civil Engineers.
Contractors. Assayers.
Mining Properties bought and sold.
Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont.
Fabre and Chibogamou, Que.
627 Coristine Bldg.,
Phone M-7515 **Montreal.**

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq.. Buffalo, N. Y.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

LONGYEAR & HODGE
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, ROOM 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibrefzing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

H. E. T. HAULTAIN,
Consulting Mining Engineer,
20 KING STREET EAST, TORONTO.

ORE BUYERS

G. W. DIXON,
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

CANADA.—DEPARTMENT OF MINES.

GEOLOGICAL SURVEY

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, and with many local areas and special subjects.

MARITIME PROVINCES

The whole of Cape Breton, and a large portion of the coal and gold fields of Nova Scotia, have been reported upon, and mapped on a scale of 1 mile to 1 inch. The remaining portions of the Province, together with New Brunswick and Prince Edward Island, have been reported upon, and, in the case of the two latter Provinces, mapped on a scale of 4 miles to 1 inch.

QUEBEC

Quebec, south of the St. Lawrence, has been reported upon, and mapped on a scale of 4 miles to 1 inch. Many reports and maps dealing with portions of the Province north of the St. Lawrence are also available.

ONTARIO

A large part of the Province of Ontario, more particularly the northern and western portions, has been reported upon and mapped.

THE PRAIRIE PROVINCES

Geological maps and reports have been issued covering the greater part of the Provinces of Manitoba, Saskatchewan, and Alberta.

BRITISH COLUMBIA

The southern portions of British Columbia, as well as other parts of the Province, have been reported upon and mapped.

YUKON

Many of the important areas in the Yukon have been reported upon and mapped.

THE NORTH WEST TERRITORIES

Many reports and maps dealing with the outlying territory of Canada have been published.

Single copies of a report or map will be sent to Canadian applicants free of cost, and to others at cost of publication.

A complete list of publications will be sent free to any applicant.

Applications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA, ONT.

THE FOLLOWING GEOLOGICAL MAPS HAVE RECENTLY BEEN ISSUED:

CANADA

1084. General Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet.
1025. Waverley Sheet.
1037. Windsor Sheet.

The above sheets belong to the regular series of Nova Scotia map sheets on a scale of 1 mile to 1 inch. The first includes Halifax City and Harbour, the second the Waverley Gold District, and the third Gypsum Quarries.

ONTARIO

1023. Geological Map showing position of Corundum-bearing rocks in Central Ontario.
1076. Gowganda Mining Division.
This map besides representing the geology of the Gowganda area, represents the geography of a considerable area to the east and north.
980. Portion of Algoma and Thunder Bay districts, Ontario, 1908. W. J. Wilson.
1081. Region lying north of Lake Superior between the Pic and Nepigon Rivers, Ontario, 1906. W. H. Collins.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland.
This map, on a scale of 400 feet to 1 inch, besides accurately indicating the topographical and cultural features, shows the geology and location of veins.
1004. Geological Sheet, Rossland Mining Camp. Scale 1200 feet to 1 inch.
1074. Sketch map of Sheep Creek Mining Camp, West Kootenay, B.C., scale 1 mile to 1 inch.

YUKON

1041. Geological and Topographical Map of Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of same belt.

NOTE.—Maps recently published may be had on linen cloth, for use in the field, at 10c. per copy.

REPORTS

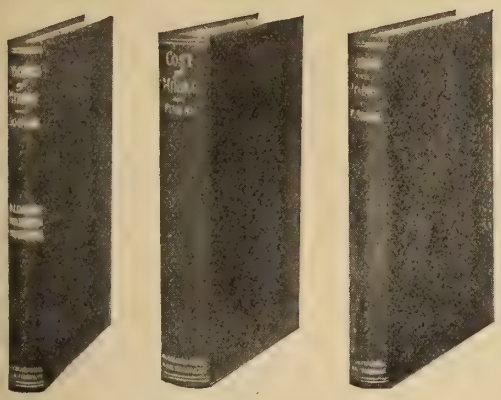
1072. Summary Report of the operations of the Geological Survey for year 1908.
1085. Descriptive Sketch of the Geology, and Economic Minerals of Canada. G. A. Young. Introduction, R. W. Brock.
1075. Gowganda Mining Division, 1908. W. H. Collins.
1035. Coal Fields of Manitoba, Saskatchewan, Alberta, and Eastern British Columbia, 1908. D. B. Dowling.
1050. Whitehorse Copper Belt, Yukon. R. G. McConnell.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MINERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1.00.**

DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **$1.50** paper cover, **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of these books in his library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canada Metal Co.....v
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii
Hardinge Conical Mill Co.....xvii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Nova Scotia Steel & Coal Co..viii
Newton & Treloar xxvii
Nova Scotia, Province of....xxvi
Nissen Stamps xviii
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xxi

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd,, Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for Aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertisers kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Jeffrey Mfg. Co.
Link Belt Co,
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Peacock Bros.
Mussens, Ltd.

Cranes—
Smart-Turner Machine Co., Ltd.
Link Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
McKee & McLeod Co.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link Belt Co.
Mussens, Ltd.
Peacock Bros,

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Mussens, Ltd.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock.
S. Flory Mfg, Co.
M. Beatty & Sons.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Goldie & McCulloch Co.
Peacock Bros.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
S. Flory Mfg. Co.
Jeffrey Mfg. Co.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Canadian Rand Drill, Ltd.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Allis-Chalmers-Bullock.
Peacock Bros.
Canadian Cleveland Drill Co,, Ltd.
Mussens, Ltd.

Miners' Outfits—
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Alex. Fleck, Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Peacock Bros.
Jeffrey Mfg. Co.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link Belt Co.
Waterous Engine Works.

Shafting—
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
B. Greening Wire Co.
Allis-Chalmers-Bullock.
Peacock Bros,
Allan, Whyte & Co.
Jeffrey Mfg. Co.
Mussens, Ltd.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.
Canadian Fairbanks Co., Ltd.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

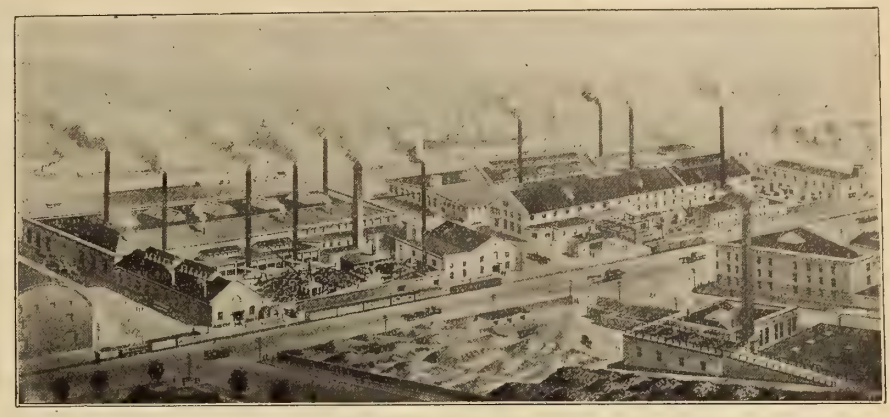
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



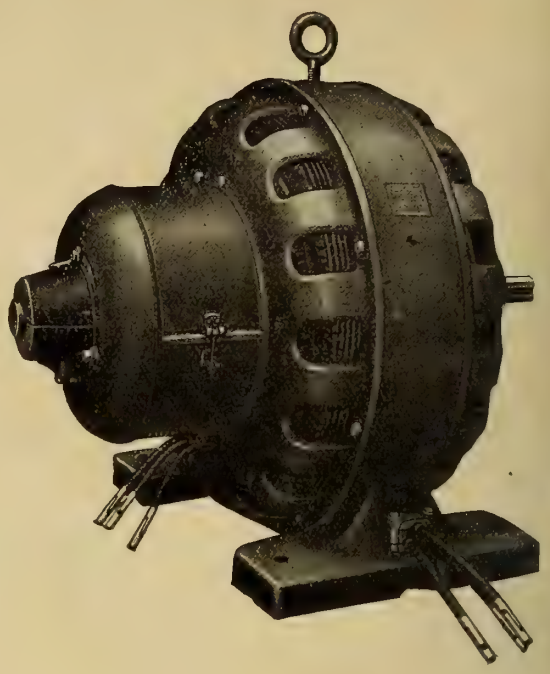
A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse

Type "H F" Polyphase Constant Speed Motors



Particularly adapted to mine service where the motors are required to start under severe conditions with a comparatively low starting current. Their design embraces the best possible balance of the various necessary operating characteristics:

¶ Air gap between rotor and stator to give safe operation for long periods without adjustment.

¶ Practically uniform efficiency between half load and 25% overload, allowing operation over a wide range of outputs.

¶ Provisions for free circulation of air, assuring cool operation.

Westinghouse "H F" Motors are made in standard capacities from 5 to 500 horepower (larger sizes built to order) for 25, 40 and 60 cycle operation:—See Circular 1152.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

A Ten-by-twelve Tent for $9.90

Made of 8-Ounce Duck



THIS is a photographic illustration of a special tent we have had made on a quantity-order basis. In no other way could we supply a tent of this size and quality of canvas for $9.90.

Made of 8 ounce duck, with double sewn seams and re-inforced strain points.

Used either with an outside ridge pole, or a ridge rope stretched between trees. An ideal prospector's tent with plenty of wall.

Dimensions—Height, 7 feet; Length, 12 feet;
Width, 10 feet; Height of walls, 3 feet.

Complete with guy ropes,..... **$9.90**

Poles and pegs if desired, **95c** extra

A "Black-Fly"-Proof Netting

A SPECIAL FLY NETTING with *smaller mesh* than the ordinary mosquito netting, so that it is proof against Black Flies, and all other insect pests. This netting we have had made to meet a special demand from the north country; per yard—9 cents, or piece of 24 yards for..... **$2.00**

36 INCHES WIDE, WHITE OR GREEN.

THE ROBERT SIMPSON COMPANY LIMITED
TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

AUGUST 1st, 1910 SINGLE COPIES, 15 CTS.

THE CANADIAN MINING JOURNAL

VOL. 31 TORONTO No. 15

THE $12,000 PRIZE

IN THE SOUTH AFRICAN STOPE DRILL CONTEST HAS BEEN WON BY THE

HOLMAN DRILL

MUSSENS LIMITED

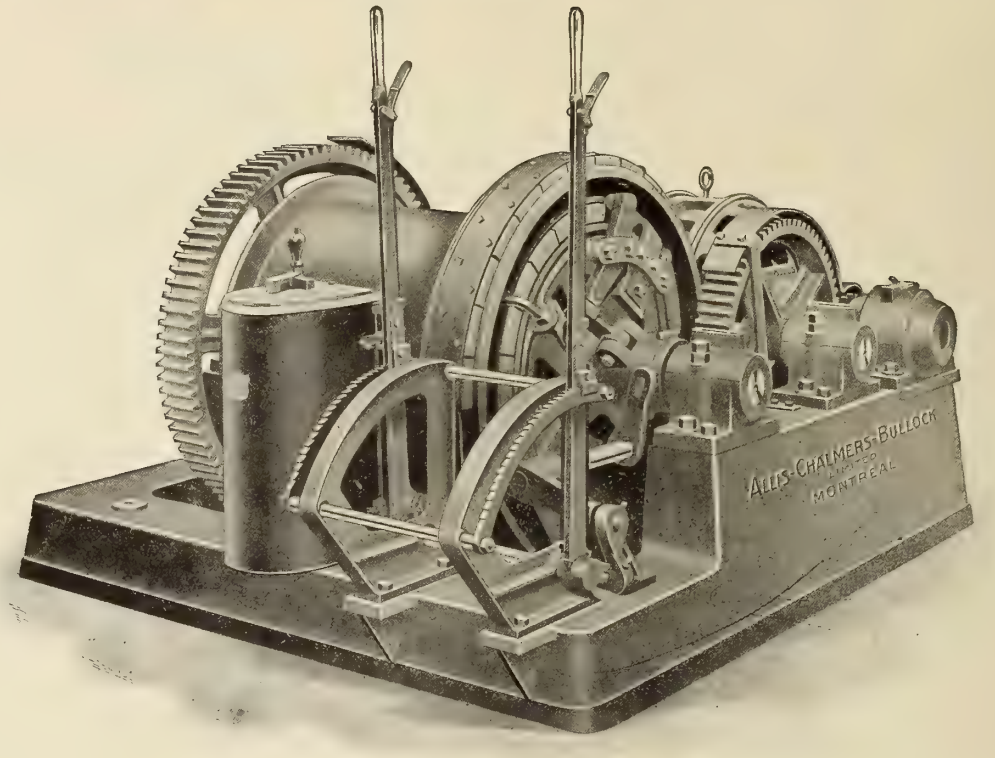
MONTREAL, 318 St. James St. | TORONTO, 73 Victoria St. | COBALT, opp. Right of Way Mine | WINNIPEG, 259-261 Stanley St. | CALGARY, Crown Bldg. | VANCOUVER Mercantile Bldg.

will be glad to send you the latest Holman Rock Drill Catalogue covering Rock Drills for operation by steam or air for all classes of work. Stocks of drills and accessories carried in Canada.

ELECTRIC HOISTS

FOR

MINING WORK



ELECTRIC HOISTS, to give the best service must be designed and built to meet operating conditions. The hoist shown in the illustration is operated by one of our 40 h.p. induction motors and is designed for a load of 3,000 lbs. at a speed of 300 feet per minute.

ALLIS-CHALMERS-BULLOCK

LIMITED

WORKS - - - MONTREAL

SALES OFFICES

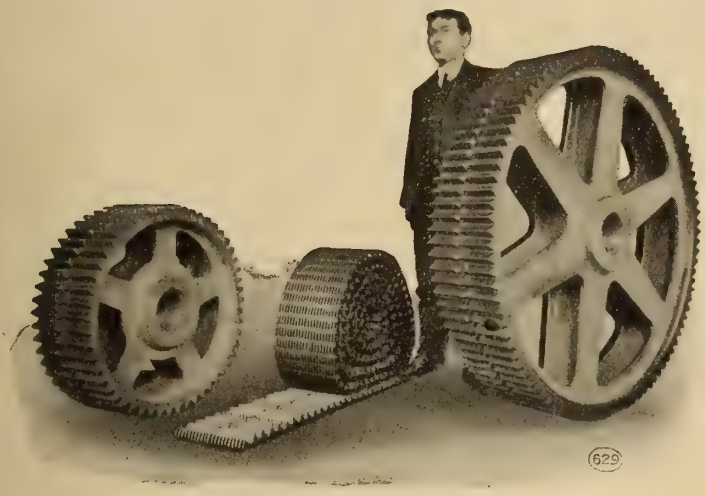
MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

Renold Silent Chains

Transmit at a

High Speed-any Power



150 H.P. Drive to Lineshaft.

and do it as **smoothly** and **quietly** as belts with the certainty of gears.

We have installed a number of these heavy drives in Canada with the greatest of satisfaction.

JONES & GLASSCO

Sole Canadian Agents **MONTREAL**

"CLEVELAND" STOPE DRILLS



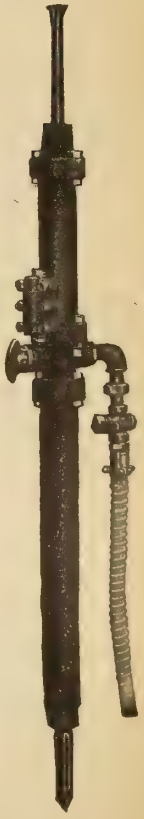
EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just because it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



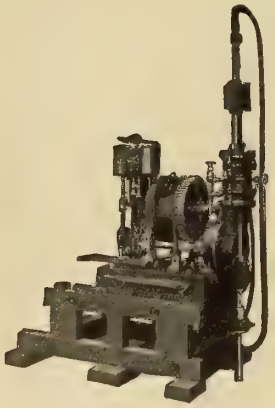
DIAMOND DRILLING VS. A SUBSTITUTE

The "justasgood" process of core drilling is advertised as much cheaper than the "real thing"—"just think of the high price of diamonds."

Nova Scotia is a locality, perhaps the only one, where diamond drills and the "justasgood" are used in the same formation, so that a fair comparison can be made of the two processes.

The following "Deadly Parallel" is made up from figures published in the report of the mines department for the year ending September 30th, 1909. *See Canadian Mining Journal for July 15th.*

DIAMOND DRILL		SHOT DRILL
3378	Total feet drilled	2198
$.79	Total cost per foot	$2.17
.58	Labor and management per ft.	1.17
.038	Diamond or shot loss per ft.	.057
13	Rate of drilling per shift in coal formation—feet	6



Sullivan Steam Driven Diamond Core Drill.

Please note, **first,** that the cost of diamond wear was **less** than the cost of shot wear, **second,** that labor cost is the heaviest item of all, and that shot drilling was twice as expensive as diamond drilling in this particular.

When **accuracy** and **reliability** are considered, the showing is much more in favor of the Diamond Drill.

Do you need drills or drilling work? Let us send catalogue 655, or make you a price per foot on testing your property by contract.

Air Compressors Hammer Drills
Coal Cutters Rock Drills

SULLIVAN MACHINERY CO.

CLAREMONT, N.H. **CHICAGO, ILL., U. S. A.**

BIRMINGHAM DENVER KNOXVILLE PITTSBURG COBALT, ONT. SAN FRANCISCO PARIS, FRANCE SALT LAKE
BUTTE JOPLIN NEW YORK ST. LOUIS NELSON, B. C. SPOKANE SEATTLE SYDNEY, AUS. EL PASO

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

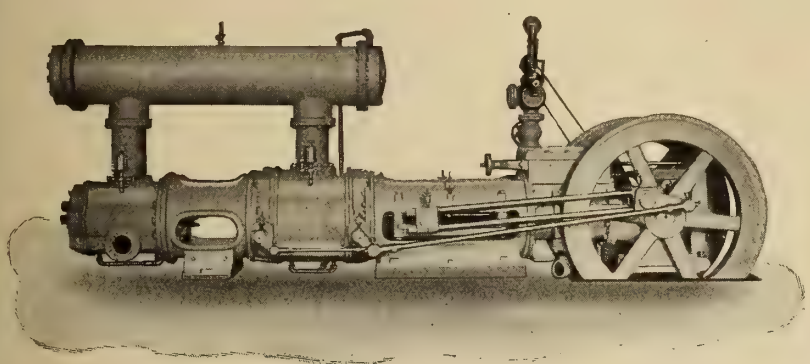
Address nearest office to-day.

THE PATERSON MANUFACTURING COMPANY, LTD.
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Straight Line, Steam Driven Compound Air Compressors

High *efficiency, simplicity* and ease of accessibility are distinct characteristics of the Class C-2 Compressor.

Corliss Inlet Valves on Low Pressure Air Cylinder, giving exceptionally large direct intake areas, practically unlimited life, quiet operation at all speeds and sustained high volumetric efficiency.



A simple direct Corliss Valve motion in which all complications have been eliminated and best efficiency obtained.

Sole Agency for B.C. Drill Steel in Cobalt Territory.

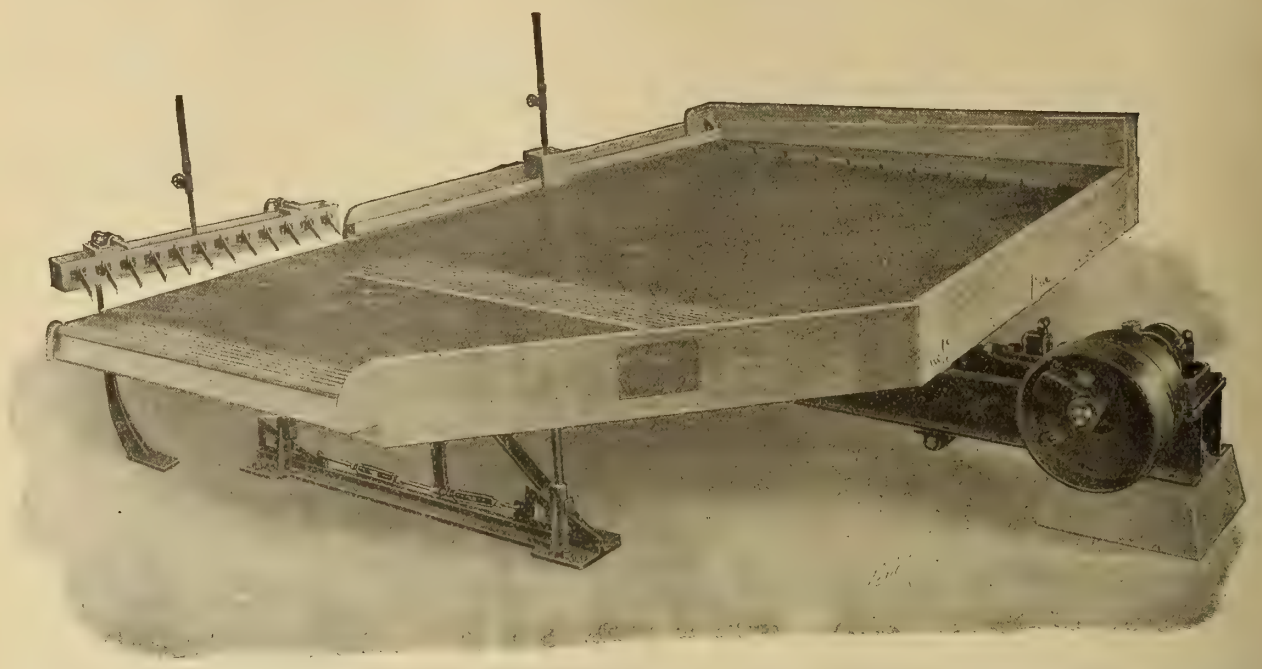
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

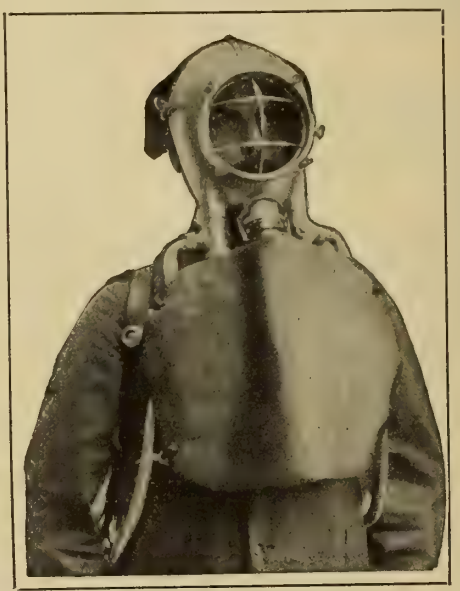
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING. FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

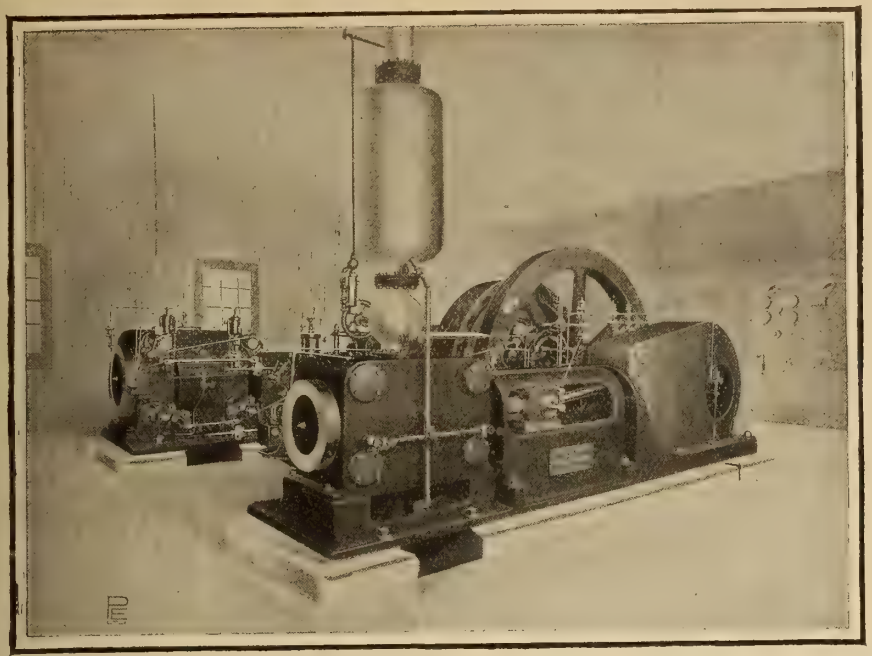
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English, American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



POWER PLANTS
FOR
MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave, Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

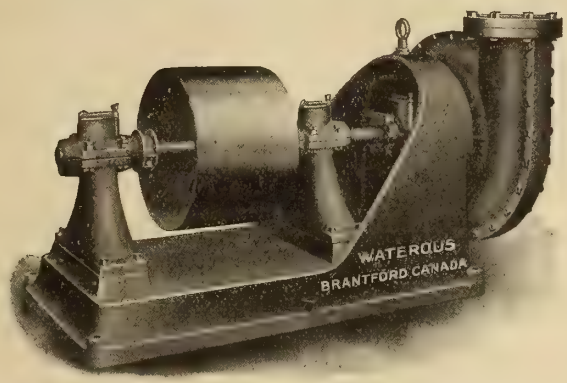
Ask for Catalogues, Prices and all Information.

For Mine Drainage

where compact, durable and easily operated machinery is desirable

OUR SPLIT-BASE PUMPS

will fill every requirement.



—ENGINE, MOTOR OR BELT DRIVEN—

In sizes of 4, 6, 8, 10, 12 or 14 inch opening

Write for Catalogue No. 200

The Waterous Engine Works Co., Ltd. Brantford Canada

EXPLOSIVES

Of Every Description

TRADE MARK — CURTISS & HARVEY LD LONDON — DRAGON BRAND

BEST QUALITY ONLY

Blasting Powder, Compressed Pellets, Dynamite, Gelignite, Gelatine Dynamite and Blasting Gelatine.
Cheddite will not freeze or exude.

Permitted Explosives for Gaseous Mines:—
Bobbinite has the largest sale of any Permitted Explosive.
Excellite, Kolax, Curtisite, Rippite, Etc., Etc.

Only makers of the Celebrated "Diamond ◆ Grain" Black, "Amberite" and "Smokeless ◆ Diamond" Sporting Gunpowders.

Manufactured by

Curtis's & Harvey, Limited

Head Office: 3, Gracechurch St., London, E.C.

THE

Bennett Fuse

Crown  **Brand**

MANUFACTURED BY

William Bennett, Sons & Co.

CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

The Giant Powder Company, Con.

VICTORIA, B.C.
AND AGENCIES THROUGHOUT THE DOMINION.

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS
Rutherglen, Glasgow, Scotland

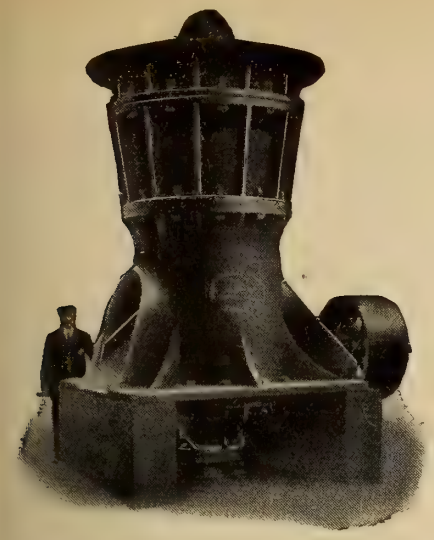
WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz:

Nova Scotia: Wm. Stairs, Son & Morrow, Limited. **New Brunswick: W. H. Thorne & Co., Limited.**
Montreal and Toronto: Drummond, McCall & Co. **Vancouver, B.C.: John Burns.** **Winnipeg: David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables: "Ropery, Rutherglen." Codes: A. B. C. (4th and 5th Editions), A.I., Liebers and Private.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

COAL MINING MACHINERY

Revolving Tipples, Screens, Picking Belts, Chutes, Car Hauls, Complete Plants Designed and Built, Mine Cars, Hoists, Pulleys, Transmission Machinery and Conveyors.

Correspondence Solicited

THE BROWN MACHINE COMPANY, Ltd.

ENGINEERS

NEW GLASGOW = NOVA SCOTIA

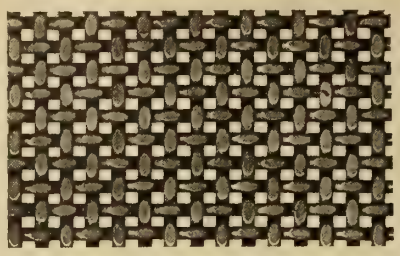
ROLLED WIRE SCREEN

Rolled Steel Wire Cloth

A flattened Steel Wire Cloth has the same smooth surface as perforated metal, with the added advantage of doubling the screening area.

Your enquiries are solicited.

"A SUBSTITUTE FOR



Rolled Steel Mining Cloth

Owing to the increase in the demand for the above materials, we have recently installed a very heavy Rolling Plant and now have facilities for rolling any desired size and weight.

Prices and details on application.

PERFORATED PLATES."

Hamilton, Ont. **THE B. GREENING WIRE COMPANY, LIMITED** Montreal, Que.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

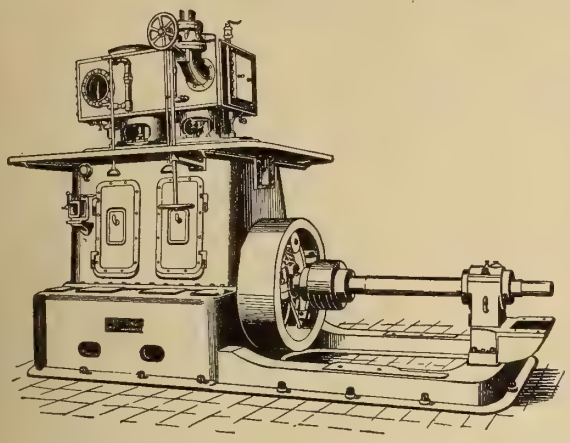
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF

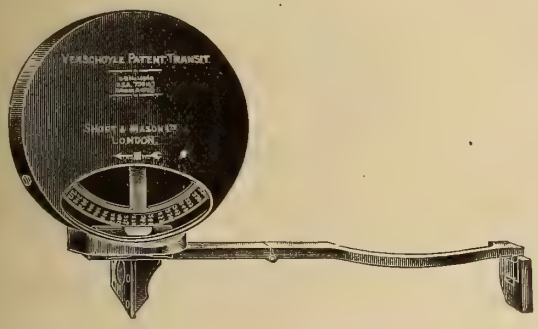


Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker - Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments
FOR
Civil, Mining Engineers & Surveyors



THE VERSCHOYLE POCKET TRANSIT
combines the useful features of the Abney Level, Prismatic Compass and Clinometer

For preliminary surveys of every description

Catalogue On Request

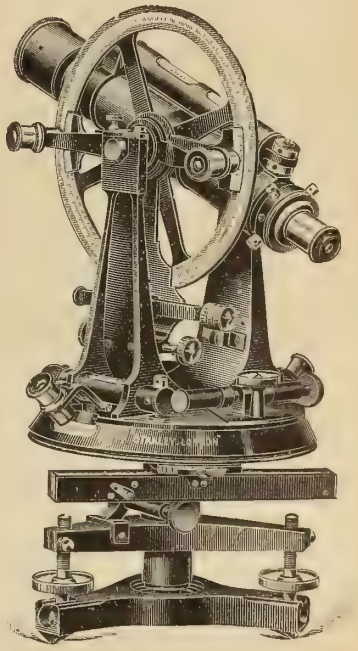
Eugene Dietzgen Co.
LIMITED,
TORONTO, - 10 SHUTER STREET

STANLEY, LONDON

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our J65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK



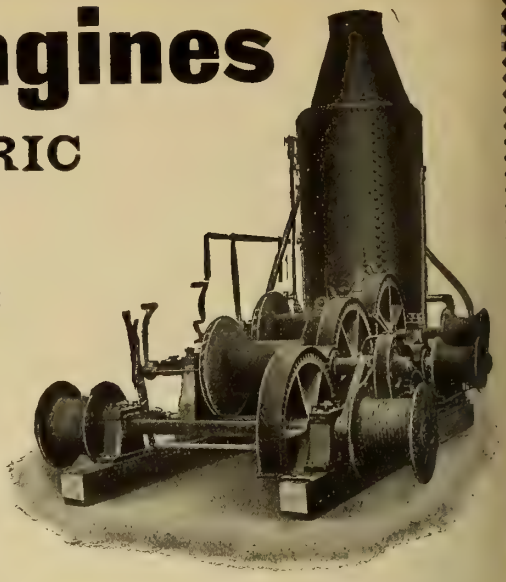
New Pattern Transit Theodolite with Through Compass

W. F. Stanley & Co., Limited
Great Turnstile, London, England

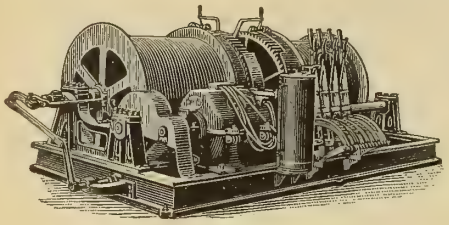
Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.



The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.

MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.



WHERE IT'S ALWAYS COOL

Get away for the week-end for a rest, a comfortable fishing trip, or change of air and scenery.

ASK FOR A WEEK-END PAMPHLET

HAVE YOU TRIED

KAWARTHA LAKES

STONEY LAKE, ETC

Reached via Bobcaygeon, Peterboro or Lindsay — Immediate connection with C.P.R. trains.

ASK FOR ILLUSTRATED FOLDER

POINT AU BARIL

"THE FINEST SUMMER RESORT ON THE GEORGIAN BAY"

Steamer "Wanakewan" leaves C.P.R. Station wharf for Island Resorts—Immediate connection.

ASK FOR ILLUSTRATED FOLDER

MUSKOKA LAKES

BEST REACHED VIA BALA

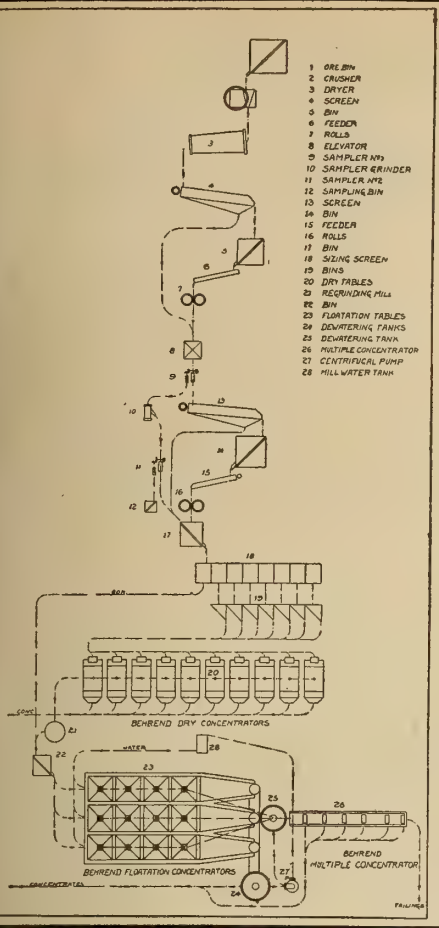
Lv. Toronto:
9:40 a.m. daily 12:15 p.m. week days
6:05 p.m. week days 10:10 p.m. daily

ASK FOR ILLUSTRATED FOLDER

CANADIAN PACIFIC RAILWAY

THE LINE FOR ALL VACATION SPOTS

R. L. THOMPSON - - District Passenger Agent - - TORONTO



FLOW SHEET

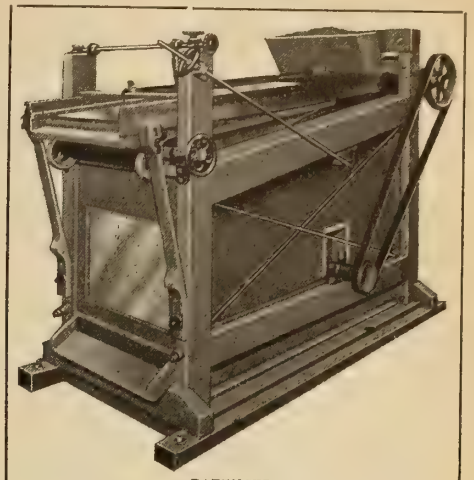
OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM

OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED
32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

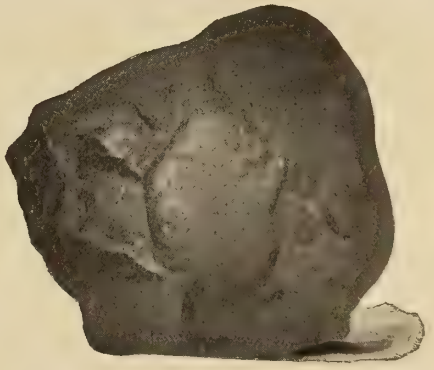
NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,
108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - - 225 E. Maple St.

When wanting goods write nearest office.

TO BE SEEN AND OBTAINED AT THE OFFICES OF THIS PAPER.

NOW READY

Published February 9th. ***Twenty-fourth Year.***

Containing all the latest information up to within a few days of publication.

THE

MINING MANUAL

1910

BY WALTER R. SKINNER.

The Standard Reference Work on Mines.

Price 17/- net Post Free (Abroad).

1,600 pages. In demy 8vo, handsomely bound in RED cloth.
A record of information concerning

MINING COMPANIES

(Gold, Diamond, Silver, Copper, Tin, Iron, and other Mines, Collieries, Land, Exploration and Mining Investment Concerns, &c.)

Arranged in three sections—

Australasian, African, Miscellaneous,

Preceded by Tables of Crushings and followed by lists of Mining

DIRECTORS, SECRETARIES, MINING and CONSULTING ENGINEERS and MINE MANAGERS.

Their Names, Addresses, and Descriptions, and Names of the Companies with which they are connected, and a

DICTIONARY OF MINING AND OTHER TERMS.

THE MINING MANUAL for 1910 contains particulars of over 3,600 Companies arranged in three sections, 430 Companies being AUSTRALASIAN (including Western Australia, Queensland, Broken Hill, Deep Leads, New Zealand and Tasmania); 1,030 AFRICAN (including Transvaal, Rhodesia ,West Africa, Cape Colony, Natal, Egypt); and 2,140 MISCELLANEOUS (including Siberia, Mexico, India, British Columbia, America, &c., and the Coal, Iron, Tin and other Mining concerns of the United Kingdom). The particulars given of each Company include the Directors and other officials; date of establishment; seat of operations; description of the property, with the purchase consideration; plant erected or in course of erection; present working results; ore reverses; details of capital; calls; dividends paid; and the financial position as disclosed by the accounts. Highest and lowest prices of the shares for the last four years, also latest price. The three sections extend over 1,100 pages,

Crushing tables and Gold Outputs from the principal mines are given at the commencement of the volume, showing tons treated monthly, results obtained, and yield per ton; also annual yields.

The Lists of Directors (8,000), Secretaries (1,900, Mining and Consulting Engineers and Mine Managers (1,400) include their addresses and descriptions and names of the Companies with which they are connected.

A complete Alphabetical Index, containing the names of 5,300 Companies and including many useful items of reference, occupies 42 pages.

Full particulars of all Re-constructions, Re-organisations and Amalgamations durlng 1909 are given in a simple and concise form.

LONDON:

WALTER R. SKINNER, 11-12, Clements Lane, Lombard St. E.C.

Nat. Tel.: 1323 Avenue. Tel. Address: Capitalist, London.

"LINK-BELT" CONVEYING MACHINERY FOR COAL MINES



Retarding Conveyor, United States Coal and Coke Co. Anawalt, W. Va. Total length, in three sections, 1200 ft. Average capacity, 150 tons of run-of-mine coal per hour.

We Design and Construct:

Retarding Conveyors
All kinds of Chain Conveyors
Belt Conveyors
Car Hauls
Tipples
Coal Pockets
Bucket Carriers
Screw Conveyors
Picking Bands
Washeries
Coaling Stations
Power House Fueling Equipments
Lumber and Log Hauls
Car Loaders and Unloaders
Steel Casings
Rotary, Stationary and Shaking Screens
Conveying and Power Transmission Chains.
➢ FLINT-RIM ≺ Sprocket Wheels, Small Rollers and Truck Wheels for Conveyors, Carriers and Cars
Industrial Cars and Tracks
Steam and Electric Locomotive-Cranes
Chutes
Hoppers, Feeders
Weigh Boxes, Crushers
Elevator Boots, Buckets
Bearings
Takeups
Friction Clutches
Jaw Clutches, Etc.

We have issued a revised edition of our Book, copies of which will be sent to any address you specify.

LINK-BELT COMPANY

PHILADELPHIA 299 Broadway **CHICAGO** 1501-2 Park Building **INDIANAPOLIS**

NEW YORK PITTSBURGH

Central Nat'l Bank Building
ST. LOUIS

439-440 N.Y. Block Lindrooth, Shubart & Co.
SEATTLE DENVER

Wilmot Machinery Co.
NEW ORLEANS

SAN FRANCISCO, Eby Machinery Co.

ACKROYD & BEST, Ltd.

MORLEY, LEEDS, ENGLAND.

CANADIAN AGENTS

Messrs. G. .M GRAHAM & CO.

North Sydney, C. B.

Are the only makers of an unpickable Magnetic Lock, and of an Electrically-lit Oil Lamp having a snuffer which completely snuffs the wick, and are the only makers of a Relighting Machine for the Mine which is Flame and Fool Proof.



Battersea Assay Goods

Battersea goods, clay and plumbago, have won for themselves a world wide reputation. They are manufactured for melting gold, silver, copper, iron, etc., etc., and are stocked by us in Montreal, ready for *immediate* shipment in an endless variety of shapes and sizes, crucibles, scorifiers, muffles, etc.

We carry a FULL LINE of THESE GOODS.

SOLE AGENTS

LYMANS, Limited

Wholesale Druggists

Importers and Dealers in Chemical and Assay Apparatus.

ST. PAUL STREET, MONTREAL.

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

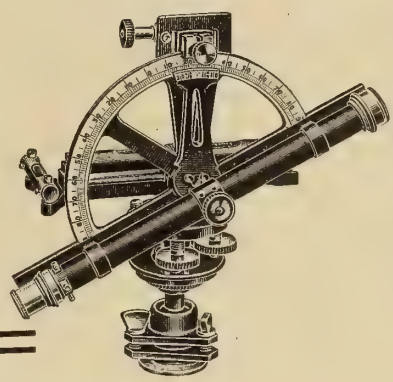
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Hayes' Mining Level

Specially designed for accurate levelling and for taking angles of inclination in mines. Equipped with a ball and socket motion for rapid levelling—can be levelled anywhere in 15 seconds. A great time-saver and invariably accurate. With telescope attachment or sights.

A well-built and minutely accurate instrument with advantages too numerous to explain herein.

Catalogue F sent free.

Joseph Casartelli & Son

Scientific Instrument Makers

43 MARKET STREET

MANCHESTER, ENG.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys, Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co., Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire-threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.

And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.

Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

Specify Distinctly  Allen's Stag Brand

"STAG" BRAND.

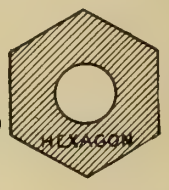


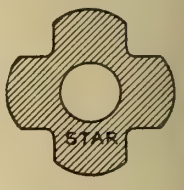


SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock





SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

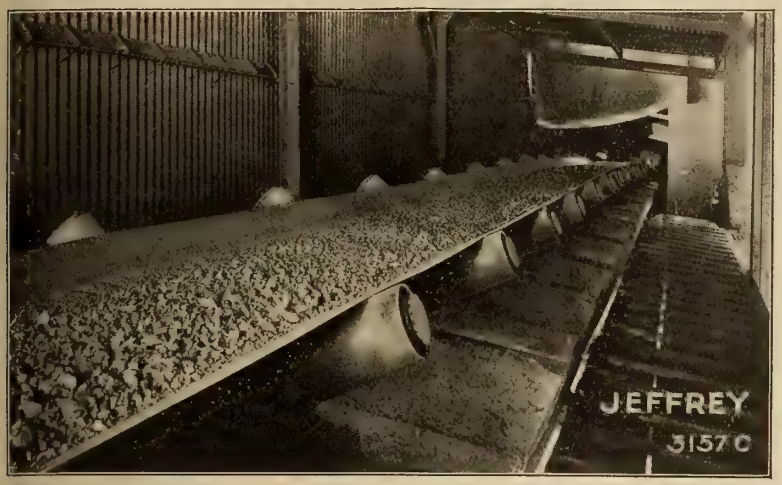
Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL

WHY NOT INSTALL A JEFFREY CONVEYER?



JEFFREY RUBBER BELT CONVEYER HANDLING COAL

They reduce the cost and simplify the handling of Coal, Ores, Sand, Gravel, and all materials which are transferable.

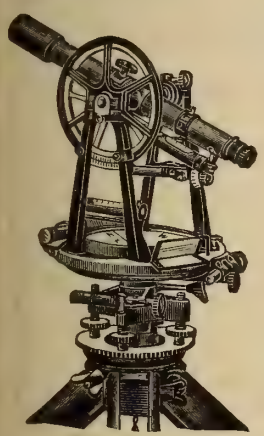
JEFFREY CONVEYERS are designed and built in styles and capacities suitable for whatever material they are to handle and whatever conditions they are to operate under.

We solicit an opportunity to figure on your conveying requirements and shall be glad to send you Catalogue X 81 illustrating our systems in operation.

The Jeffrey Manufacturing Co.,

Canadian Office and Works, Montreal, Cote and Lagauchetiere Sts.

Toronto Office, 8 Temperance St. - Main Office and Works, Columbus, Ohio.



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES :

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

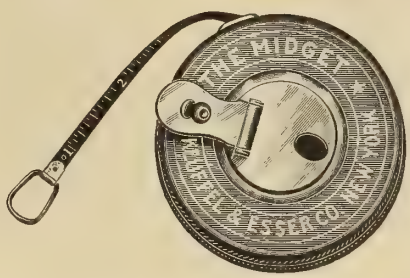
Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196

Measuring Tapes



K & E Measuring Tapes possess every desirable quality—clearness, accuracy and durability. They are made in largest variety to meet every requirement of engineering work.

All **K & E** Steel Tapes have the KECO finish, which produces an even black tape line with brilliant, bright steel graduations and figures. The KECO finish guards against rusting and obviates the necessity of greasing the line to protect it.

Send for Complete Catalogue.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

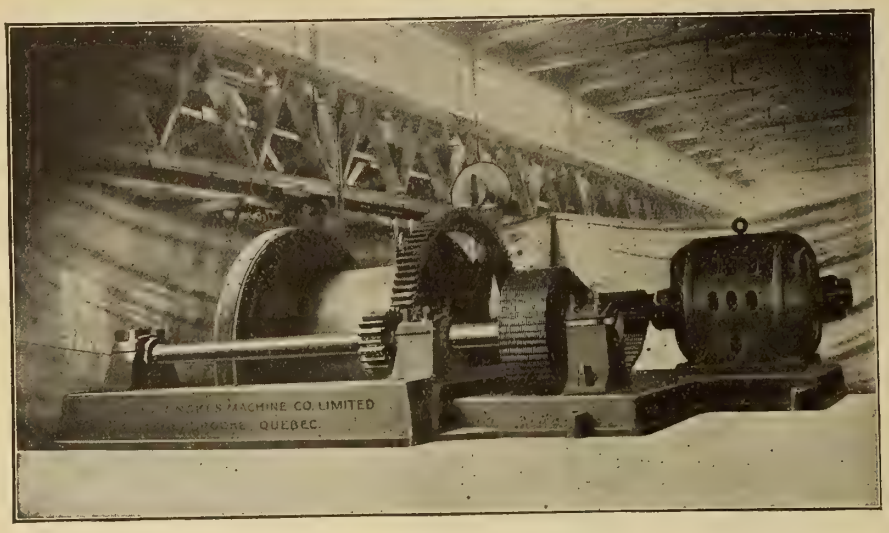
General Office and Factories

HOBOKEN, N J.

New York Chicago St. Louis San Francisco

Mathematical and Surveying Instruments

Drawing Materials Measuring Tapes



OUR Hoists are compact in design, of heavy construction and sightly in appearance.

We now build electric driven hoisting machines having silent chain drives from the motor.

In all sizes, for every service.

FOR FURTHER PARTICULARS WRITE US

The Jenckes Machine Company, Limited

Mining Machinery, Pulp Mill Machinery, Steam and Water Power Plants

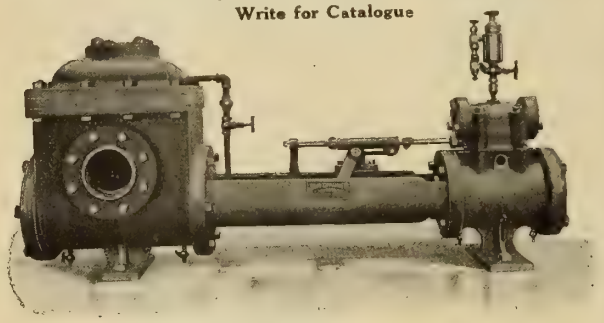
SALES OFFICES:

Sherbrooke, Montreal, St. Catharines, Cobalt, Vancouver

WORKS, SHERBROOKE, QUE. and ST. CATHARINES, ONT.

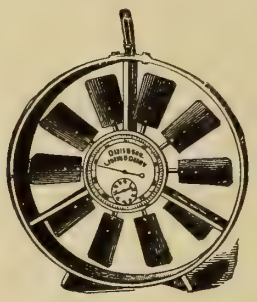
Power & Steam Pumps, Condensers, Travelling Cranes

Write for Catalogue



THE SMART-TURNER MACHINE COMPANY, Limited

HAMILTON, CANADA



DAVIS DERBY.

ANEMOMETERS

WATER GAUGES

HYGROMETERS

(STOCK AT MONTREAL)

SEND FOR CATALOGUES

PEACOCK BROTHERS

68 BEAVER HALL HILL

MONTREAL

Write for pamphlet No. 42 M.

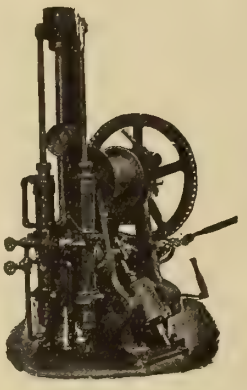
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, August 1, 1910 No. 15

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 449
(a) The Two Functions of Rescue Apparatus..... 449
(b) The Passing of Le Roi..... 449
(c) To The Investor 450
(d) The Geologist and His Glim..... 450
(e) The Technical Education Commission..... 450
(f) The Hammer Drill..... 450
(g) Editorial Notes..... 451
Growth of Steel Output in Canada..... 451
Personal and General 451
Early Copper Mining in the Province of Quebec, by James Douglas 452
An English Gold Stamp Battery in South Africa, by F. C. Perkins 456
Mineral Production in British Columbia in 1909..... 457
Mine Rescue Stations in British Columbia..... 460
Canadian Mining Institute 460
Hammer Drills in Overhand Stoping and Raising, by H. B. Williams 461
Canadian Minerals at the Brussels Exhibition..... 463
The Dinner Hour 464
Personal and General 464
On the Distribution of Asbestos Deposits in The Eastern Townships of Quebec, by John A. Dresser..... 465
The Clay and Slate Deposits of Nova Scotia and Portions of New Brunswick and Prince Edward Island, by Heinrich Ries 470
Correspondence 471
Special Correspondence 472
General Mining News 475
Company Notes 476
Statistics and Returns 477

THE TWO FUNCTIONS OF RESCUE APPARATUS.

Although rescue, or breathing, apparatus was primarily designed for the salvage of life after explosions in collieries, yet in practice the devices have been more utilized in fighting fires.

Experience has thus taught us the underlying principle, namely, that the provision of rescue apparatus for fighting fires in mines is a matter to be left in the hands of mine owners, but that the salvage of life after explosions, or in circumstances involving great danger to the rescuers, is one that concerns the Government more than the individual owner.

This principle has been recognized by the Home Secretary of Great Britain. In effect it has been acted upon by several Canadian collieries. But our Governments, both Provincial and Federal, have been exceedingly tardy in taking any steps whatever.

As matters now stand, those of our collieries that possess rescue stations may be called upon at any time to furnish assistance to other mines. This is absolutely unfair. In rescue work there is always a large element of risk. That risk is unreasonably large when the rescuers attempt salvage work in mines with which they are unacquainted. Indeed, it is debatable if such requests should be granted.

In these circumstances it is manifestly the duty of the Federal Government, and equally the duty of the Provincial Governments, to see to it that all coal mining centres are provided with the means of instructing coal miners in the use of rescue apparatus. Whilst mine owners must do their part, the Government cannot afford to ignore the moral obligation resting upon its own shoulders.

The subdivision of responsibility as indicated above forms the only practicable basis upon which joint work can be begun.

THE PASSING OF LE ROI.

There is something unspeakably tragical in the failure of a full-grown mining enterprise. Some years before the Rossland boom began, two French-Canadians, Morris and Bourgeois, staked the Le Roi claims. In 1892, Col. I. N. Paton, of Spokane, Washington, took over the mine. In 1893 extensive development was commenced. One year later the meteoric Augustus Heinze came on the scene. He it was who built nine miles of railway from the mine to Trail; also he erected a smelter wherewithal to treat the ore. Just after the height of the boom, ex-Governor C. H. McIntosh, known to all adult Canadians, came on the scene as a representative of one of Whittaker Wright's syndicates. After purchasing Le Roi for a sum exceeding $4,-000,-

000, the syndicate undertook to develop and prospect the property on a scale that was, perhaps, hardly warranted. A smelter was erected at Northport. Diamond drilling was begun, and sinking and driving pushed vigorously.

At least $20,000,000 in gold has been taken out of Le Roi. For some reason—there are those who assert that the mine has suffered from a surfeit of London management—Le Roi has never yielded continuous profits. In any case, its tenuous existence has been brought to a close. And simultaneously expire the hopes and expectations of many hundred unfortunate shareholders.

TO THE INVESTOR.

The mining boom serves a special purpse. It advertises the country, it stirs men to abnormal activity, it induces the circulation of enormous sums of money. These are its benign aspects. We need not dwell upon the other side of the shield.

But, psychologically, the mining boom leads men astray. Currents and gusts of enthusiasm sweep the investor off his feet, he follows the crowd, and, usually, is lost. . . .

We have recently returned from a visit to Eastern Canada. In those parts precious metal mining is supposedly dead. Despite this popular impression, we feel safe in stating that nowhere in Canada are there more numerous and more easily available opportunities for making legitimate profits in mining of all kinds.

It were unseemly to be too specific. We should hardly care to be the moving cause in a wild rush to the east. But it is at least impressive to run over the list of minerals that are known to exist in workable quantities. That list includes tungsten, gold, antimony, manganese, gypsum, barite, infusorial earth, talc, copper, and iron. Prospects of tin are known. Throughout certain portions of Quebec alluvial gold awaits modern investigation. It may be asserted without fear of contradiction that nowhere can the investor acquire promising property more cheaply and nowhere can he, in the main, get a better run for his money.

THE GEOLOGIST AND HIS GLIM.

Many centuries ago a Chinese prophet brought upon himself the scorn and contumely of a younger generation because he refused to commit himself to an opinion concerning the future life. To-day that prophet's name is still revered. His critics are lost in the beneficent obscurity of the ages.

The modern analogue of the Oriental prophet is the geologist. His business in life is to make a commercial diagnosis of scenery. So varied and so open to various interpretations is the evidence of nature that the geologist must often halt and stumble. Hence he gives the young scoffer his opportunity. And from all sides we hear shrill voices rising against the geologist.

Whilst we shall refrain from expressing our own opinion as to the ultimate value of the geologist, we shall not miss the chance of expressing our sincere sympathy for him. His is a most distressing lot. His mistakes are chalked up against him for all time. His achievements are not remembered. Is it possible that he should be more dogmatic? Is it probable that he obscures his light under a bushel of technical terminology? Perhaps, and we make the suggestion in all due modesty, perhaps if the geologist were to talk to us in words of one syllable, all of us would be happier.

THE TECHNICAL EDUCATION COMMISSION.

The universal tendency to sneer at Royal Commissions has not been so marked in the case of the recently appointed Federal Commission on Technical Education. Sneers there will be, but we believe that all serious citizens hope and expect excellent results from the work of this latest Commission.

The cordial welcome extended by the city of Halifax, when the Commission's labours were formally opened, was a most auspicious start. Without undue loss of time the Commission tackled its proper work, the work of collecting facts, figures, and opinions, as to the educational needs of this country. At present the Province of Nova Scotia is being covered. Later the whole of the Dominion is to be worked over.

We believe that from the array of evidence to be collected by the Commission many valuable facts will emerge. Its final report should be a document of great significance. But we are yet firmly of the opinion that the Commission lacks balance, inasmuch as its membership comprises no representative of the mining industry.

This omission can easily be rectified. The point should be pressed upon Ottawa insistently and unremittingly.

THE HAMMER DRILL.

One of the most interesting of recent papers is that entitled "Hammer Drills in Overhand Stoping and Raising." As the author, Mr. H. B. Williams, gained his experience in a Canadian mine, the paper has a particular claim upon our attention.

The comparative merits of the reciprocal and of the hammer drill are not yet determined. Much can be said on both sides. Probably both types have been unfairly criticized. But the fact appears to be established that the hammer drill is a necessity in narrow stopes. Mr. Williams' statement of comparative costs is startling, and his general assertions as to the efficiency of the hammer drill are most radical.

EDITORIAL NOTES.

From the Quebec asbestos regions come reports of much activity. Within a short time four new mills have been put in operation, one at Black Lake, one at Thetford, and two at Robertson. Labour is plentiful, and no shortage is expected.

On June 1st, 1911, the taking of the next census of Canada will commence. It is to be hoped that all concerned in the mining industry will do everything possible to aid the census-taker. It is of prime importance that the industry be given proper recognition.

By late advices we learn that proclamation has been made of new Coal Mine Regulations in the Province of British Columbia. These call for the provision by owners of coal mines of adequate rescue apparatus, supplementing the Government stations and trained rescue crews.

The "Daily News-Advertiser," Vancouver, supports the CANADIAN MINING JOURNAL in its remarks upon the failure of the Minister of Labour to see that the mining industry was represented on the Commission on Technical Education. Our contemporary reminds its readers that the matter is one that should appeal with especial force to citizens of British Columbia.

Several correspondents have drawn our attention to the fact that Hon. Mr. Templeman has failed to evince practical interest in the establishment of rescue stations. As the Hon. Mr. Templeman has pledged his word definitely to support this movement, we are disappointed at his indifference. We suggest that a prod or two from mine operators would do no harm.

GROWTH OF STEEL OUTPUT IN CANADA.

The growth of the pig iron production in Canada, as well as that of the Dominion Corporation, since 1901, is clearly shown in the following table:

	Total for Canada. Tons.	Prod. of Dominion Steel Co. Tons.
1909	609,400	255,900
1908	686,800	262,800
1907	416,600	257,000
1906	585,400	210,100
1905	390,200	162,200
1904	277,700	96,600
1903	323,700	155,130
1902	348,600	191,000
1901	165,900	111,000

The above figures show that the company has increased its production of pig iron from 111,000 tons in 1901 to 262,800 in 1908 and 255,900 in 1909, the slight loss in the latter year as compared with 1908 being due to the inadequacy of the fuel supply received from the Dominion Coal Company. The output of steel ingots has been as follows:

	Total for Canada. Tons.	Prod. of Dominion Steel Co. Tons.
1909	570,600	296,750
1908	662,000	279,500
1907	606,500	269,000
1906	569,200	235,300
1905	300,400	163,150
1904	128,900	62,850
1903	260,600	135,300
1902	136,400	99,400
1901	33,300	.....

The Dominion Company began to turn out steel in 1902 when it totalled 99,400 tons, increased since then to 296,750, an even greater gain than that recorded in the pig iron production.

The Government bounties on pig iron and steel ingots expire on December 31st this year, and those on wire rods, which were given in lieu of tariff, on June 30, 1911. It is thought that when the different bounties are terminated they will be replaced by a protective tariff, although the cessation of the bonuses indicates that the steel industry in Canada is thought to have established itself upon a firm and lasting foundation.

To take care of future business, the corporation has been carrying out extensive plant alterations and improvements, which will also materially reduce productive costs and increase the total capacity 50 per cent. The first new work to reach completion is the set of coke ovens which embody all the improvements of the last ten years. There are 120 of these, requiring the service of 56 men and capable of turning out 720 tons of coke every 24 hours. The 500 old ovens produce about 1,250 tons of coke a day.

Following these the open hearth furnaces will be finished and will be among the largest in the world, with a capacity of 500 tons each. A new power plant is under way, as well as a finishing plant, which will consist of a continuous roughing mill and Belgian train.

These improvements were provided for in the consolidated mortgage bonds issued last year, about $2,285,000 of the $5,000,000 total being set aside for the purpose.

During the past four seasons, net earnings have averaged about $2,327,715 a year, but after the different betterments have been completed the income account ought to show a gain corresponding with the greater capacity.

PERSONAL AND GENERAL.

Mr. H. E. T. Haultain has opened an office at 41 National Trust Chambers in connection with his work as consulting mining engineer.

Early in July Mr. A. A. Hassan left Cobalt for Porcupine. His visit to Porcupine will probably cover the whole month.

Mr. Edward Slade, who was recently manager of the Amalgamated Asbestos Corporation's properties at Black Lake and prior to the merger was manager of the British-Canadian Asbestos Company, has, it is understood, been appointed general manager of the Black Lake Consolidated Asbestos Company. This appointment is considered by the Black Lake Company to be an especially satisfactory move, as Mr. Slade has a high reputation in the asbestos industry.

EARLY COPPER MINING IN THE PROVINCE OF QUEBEC.

By James Douglas, LL.D., New York.

(Canadian Mining Institute, Annual Meeting, Toronto, 1910.)

Sir W. E. Logan, in his report for 1847-48, as Director of the Canadian Geological Survey, refers to copper in the Eastern Townships, and states: "The quantity appears to be too insignificant, in any case, to be worthy of further notice, with the exception of three deposits, where the ore, occurring in veins bearing the character of regular lodes, seems to be sufficient in amount to justify the risk of small careful trial. . . One locality is on the 4th lot of the second range of Inverness, in the occupation of Mr. George, where, on the east southeast side of a valley not far from the position which would be in the direct run of the associated serpentines and dolomites of Leeds and Inverness, a vein of opaque white quartz occurs in chloritic and talcose slates, and, coinciding in its direction with the strike of the measure, maintains with the valley a course a little to the north of east. The quartz vein, a mixture of chlorite, presents the thickness of about two feet, and the ore is disseminated in it in irregular patches and lenses, some of which weigh upwards of a pound; but the patches at the outcrop, in the spots experimented upon, are so thin that, notwithstanding the product of the pure ore, which is variegated copper, is upwards of 60 per cent., the whole two feet of the lode do not yield more than 0.74 per cent cwt., which would not give more than 90 pounds of copper in a fathom forward by a fathom vertical."

Nevertheless, it was on this not very flattering showing that the Megantic Mining Company was organized soon after the date of Sir William's report. The company secured other copper lands in New Ireland and Halifax Townships, and it still exists—the only survivor of the many organizations chartered in those early days.

My personal recollections are of spending my summer holidays of 1850 at these mines in Inverness. I recollect my father finding one of the shareholders reading by the light of a candle stuck into the blasting powder of an open keg, and another calculating seriously on the best way of disposing of his enormous prospective fortune and deciding on patriotically paying off the British national debt.

The copper deposits of Inverness which were then worked resembled the small rich gash veins which were subsequently opened more extensively in Leeds, but which proved in both places too unproductive in quantity to support a mining organization. I do not think the George veins were ever found to be associated with interstratified beds, though further development may show that such connection exists.

Some desultory work was done in Inverness as late as 1856.

The discoveries in the neighbouring Township of Leeds had withdrawn attention from those of Inverness. The same promoters and stockholders were interested in both. Dr. Douglas, when in England in the spring of 1853, interested the firm of John Taylor & Sons sufficiently to induce them to send out the well known mining and metallurgical engineer, John Arthur Phillips, to report on this prospect. I have not the report he made to them at that date; but in 1856, when the Quebec and Saint Francis Mining Company was organized to purchase and work the mine, Mr. Phillips supplied the company with the following statement:

Report of the Mines of the Quebec and St. Francis Mining Company.

"The lands acquired by the Lower Canada Mining Company in the Township of Leeds, County of Megantic, visited by me in company with Captain F. Kent in 1853, are principally composed of talcose chloritic and micaceous shales, of which the stratification in some localities is disordered, but has a general run approaching east and west. Their underlie, though variable in amount, is almost without exception towards the north.

"At Harvey's Hill, to which the attention of the company has been chiefly directed, a large mass of steatite crops out on the southeastern side of the concession. This substance contains in many places crystals of carbonate of iron; numerous specimens of asbestos were also remarked, and some of the shale beds contain large radiated masses of crystallized hornblende.

"The whole of this district is traversed by courses of white opaque quartz, which vary in thickness from a few inches to several feet. These in some instances appear to follow the general direction of the stratification of the country, whilst in others they are evidently true lodes intersecting the surrounding strata at a strong angle.

"Such veins in some cases contain copper, specular iron and arsenical pyrites, but are seldom accompanied by any considerable amount of gossan.

"The shale in the neighbourhood of these veins frequently contains well-defined crystals of iron pyrites. The general run of the true veins is about 30 degrees east of north, whilst their underlie, which is extremely variable in amount, is usually towards the west.

"In the Harvey Hill property at least five of these veins occur, and are all more or less spotted with spathose iron and grey copper ore. In addition to the veins above mentioned, and which vary in thickness from eight inches to three feet, this locality exhibits branches of rich copper ore.

"On arriving on the ground we found that with the exception of some very ill-directed shoading, no mining operations of any description had been carried on, and that these veins had been merely opened to such an extent as to admit of the extraction of some barrels of ore, which were forwarded to London.

"After having completed our general survey of the whole district, we set two men to open on the backs of the branches before mentioned. That called the Brook Lode was thus uncovered for a distance of about ten fathoms, and found to run thirty degrees east of north, with an underlie of one and a half foot in a fathom towards the northwest.

"At both extremities of the cutting, which was nowhere above four feet in depth, very excellent stones of grey copper ore were extracted; but towards the middle of the opening from two to three fathoms of unproductive ground were found to occur.

"We raised during our operations at this place eight cwt. of very fine copper ore, which was brought down to Quebec and forwarded to London.

"This lode, which at the time of suspending our operations was evidently improving in the eastern end both in size and produce, was again cut by an open drift about eighty fathoms south of the point last mentioned.

"In this locality, although much disturbed, very beautiful stones of horse-flesh ore are found, it being from this place that the finest specimens sent to England were procured.

"About twelve fathoms to the east of the foregoing vein, another rich branch of copper ore was discovered and partially explored previously to our arival. This vein could be traced for a considerable distance at the surface, and was opened on, for a length of about six fathoms, and a depth of some five or six feet, but although producing in some places exceedingly rich stones of copper ore, we found it very much disturbed and contorted, and regret to say its aspect was not materially improved by the workings we ourselves made upon it.

"In addition to the two branches of ore above described, a third was discovered on the Harris Lot, at a distance of little more than a mile to the southwest of the other. This lode, which occurs in a channel of highly magnesian shale, we opened on the back for a distance of about five fathoms and to a depth of eight feet, and in doing so obtained nearly one and a half ton of rich sulphuret of copper, slightly intermixed with crystallized carbonate of iron.

"The Harris Lode, as this vein has been called, was found when first opened, to be extremely rich in copper ore, and in fact still remains so; but although it evidently increases in size in proportion as it goes down, the ore last obtained was perhaps more mixed with carbonate of iron. This vein runs nearly north and south, and underlies towards the west, but from the slightness of the dip, together with the contortions to which the enclosing rock has been subjected, it is difficult to determine either its direction or the nature of the underlie it may ultimately assume.

"The other lodes in the district have, without exception, remained totally unexplored, since from the limited time allowed for the inspection, we were obliged to confine our operations to such veins as afforded the most favourable indications. It is, however, certain that numerous other true veins occur in this district, and that wherever exposed they almost without exception contain more or less copper ore. On the other hand it may be remarked that many bands of spar interposed between the layers of the strata, also afford copper, and that these are in some cases cut off in depth.

"The ores obtained from this property in 1853 yielded thirty-nine per cent. of copper, and were sold at the rate of £42 10s. per ton.

"In the month of September, 1855, this district was visited and inspected by Captain Francis Bennetts, who remained a longer time on the ground, and more fully explored the different lodes than had been done two years previously by Captain Kent and myself.

"At a distance of fifteen fathoms northwest of the opening on the Brook Vein, Captain Bennetts discovered a lode about twenty inches in width, bearing a little west of north, and on this he extended an open cutting six fathoms in length and eight feet in depth. At the time the workings at this place were discontinued, the lode in the bottom was from fifteen to twenty inches in width, without any perceptible underlie, and composed of a mixture of quartz, carbonate of iron, and grey copper ore.

"The lode in this excavation will for a distance of about two fathoms yield one ton of copper ore per fathom. In the other portion of the cutting the lode has been slightly disordered by a small band of killas. There can be but little doubt, however, that it will again yield ore a few feet beneath the point at which the killas has passed through it.

"Nine tons of ore, yielding from thirty-six to forty-two per cent. of copper, were raised from this cutting by two men in the course of four weeks. The Harris Lot, which was also explored, presented a regular lode about one foot in thickness. About two tons of ore were extracted from this vein as a sample, and forwarded to England.

"During the time that Captain Bennetts was employed in exploring this property he raised and forwarded to Quebec nearly twelve tons of ore, of an average yield of forty per cent. of copper, and a total value of about £500.

"With regard to the facilities for mining, it may be remarked that at Harvey's Hill the whole of the lodes may be cut by a level, at an average depth of about thirty fathoms.

"The land in this locality consists of about one-half cleared ground, available for the cultivation of corn and other produce, whilst the remainder is covered by an abundance of timber, well fitted for every mining purpose.

"The roads in the neighbourhood are all exceedingly bad, and must in some seasons be quite impassable; but the Grand Trunk Railroad passes within twenty miles of the mines, and considerable facilities exist for the construction of good common roads. The present cost of carrying ores from these mines to the St. Lawrence varies from £3 to £3 10s. per ton. Labour, and every manufactured material, is fifty per cent. dearer than in Cornwall. Water power, for the purpose of washing, is to be obtained on the mines.

"In conclusion, I would remark, that from the number of lodes already discovered, and the uniform success which has hitherto attended the shallow workings above described, there can be no doubt but that this ground forms a tract of more than ordinary promise, and one which merits a more extensive and systematic trial. I would add that a sum of from £5,000 to £6,000 will probably be found amply sufficient for opening out the mine. "J. Arthur Phillips."

"I beg to confirm the various statements made in the foregoing report, and to signify my concurrence with the opinions expressed by Mr. Phillips relative to the property of the Quebec & St. Francis Mining Company.

"Francis Bennetts, Jun."

"Kensington, February 11th, 1856."

The operations of the Quebec & St. Francis Company were sufficiently flattering to induce some gentlemen in London to organize in 1858 the English & Canadian Mining Company, with a capital of £40,000. The history of the English company was that of many another —each annual report regretted that operations were conducted at a loss, in spite of favourable developments and brighter prospects. Bad roads, costly transportation and insufficient water supply for ore dressing, were the really valid grounds for the disappointing results. The operations as gauged by shipments of a mine to-day, were contemptibly small. They were in—

	Tons.	Cwt.	Qrs.	Lbs.	
1858	9	15	0	2)	
1859	43	7	0	21)	Averag-
1860	104	5	3	0)	ing about
1861	70	4	1	6)	30 p.c.
1862	94	17	2	21)	
1863	113	20	3	14	26 p.c.
1864	225	12	3	3	20 p.c.
Making a total of	671	20	2	11	

The mining ton being 21 cwt., or 2,352 lbs.

But during the administration of the English company very interesting developments were made. In 1859-60 the value of the interstratified beds was first appreciated, and work was done on them. Mr. Williams, the superintendent, referring to the bed, reported to the Board on 4th February, 1860:

"I herewith beg to enclose you monthly report for January, in which I refer to the visit of our eminent Provincial Geologist, Sir W. E. Logan, to this place. He was much pleased with the works, and thinks we have a great future in our interstratified bed, and considers it a most valuable deposit; in fact, he did not expect to see anything so promising."

And on February 24th he reported:

"We have met with in our interstratified bed, within the last few days, a few isolated crystals of galena, which have given me an assay 72 1-2 per cent. of lead and 70 ounces of silver to the ton of lead. The quantity, however, that we have yet met with is so small as to be considered of no value, though I should be glad to see it increase and become one of our important products, which it might be, did we find it in a reasonable quantity."

The ore from the interstratified beds became henceforth the principal source of supply of the English company. Mr. S. Arthur Sewell, one of the directors, visited the mine, and he reported to the board that:

"This adventure must not be judged of by the rules applicable to those of like kind in this country. To estimate it properly we must take into consideration the almost primeval nature of the district, its distance from any rail or water communication, the scarcity and dearness of labour, the entire absence originally of all accommodation for residence at the mines, and its isolation from any markets where the necessaries of life or the appliances of civilization are procurable.

"With this in view, I must say that during my short stay at the mines I was astonished at the energy which, in a comparatively unsettled country, had pushed forward mining operations of great extent, over a surface of about fifty acres, had erected workshops, built cottages for the labourers, opened stores for their supply, dug reservoirs for water, made tramroads for the transmission of ore from the mines, and last, but not least, constructed roads through forests and over swamps for its further transmission to port for shipment."

By 1861 the directors issued a circular, in which they say:

"You are aware that the original capital of the company has been all called up. The returns during the present year have increased upon those of 1859, but are not sufficient to allow the payment of a dividend out of profit. The company's managing superintendent, Mr. Herbert Williams, is now in England. and will be at the meeting to explain the present condition and future prospects of the undertaking.

"The insufficiency of the present capital has been for some time manifest to the directors, and they have been in correspondence with Mr. Williams and the Canadian committee on the subject. Mr. Williams, in a letter dated the 10th October last, gives the following as his opinion of the sum required:

" 'In estimating the additional capital that we may probably require, the time occupied before we realize our products must be considered. It is twelve months since some of the ores now at Swansea left Harvey Hill, and the average, on account of our long winters, cannot be less than about nine months, unless we send some home by way of Portland, or try the Boston market during the winter months. Hence we shall require about nine months' working capital on the average of the year. Presuming we confine our expenditure to the present limited sum of £400 per month, we shall require a sum of £3,600 to carry on the work for that period. I fully trust we shall be able, before the expiration of the nine months, to open out sufficient grey ground to meet our expenditure by the products. Hence the following heads of expenditure will have to be considered by the board as the estimated capital required for completing the works already commenced, and, I trust, bring the mine, which certainly looks promising, into a healthy condition.

General exploration of the company's lands...	£2,000
Buildings	600
Roads	680
Continuation of Morrison's adit beyond the period of nine months	750
Working capital for nine months	3,600
Contingencies	370
	£8,000

"In consequence of the above communication your directors have made enquiries as to the best terms on which the above sum may be obtained, and have to report that a friend is willing to furnish the above amount, or such part of it as may be required, for three years, on debenture bonds, at 8 per cent. per annum, interest payable half-yearly, to be a first charge upon the property and produce of the mines, after paying working expenses."

But the report for 1862 opens with a cry of despair:

"At the formation of this company in the spring of 1858, it was little expected that four years would have elapsed without a sufficient return from Canada to divide as a dividend amongst the shareholders, but such is unfortunately the case up to this time, notwithstanding the indications of mineral wealth were and still continue to be of a very encouraging nature.

"The shareholders are aware that the capital of the company raised in England became exhausted in 1860, and that by resolutions passed at an extraordinary general meeting, held on the 28th February, 1861, power was given to the directors to raise on mortgage the sum of £8,000, to be taken up as the necessities of the company might require. The first installment of £1,000 was received from the late Mr. C. Tilt on May 1st last, and ,subsequently, four other sums of that amount have been received."

A fire at the ore dressing plant interfered with the shipments. The company sent out a Mr. Tregoning for advice. One of the paragraphs of his report expresses his bewilderment at the departure of our ore deposits from European standards.

"In these slates have been discovered some remarkable 'lenticular masses' and interstratified beds of copper ores, and these ores present with the slates in which they are embedded geological features totally different from those of the general mining districts of Northern Europe, but may be considered a type of an extensive cupriferous formation peculiar to this part of Lower Canada, and which there are strong reasons for believing contains a vast deposit of mineral wealth.

"From the appearance of the copper ores when discovered at the surface, they were supposed to be the 'out-crops' of what in depth would prove regular and well-defined lodes, as they did not coincide with the slates either in strike or dip, but after being opened, and yielding some considerable quantities of valuable (copper) ores, they were found to thin away from

their centres both horizontally and vertically, and disappear, having assumed the form of lenticular masses, variable in size, and succeeding each other at irregular intervals, and principally composed of quartz, associated with rich ores and bitter spar. In their occurrence and productiveness they will probably be governed by the bands of slates in which they are embedded. The probable average size of these lenticular masses is from 10 to 12 fathoms in length by 5 fathoms in height, and at the centre from 2 to 4 feet in thickness. Many far exceed these limits, and some are much less. They are equally variable in produce, as some have only yielded a few hundredweight of ore, while others have given several tons. About 300 tons of copper ores have been raised from workings made on these masses, worth about £6,000. Of this quantity about 60 tons, containing from 30 to 40 per cent. of copper, have been obtained from the Fanny Eliza alone, which has been discovered and worked at a depth of 30 fathoms from the surface, by cross-cut from Kent's shaft. This valuable discovery proves a singular and important feature of this enterprise, and one greatly in its favour, and from its appearance and the favourable geological character of the nacreous slates, there is every reason to believe that at greater depth these 'lenticular masses' will be found to increase in size and productiveness."

At this crisis some relief was received by a promise of a sale of the property to a Boston firm of brokers who advanced a forfeitable sum of $20,000. The value of the property was apparently assured by the concensus of so many notable experts, and the sale would probably have gone through but for the financial complications due to the increasing rise in the value of gold in the United States. These negotiations failing, the principal English shareholders tried in vain to float on the English market the London & Quebec Copper Mining Company, with a capital of £100,000. The Englishmen being unwilling to risk more in the venture, some Canadians undertook to pay the company's debts and to buy out the English shareholders.

The Canadian company never had adequate means for prosecuting the work. The old dressing floor had been planned after the oldest English models, using hand jigs and disregarding all labour-saving appliances. And the water supply was inadequate and variable, being derived from hillside reservoirs. When the English company was bought out, it was contemplated to build better works on the Palmer River, not more than a mile away; but this reasonable plan was abandoned in favour of the leaching method of Messrs. Whelply & Storer. It was a method based on sound chemical principles but carried out by the adoption of as many mechanical complications as perverse human ingenuity could devise to frustrate success. Pulverized charcoal was added to the ore to create an intense heat in a shaft furnace where a most moderate heat was required. Storing pulverized charcoal in a room lined with canton flannel is as dangerous as storing lighted matches, and the mill when it mysteriously caught fire exploded, rather than burned up, before the process had really had a fair trial.

The engine and boilers had been saved, and good concentrating works, provided with Rittenger jigs and designed on his general plans, replaced the Whelply & Storer leaching method.

After the fire in 1867 my father took a lease of the property, undertaking to pay $5,000 a year and to erect a 50-ton concentrating mill. His operations under the lease were less unsuccessful than they had been under the old company. The output rose to about 500 tons of concentrates a year, and the revenue nearly covered the actual operating expenses. It was, however, a struggle against penury; and while extravagance has wrecked many a mining enterprise, to the shifts and uneconomical expedients, incident to shortness of funds, not a few other failures have been due.

During this lease the bed which was supposed to run 3 1-2 per cent. carried that grade of copper over a comparatively limited area where a series of deep and surface veins affected its copper contents. Beyond this system of veins it carried apparently about 1 1-2 per cent. It could not, therefore, be worked profitably under the existing conditions with the existing appliances. But the deep veins, especially the Fanny Eliza, yielded an excellent grade of ore and promised so well that a Glasgow organization, the Harvey Hill Copper Company, subscribed a working capital in 1872. The Fanny Eliza Lode and the so-called East Lode had yielded the lessor most of his revenue, but were worked uneconomically by winzes sunk below the upper bed. Both veins looked so promising for permanency that Capt. Whitburn, who was sent out by the Glasgow company, decided to spend the company's working capital on a vertical shaft at nearly a couple of thousand feet distant on their strike from the point to which they had been explored. The veins were found where expected; but were barren and the company treasury was empty. The company was formally wound up in 1879. The same series of events have, I believe, been repeated since then—resuscitation, a lingering life, death and burial. And yet I think the property may deserve a better fate.

The ore deposits of Harvey Hill may well have puzzled Mr. Tregoning, as they have scant resemblance to those worked in Northern Europe; but in the rocks of the Quebec group and where those same rocks occur in North Carolina and elsewhere, they sometimes carry copper under similar conditions.

At Harvey Hill three beds were met with which, if they extend over the entire hill, would exist at the following depths below the surface at Kent's shaft:

1. The uppermost bed, cut in grass-shaft No. 2, and from which a great deal of ore has been extracted by the Kent shaft, at 20 fathoms from the surface.
2. The second bed, that lying on the soapstone in Fremont's shaft, which should be at about 60 fathoms from the surface; and
3. The lowermost bed, that met with near the end of the adit, and which should be at about 20 fathoms deeper still, or at 80 fathoms from the surface.

There is, however, no likelihood of these beds being of such great extent, and it is certain they are not of the uniform richness at one time attributed to them.

No exploratory work was done, and no ore was extracted from any of the beds but the uppermost, and as the deeper beds were not encountered in sinking on the shoots of ore in the Fanny Eliza vein, they probably are not of very great extent. The areas of these beds and their copper contents could, however. be very cheaply determined by either churn or diamond drills.

Should any intention to re-open the mines be seriously contemplated, such preliminary exploration work should be done on the beds, as the contribution of ore from the veins, though valuable, would probably be small and the beds would have to be looked to for quantity. The opinion expressed by the Geological Survery that the beds fed the veins is questionable. The impression made on me was rather that the deeper veins fed the upper bed, as its slates were most productive where the deeper veins entered it. These apparently not only enriched it but injected into its slates the con-

stituents which composed their gangue. On the Harris lot, one mile from Harvey Hill, a shallow shaft was sunk on a vein of bitter spar yielding copper glance and visible gold; but neither here nor on any part of the property was what would be considered thorough and judicious development work ever done. Company after company undertook to work the mines with insufficient capital. The cost of mining and concentrating, as compared with modern methods of stoping, on a bed ten feet in thickness, were high.

They used to be estimated at:

Mining, per ton	$4.00
Dressing the ore (concentrating), per ton	1.75

The cost of transportation to Quebec was $10.00 a ton, and to Boston, $15.00 a ton. Harvey Hill may now be considered to be on the Quebec Central Railway. The above figures for extraction and treatment might now be reduced to one-third.

But it is doubtful whether any of the mines of the province would be singly productive enough to feed a profitable smelter, and few copper ores or even copper concentrates can bear a heavy transportation charge. If the copper mines of the province are to be advantageously opened, it should be on some principle of co-operation by a strong company.

These copper deposits were, when they were most actively worked, distributed as occurring in "three synclinal troughs."*

The first is briefly defined as "the synclinal extending from the Township of Farnham, near Missisquoi Bay, to the Seigniory of Lauzon, on the St. Lawrence. This, where it is traversed by the St. Francis, is nearly or quite separated into two parts by the appearance of the underlying slates. The southwestern portion appears to be divided by an undulation into at least two subordinate troughs, thus giving the Roxton and Ely an additional breadth to the exposure of these rocks. The copper deposits of Upton, Acton, Wickham, Roxton, and Durham, occur in this synclinal, while in its northeastern extension are those of Wendover, Somerset, Nelson and St. Flavien."

The second synclinal is described as "extending from St. Armand to the Seigniory of St. Mary, on the Chaudiere. In it are the copper deposits of Sutton, Shefford, Stukely, Melbourne, Cleveland, Shipton, Chester, Halifax, Leeds, Inverness, and St. Mary. In its southern extremity, this synclinal is divided into two by Sutton Mountain, and while one part occupies Sutton Valley, the other extends southward into Potton . . ."

The third synclinal is described as "extending from the Owl's Head Mountain on Lake Memphremagog, to Ham, and includes the Stoke Mountains. An extension of this is traced north-eastward to Vaudreuil and St. Joseph, on the Chaudiere and beyond it, into Buckland. Between the southwestern portion of this synclinal and the second one, is a large area occupied by newer rocks, of the same age as those which limit the belt to the southeast. They include the slates and limestones which occupy the northern part of Lake Memphremagog; and, extending through parts of Oxford, and Brompton, cover a considerable area in the contiguous parts of the Townships of Windsor, Wotton, Ham and Stoke. These unconformable rocks overlie and conceal a large portion of the strata of the third synclinal; but along the eastern limit of this are exposed the copper deposits of Ascot, Ham, and Garthby."

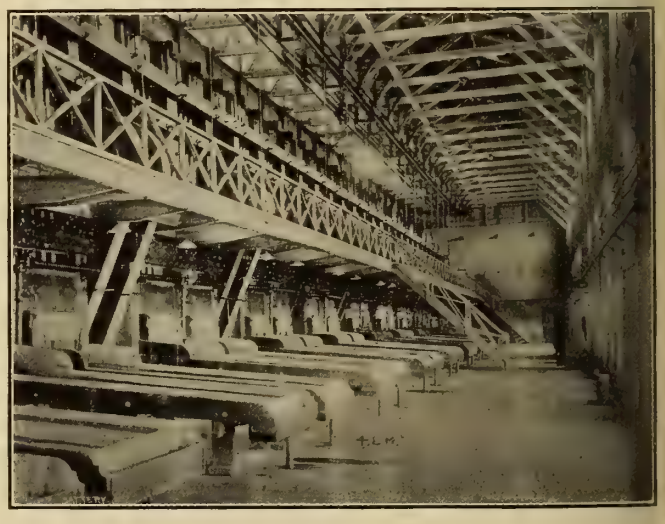
* The Geological Survey Report for 1863, page 709.

Roughly speaking these three groups of deposits, some of which may be developed into mines, contain the necessary elements of a favourable smelting mixture. In the first group are the calcarious ores of Upton and Acton. In the second the silicious and aluminous ores in the slates of the Quebec group. The leanest are suitable for concentration to a higher grade. The richer would bear transportation to a central smelter. In addition to the ores of Harvey Hill, others of the group worthy of examination are the mines still owned by the Megantic Mining Company, in Inverness, New Ireland, and Halifax; and also the Viger Mine and other mines in Chester and St. Armand counties. The third group would yield the essential element of sulphur, without which economical smelting could not be conducted. Such a scheme would, of course, require much preliminary study, prudent development work, and then abundant capital for its realization, should the study and development work justify this third step. Singly, the deposits are probably too small to be self-supporting, and their ores are unfit for isolated treatment, whereas consolidated there may be the material for a successful enterprise.

AN ENGLISH GOLD STAMP BATTERY IN SOUTH AFRICA.

By Frank C. Perkins.

The accompanying illustration shows the arrangement of a 120-stamp mill sent out to South Africa by the Sandycroft Foundry Company, Limited, of Chester, England, having stamps of a falling weight of 1,250 pounds. This gold stamp battery is in operation at Johannesburg in South Africa and is constructed on the high bank principal. It is stated that this type of mill is the one most in use at the present time in South Africa, and, it is maintained, possesses many advantages over other forms in operation in that country.



Large numbers of grinding pans are utilized as constructed in this English works, instead of using tube mills. These grinding pans for regrinding after milling are said to cost considerably less than tube mills and are held to be equally effective. Whether these grinding pans will ever supersede tube mills is questioned by many mining engineers, but in the meantime their operation is being watched with interest.

MINERAL PRODUCTION OF BRITISH COLUMBIA IN 1909.

Annual Report of the Minister of Mines.

The annual report of the Minister of Mines for the year ended December 31, 1909, being an account of mining operations for metalliferous minerals, coal, etc., in the Province of British Columbia, has been issued. Some of the statistical tables give the total mineral output of the province to the end of 1909, while others show in considerable detail the actual mineral production of last year, based on smelter and mill returns. Comparative tables exhibit the production of separate minerals during four years, 1906-1909, thus illustrating by comparison the progress made in productive mining in that period.

Table I. shows the total gross value of each of the chief mineral products mined up to the close of 1909. From this it will be seen that of the aggregate of $347,820,584, coal mining has produced the highest individual total amount, $102,904,261; next in importance is placer gold, with a total of $70,673,103, and then copper at $55,871,893. If placer and lode gold be taken together, a total of $125,950,790 is obtained, thus placing this mineral at the head of the list in regard to total value of production. The figures for the several minerals appear below:

TABLE I.—Total Mineral Production for all Years to 1909, Inclusive.

Gold, placer	$ 70,673,103
Gold, lode	55,277,687
Total gold	$125,950,790
Silver	29,850,586
Lead	23,259,255
Copper	55,871,893
Other metals	890,699
Total metals	$235,823,223
Coal and coke	102,904,261
Building stone, bricks, etc.	9,093,100
Aggregate value of production	$347,820,584

Table II. shows the value of the mineral production of the province for each individual year from 1890 to 1909, both years inclusive, during which period the value increased nearly ten-fold. Table III. presents in graphic form the facts shown in figures in the tables, and demonstrates, to the eye, the rapid growth of lode mining, also the fluctuations to which it has been subjected.

Table IV. gives a statement in detail of the quantities and value of the different mineral products for the years 1907,1908, and 1909. This table follows:

TABLE IV.—Quantities and Value of Mineral Products for 1907, 1908, and 1909.

	Customary Measure.	1907 Quantity.	1907 Value.	1908 Quantity.	1908 Value.	1909 Quantity.	1909 Value.
Gold, placer	Ounces	41,400	$ 828,000	.....	$ 647,000	.....	$ 477,000
Gold, lode	Ounces	196,179	4,055,020	225,582	5,282,880	238,224	4,924,090
Total gold		.....	$4,883,020		$5,929,880		$5,401,090
Silver	Ounces	2,745,448	1,703,825	2,631,389	1,321,483	2,532,742	1,239,270
Lead	Pounds	47,738,703	2,291,458	43,195,733	1,632,799	44,396,346	1,709,259
Copper	Pounds	40,832,720	7,166,544	47,274,614	6,240,249	45,597,245	5,918,522
Zinc		.....	.....	.....	270,000	.....	400,000
Total metallic		.....	$17,044,847		$15,394,411		$14,668,141
Coal	Tons, 2,240 lb.	1,800,067	6,300,235	1,677,849	5,872,472	2,006,476	7,022,666
Coke	Tons, 2,240 lb.	222,913	1,337,478	247,399	1,484,394	258,703	1,552,218
Building materials, etc		.....	1,200,000	.....	1,100,000	.....	1,200,000
Total value of production		.....	$25,882,560		$23,851,277		$24,443,025

Table V. shows the respective proportions of the mineral production made in each of the districts into which the province is officially divided. It will be observed that Yale (Boundary) district continues to hold the honour of first place on the list. The Coast district, which in 1908 was third, last year changed places with West Kootenay, and came second. East Kootenay was again fourth. The Coast and East Kootenay districts obtain a considerable proportion of their output from coal mines situated within their respective limits, whereas in the other districts the production is almost entirely from metal mining.

TABLE V.—Production of Mineral by Districts and Divisions.

Names.	Divisions. 1907	Divisions. 1908	Divisions. 1909	Districts. 1907	Districts. 1908	Districts. 1909
Cariboo District	.....	.....	.....	$ 360,500	$ 405,000	$ 247,000
Cariboo Mining Division	$ 306,500	$ 355,000	$ 220,000	.....	.....	.....
Quesnel Mining Division	44,000	30,000	12,000	.....	.....	.....
Omineca Mining Division	10,000	20,000	15,000	.....	.....	.....
Cassiar District	.....	.....	.....	572,809	298,234	234,498
East Kootenay District	.....	.....	.....	5,548,880	4,802,680	4,766,215
West Kootenay District	.....	.....	.....	4,792,976	5,448,224	5,169,749
Ainsworth Division	364,868	422,181	617,340	.....	.....	.....
Nelson Division	614,395	462,836	584,955	.....	.....	.....

Slocan Division	619,842	676,580	954,737	.....	.....	.....
Trail Creek Division (Rossland)	3,049,702	3,713,392	2,875,084	.....	.....	.....
Other parts	144,169	173,235	137,633	.....	.....	.....
Lillooet District	.....	.....	.....	15,721	13,779	16,676
Yale District (Boundary)	.....	.....	.....	8,444,326	7,649,963	7,728,256
Osoyoos, Grand Forks & Greenwood Divisions	8,354,995	7.545,380	7,501,046	.....	.....	.....
Similkameen & Nicola Div.	56,564	101,583	225,210	.....	.....	.....
Yale Division	32,767	3,000	2,000	.....	.....	.....
Coast District (Nanaimo, Alberni, Clayoquot, Quatsino, Victoria)	.....	.....	.....	6,147,348	5,233,397	6,280,631
				$25,882,560	$23,851,277	$24,443,025

Other tables, not here reproduced, are as follows:

No. VI. gives the statistical record of the placer-gold mines of the province from 1858 to 1909, inclusive, and shows a total production of $70,673,103. The output for 1909 was less than that for 1908 by about 26.2 per cent.

No. VII. relates entirely to the lode mines and shows the quantities and value, respectively, of the various metals produced each year since the beginning, in 1887, of lode mining in the province. The gross value of the products of these mines (excepting zinc, which is not included in this table), is $164,259,421. The value of the production of lode minerals in 1909 was rather less than in 1908.

No. VIII. contains the statistics of the production of the coal mines of British Columbia. The total quantity of coal mined to the end of 1909 was 29,629,025 tons (of 2,240 pounds), valued at $92,010,796. In these figures the quantity of coal used in the manufacture of coke is not included. The production of coal was commenced in 1895; the total quantity made to the end of 1909 was 2,032,890 long tons, valued at $10,893,465. The average selling prices used in calculating the value of the coal and coke production prior to 1907 were $3 per long ton of coal and $5 per ton of coke. For the last three years the prices used have been $3.50 for coal and $6 for coke.

No. IX. exhibits details of production of the mines of the province (excepting the coal mines) for four years, 1906-1909, and the districts in which such production was made. The tonnage of ore mined in each district, with its metallic contents and market value, is shown. The total tonnage of ore mined in 1909 was 2,057,713 tons, having a gross value, including building materials, of $15,868,141. This compares with 2,083,606 tons, valued at $16,494,411 in 1908. The percentage of tonnage and value derived from the various districts of the province last year were as under:

	Tonnage, p.c.	Value, p.c.
Yale (Boundary) district	71.03	53.92
Trail Creek mining division	11.55	20.84
Fort Steele mining division	7.28	9.65
Slocan district	1.37	4.02
Coast district	1.92	2.18
Other parts of province	6.85	9.39
	100.00	100.00

No. X. compares graphically the output of mineral products of British Columbia with that of similar products in all the other provinces of the Dominion, and shows that in 1909 this province produced in the minerals shown an amount equal to about 67.8 per cent. of that of all the other provinces of Canada combined.

Progress of Mining.

From the comments of the Provincial Mineralogist on the Progress of Mining the following information has been taken:

While the value of the mineral production of the province in 1909 was less than in the years 1906 and 1907, it was considerably greater than that of any earlier year than those.

The tonnage of ore mined, exclusive of coal, was 2,057,713 tons, which quantity was a decrease as compared with the tonnage for 1908 of 25,893 tons, or 1.24 per cent. This tonnage was produced by the various districts in the proportions shown by the next following figures: Yale district, Boundary mines, 71.03 per cent.; West Kootenay district, Rossland mines, 11.55 per cent.; East Kootenay district, mines in Fort Steele division (chiefly the St. Eugene), 7.28 per cent.; Coast district, 1.92 per cent.; all other parts, 8.22 per cent.

The number of mines from which shipments of ore were made was 89, and of these only 52 shipped more than 100 tons each during the year, while but 32 shipped in excess of 1,000 tons each. Of the latter, 8 were in Nelson mining division, 5 in the Boundary, 5 in Ainsworth division, 4 in Slocan district, 3 in the Coast district, 3 in Trail Creek (Rossland) division, 2 in Fort Steele division, and one each in Trout Lake and Queen Charlotte divisions.

The number of men employed were: In metalliferous producing mines, 3,037 (2,048 below and 989 above ground); in mines not shipping ore, 217 (136 below and 81 above ground); total, 3254. A mine employing say 12 men for four months was credited with four men for 12 months, so that the total above given is less than the actual number of men who worked in the mines during the year. The number employed at the coal mines was 6,418, this including 215 white boys, and 672 Chinese, Japanese, and Indians. The official figures of all employed at the mines of the province therefore give a grand total of 9,672. Although it is not so stated in the report, it is quite probable the 1,000 or more men employed at the several smelting works are not included.

Coal.

The coal produced was mined chiefly by three companies, namely, the Wellington Colliery Company and the Western Fuel Company, on Vancouver Island, and the Crow's Nest Pass Coal Company, in southeast Kootenay; these companies together produced about 88 per cent. of the total coal mined. Of the smaller collieries, those on Vancouver Island were the Pacific Coast Coal Mines, Limited, with about 70,000 tons, and the Vancouver-Nanaimo, with 10,000 tons; in the Nicola district, the Nicola Valley Coal & Coke Company's production was about 62,000 tons, and the Diamond Vale Company's about 1,700 tons; in the Crow's Nest district, the

Hosmer and Corbin collieries each produced about 60,000 tons. The gross output of coal was 2,400,600 tons of 2,240 pounds), of which 998,494 tons was sold for consumption in Canada; 741,646 tons exported, mostly to the United States; 260,554 tons burned under colliery boilers, etc.; 394,124 tons used in making coke, and 5,782 tons added to stock. The quantity of coke made was 258,703 long tons, of which 210,884 tons was sold for use in Canada; 40,629 tons exported, nearly all to the United States, and 7,199 tons added to stock. The production of coal was the largest for any year since coal mining was commenced in the province; that of coke was second only to that of 1905, when 271,785 long tons was made.

Gold.

The production of placer gold was $477,000, as against $647,000 in 1908, and this was the smallest amount produced in any year since 1894. The decrease in output was attributable partly to the short water supply last season.

The value of lode gold was $4,924,090, a decrease of $358,790 as compared with 1908. Nelson, Boundary, and Coast districts each produced more lode gold, but the decrease in Rossland camp was larger than the total of the increases in other parts of the province. About 86.5 per cent. of the lode gold was recovered from smelting ores also copper-bearing; the remaining 13.5 per cent. was from ores treated in stamp mills, etc. The larger stamp mills operated last year were those of the Hedley Gold Mining Company at Hedley, Similkameen, with 40 stamps; Granite-Poorman mill, near Nelson, 20 stamps, and Queen mill, Sheep Creek, 20 stamps. There are two small mills at Sheep Creek mines, one of which, at the Nugget mine, with four stamps, was worked nearly all the year.

Silver.

The silver produced totalled 2,532,742 ounces, a decrease in quantity of 98,647 ounces and in value of $82,213, as compared with 1908. About 98.2 per cent. of this was from silver-lead ores and the remainder from copper-silver ores. The Slocan district—including Ainsworth, Slocan, Slocan City, and Trout Lake divisions—produced about 50 per cent. of the total, and Fort Steele division of East Kootenay 23 per cent., all from argentiferous galena ores.

Lead.

Lead showed a production of 44,396,346 pounds, this being an increase of 1,200,613 pounds in quantity and $76,460 in value over that of 1908. Mines in Fort Steele division (chiefly the St. Eugene), produced nearly 61 per cent. of this total; those in Ainsworth and Slocan, 34 per cent., and in Nelson and Trout Lake divisions, 5 per cent.

Copper.

The amount of copper, placed at 45,597,245 pounds, was less in quantity by 1,677,369 pounds, and value by $321,727 than in 1908. These figures do not take into account smelter charges or deductions, but show the copper contained in the ore smelted. There was a slight increase in the Boundary district and Nelson division, but a heavy falling off in Rossland camp and the Coast district. The proportions of production of districts were: Boundary, 89.04 per cent.; Rossland, 7.70 per cent.; Coast, 2.84 per cent., and Nelson, 0.42 per cent. The average assays of copper in ores of the several districts, based upon copper recovered, were: Boundary, 1.41 per cent.; Coast, 1.5 per cent.; Rossland, 0.75 per cent.

Iron and Zinc.

No iron ore was shipped and very little mined, there having been no market in 1909 for iron ore from the province.

About 10,000 tons of zinc ore and concentrates was sold in 1909, the zinc contents ranging from 38 to 42 per cent. The Lucky Jim, Slocan, was the only mine that shipped zinc ore; it sent out 4,700 tons averaging 48 per cent. zinc. The Whitewater group, Ainsworth division, produced 4,600 tons of zinc concentrates, containing 38 to 43 per cent. zinc, also silver from 15 to 25 ounces per ton. Mills of other mines produced zinc concentrates of similar value, but little of their production was sold.

Building Materials, Etc.

Of building materials, etc., the chief production was in granite and sandstone, bricks, pottery, lime, and portland cement. Much building stone was supplied to Coast cities, in which many substantial buildings were erected. Three marble quarries, one on Vancouver Island and two near Kootenay Lake, were worked, and one of the latter sent out about $30,000 worth of marble, largely to prairie cities. The estimated production of red bricks was 40,000,000. Some excellent fire bricks and fancy building bricks were also manufactured. Pottery products were estimated at $100,000. Portland cement was made near Victoria, Vancouver Island; some 238,000 barrels was the output, valued at $360,000.

Features of the Report.

Prominent features of the report, other than the statistical tables and accompanying comments of the Provincial Mineralogist (Mr. Wm. Fleet Robertson) on the progress of the year, are accounts of visits paid by that official to several mining districts, and his observations on matters and things that came under his personal notice. Among the districts he visited were the Queen Charlotte Islands; the partly developed and producing coal mining district in the Crow's Nest Pass country, and the important though undeveloped coal areas in the upper Elk River district, computed by Mr. D. B. Dowling, of the Dominion Geological Survey, to embrace 140 square miles of coal-bearing country, with a probable workable coal content of 100,000,000 tons per square mile; the metalliferous mineral region in East Kootenay lying between Golden and Field, on the Canadian Pacific main line railway, and the vicinity of Moyie Lake, on the Crow's Nest Railway, on the south; the Duncan River district, in Ainsworth division, and Sheep Creek camp, in Nelson division. Much information is given concerning these several regions, of parts of which there was not on record any official information obtained in recent years. The illustrations of places and scenes in some of these little-known parts add to the value of the report.

Several official reports on the disastrous explosion that took place at the Wellington Colliery Company's Extension colliery, Vancouver Island, last October, when 32 men lost their lives, are printed; with these are diagrams and other illustrations of especial interest to men connected with coal mining.

The bulletin by Mr. Herbert Carmichael, Provincial Assayer, issued by the Bureau of Mines last winter, is reprinted in the annual report. At this time, when Portland Canal district, which it describes in some detail, is attracting much attention, this will be of particular value.

As is usual with the British Columbia Government printing office, the printing of the report, and the finish

of the half-tone illustrations, are very creditable. The reproductions of photographs are superior, and beside these decidedly ornamental illustrations, there are graphic tables, diagrams, maps, etc., to also add to the usefulness of the report. It is to be regretted that it was not practicable to get it ready for issue earlier in the year, but, though late, it will be found of much value throughout the wide field over which it will be distributed.

MINE-RESCUE STATIONS IN BRITISH COLUMBIA

With a view to the early establishment of mine-rescue stations in British Columbia, as required by the "Coal Mines Regulation Act" in force in that province, the Provincial Government has ordered Draeger oxygen breathing helmets and all requisite accessories for the full equipment of three mine-rescue stations, one of which will be established at Hosmer, Crow's Nest Pass district, which is about the most central place that could be chosen in that important coal field, and two on Vancouver Island—one at Cumberland, where is situated the most northerly of the big collieries in operation on the Island, and the other at Extension, where there was a serious and fatal disaster last October. As railway connections exist between Hosmer, and Michel and Corbin in one direction, and Hosmer, and Coal Creek and Carbonado in another, the advantage of that point for one of the Government stations is apparent. Similarly, there are railway connections between Extension, and South Wellington and Nanaimo, on Vancouver Island, so here again it is manifest that the officials of the Provincial Bureau of Mines have been giving the subject of advantageous situation of the stations their careful attention. It is planned to fit up railway cars, where practicable, as storage rooms for the Draeger apparatus, so that on emergency there will be a minimum of delay in the transportation of apparatus and those trained in its use to the scene of operations wherever their services shall be required.

Last March the Legislative Assembly of British Columbia amended the "Coal Mines Regulation Act," an important addition to which was the following section:

"82a. There shall be established by the owner, agent, or manager of every colliery to which this Act applies such number of oxygen helmets, or some such form of mine-rescue device as may be approved by the Minister of Mines.

"Such mine-rescue apparatus shall be constantly maintained in an efficient and workable condition, and shall in all cases be so stored, or placed about the mine, as to be always available for immediate use.

"The Lieutenant-Governor in Council may, from time to time, establish mine-rescue stations for the purpose of supplementing, in case of need, the colliery installations of mine-rescue apparatus, and also for the purpose of training the holders of Certificates of Competency under this Act in the use of such mine-rescue device as may be approved by the Minister of Mines; and it shall be incumbent on the owner, agent, or manager of every operating mine to which this Act applies to retain such number of employees trained in the use of such established mine-rescue apparatus as the Chief Inspector of Mines may deem sufficient:

"Provided that in cases of emergency such stations shall be available for the use of any trained corps of mine-rescuers, duly qualified medical practitioners, or corps trained in the work of first aid to the injured.

"This section shall come into force upon proclamation by the Lieutenant-Governor in Council."

Circumstances have since been such that the Lieutenant-Governor in Council has not yet issued the proclamation requisite to bring this section into force, but meanwhile much active interest has been taken in the subject of mine-rescue by the Provincial Department of Mines. The Deputy Minister (Mr. R. E. Tolmie), Provincial Mineralogist (Mr. Wm. Fleet Robertson), and Chief Inspector of Mines (Mr. F. H. Shepherd) have visited Seattle, Washington, on different occasions, to see the work being done at the United States Geological Survey mine-rescue training station there in conjunction with the Washington State authorities and the University of Washington. Information concerning this training station was printed in the Canadian Mining Journal of June 1 (pp. 334-5). There is little doubt the proclamation provided for in the last clause above quoted will shortly be gazetted, and by that time the Provincial Government will probably have received the apparatus it has ordered and have established its mine-rescue stations.

It is significant that the only company operating in the province that has anticipated the coming into law of the provisions requiring that mine-rescue apparatus be obtained and be available for immediate use, is the Western Fuel Company, the chief shareholders in which (if not all of them) are residents in the United States. The Canadian companies appear to be waiting until the law compels them to make this provision for mine-rescue, and perhaps life-saving, purposes.

Last February the Western Branch of the Canadian Mining Institute passed a resolution favouring the remission by the Federal Government of customs duty on mine-rescue apparatus, and this resolution was forwarded to Hon. Wm. Templeman, Minister of Mines. It would be interesting to hear that Minister explain to the coal miners of Canada what he has since done towards facilitating in this way the provision of life-saving apparatus, in which they are so vitally interested.

CANADIAN MINING INSTITUTE.

Proposal to Reprint Vols. I. to V. of the Journal.

Volumes I. to V. (inclusive) of the Journal of the Canadian Mining Institute being out of print, the Council contemplate publishing a revised edition of the five volumes in question provided a sufficient number of subscriptions thereto are received. It is proposed to reprint the five volumes in question in two volumes, the first to include Vols. I., II. and III. of the Journal, and the second, Vols. IV. and V. Each volume will comprise about five hundred pages.

The subscription price based on the actual cost of the undertaking has been placed at twelve dollars.

The oil companies that control the great Baku district of southern Russia are substituting electric power for steam.

Great Britain produces 1,900,000 tons of salt a year; all Europe less than 5,000,000.

HAMMER DRILLS IN OVERHAND STOPING AND RAISING.

By H. B. Williams, Associate.

Paper read before the Institution of Mining and Metallurgy.

The numerous advantages obtained by the recent substitution of hammer drills in place of hand labour and ordinary piston drills having now been sufficiently demonstrated by means of exhaustive trials and practical operation in stoping and raising at the Granite Gold Mines, British Columbia, I herewith append an account of my experience of their performance.

Overhand or back-stoping only is practised at these mines, the reef consisting of hard quartz from 8 in. to 5 ft. in width, containing 2 per cent. to 10 per cent. of sulphides of iron and arsenic, while the country rock is a dark closegrained granite. The vein underlies at angles varying from 35 per cent. to 50 per cent.

Figures being available to show the cost of stoping as practised in previous years at the mines, this paper is written with the object of a general comparison of results by the various methods employed, and in particular with regard to those obtained with the hammer drill. The drill found most efficient is the Waugh stoping hammer drill, a 2-in. cylinder, valve machine. The principal wearing parts are the piston hammer, costing $4.00, the chuck $3.50, tappet $2.00, and complete valves $10.00.

A general description of the mechanism of the machine in question is as follows:

Referring to Figure 1, the drill is 4 ft. in length, weighing 60 lbs., its greatest diam. being at the barrel A, 3¼ in. The cylinder is 2 in. in diam., while the automatic telescope air pressure feed (B) allows of an extension of 24 in. The hammer (C) is a piston the blow of which is regulated by a valve (D); the hammer strikes a tappet (E), the latter in turn delivering the percussion to the end of the shank of the drill steel, which is held in alignment with the drill in a chuck (F) of hardened steel. Rotation of the machine and consequently of the drill steel is effected by the hand lever (G). With an air pressure of 60 lbs, 1,000 blows per minute are struck by the hammer, its stroke being 2½ in.

In operation underground, a starter having been placed in the chuck, and the hose coupled to its connection, the hammer drill which, as previously stated, is designed for the boring of uppers in overhand stoping and raising only, is set up with the extension end on a rough sollar (Fig. 2). This sollar may be laid on broken ore or across the stope timbers at a convenient distance from the face of the stope, and the machine is so aligned as to take the best advantage of the heads occurring in the ground to be broken.

Air now being turned on, the extension piston automatically brings the bit of the drill steel forward into contact with the rock, percussion of the drill steel by the tappet commences, and the rotating lever being operated by the machine man, pitching and subsequently drilling of the hole proceeds to the depth required.

Holes up to 4 ft. in depth are bored by these machines. The drill steel used is of light cruciform section in lengths of 18, 27, 36, 45, and 54 inches, allowing 9 in. changes for each bit. It has been found important to forge and harden the drill shanks with care, 1 in. square, where they fit in the chuck, as it is at the chuck that most wear and tear occurs with these machines.

It has been suggested to myself that with slight wear only of the chuck and of the shank of the drill steel, the alignment of the machine itself and the drill steel would not coincide, and in consequence there would be a tendency to "fichured" holes; experience at the Granite Mine has proved to me that the number of fichured

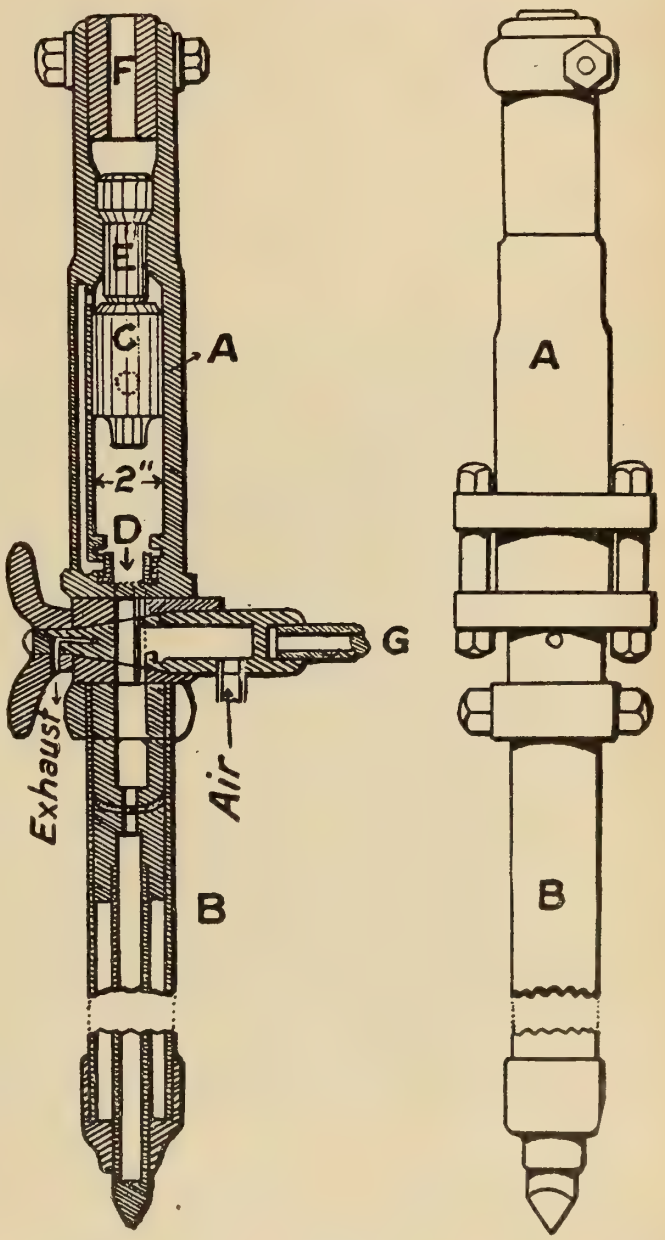


Fig. 1.

holes is small though the ground is "heady"; difficulty is experienced only when the drill bores into soft gouge which occasionally occurs on the hanging wall.

It has been found more satisfactory to avoid the boring of holes at an angle of less than 35 degrees from the horizontal. At smaller angles the dust does not clear

from the holes by gravity, and owing to the unsupported length of the machine and drill steel the leverage is sufficient to cause the drill steel to break, usually close to the chuck, and to wear the hole in the chuck itself unduly; considerable additional friction and consequent loss of boring efficiency is also caused by the boring of flat holes. With a reef underlying at over 35 degrees, as is the case with the Granite Mines, there is only occasional necessity for a low-pitched hole.

Machine men running the hammer-drills are instructed to attend carefully to the lubrication of their machines, which is essential owing to the somewhat delicate

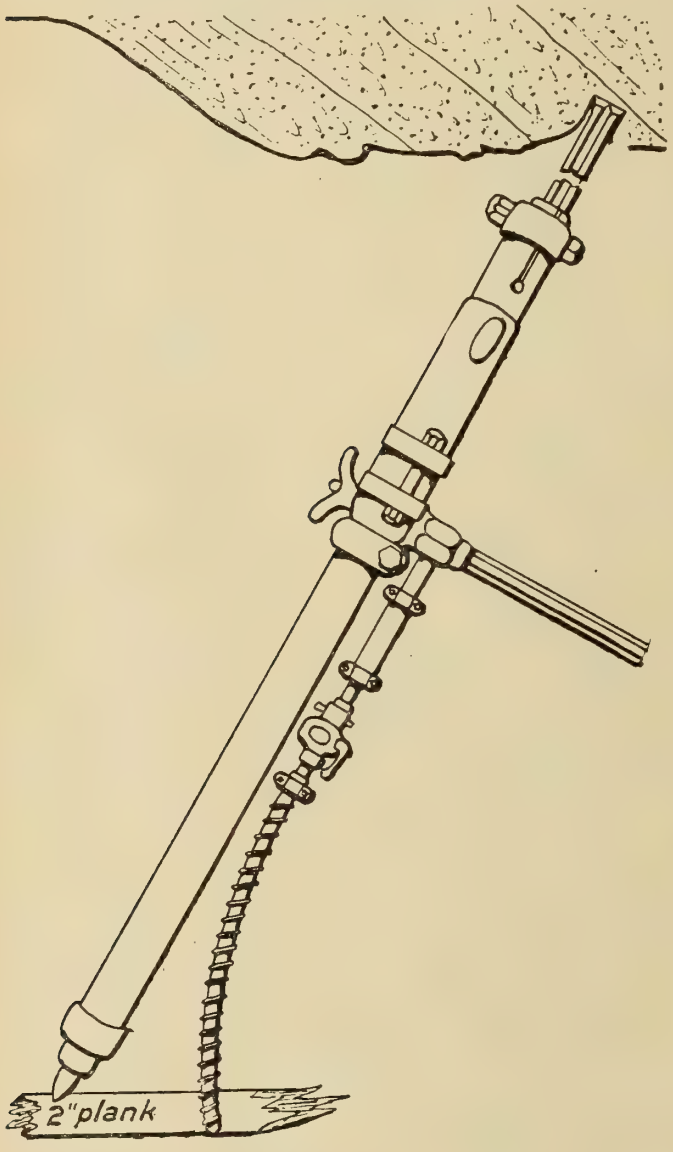


Fig. 2

mechanism of the valves. Recently an automatic lubricator has been supplied combined with the air-connecting plug, which now ensures constant oiling of the machine for a full shift without replenishing the oil-chamber.

I now propose to deal with the advantages of the hammer drill over piston drills manifested in the tests underground, which led to the final adoption of the former at the mine for stoping and raising.

The lightness and general handiness of the 2-in. hammer drill, its weight being only 60 lbs., against the 125 lbs. of the 2-in. piston stoping drill, is a point in its favour.

There is a considerable saving of time in setting up. In a shift of eight hours, it can be safely estimated that the loss of boring time in setting up, changing steel, and taking down a piston drill is two hours; with the hammer drills half-an-hour only per shift is sufficient, less time is lost in changing steel, there being no U-bolts, bars, or mountings to manipulate.

Inexperienced hand-labour miners can learn to run the hammer drills in a few shifts, a great advantage in a country where good machine men are difficult to procure.

Greater drilling efficiency has been obtained. With the small 2-in. one-man piston drill, a shift's work comprising a total footage bored of between 25 and 30 ft. was considered satisfactory, whereas the hammer drills bore ten 4-ft. holes, or an aggregate of 40 feet per shift. The bitts of the drill steel are not dulled by the quick, light blows of the hammer drill to the extent which occurs with the heavier blows from the piston drill.

Owing to the fact that the hammer drill is so compact and requires no bar or mountings, holes may be bored to take the greatest advantage of slips in the ground in low stopes, and greater efficiency in breaking ground has resulted.

The construction of the hammer drill renders its adaptability most evident for carrying considerably lower stopes than with the piston drill, a great saving of cost in stoping narrow reefs, such as those of the Granite Mines.

I have been struck with the small quantity of fine dust made by the hammer drill in the stopes and rises. I account for this improvement over piston drills by the fact that there is no churning movement of the drill steel in the hole, as is the case with the piston drills, the bitt of the drill steel held continually in the bottom of the hole while boring. The air is exhausted back from the face of the stope and no air can escape at the chuck end of the machine. It may also be noticed that the hammer drills possess the advantage of producing coarser cuttings than the piston drill.

In air consumption I have found that with a receiver pressure of 80 lbs., there is only a slight advantage in practice in favour of the 2-in. hammer drill over the 2-in. piston drill.

Having related the advantages of the hammer drill over the piston drill, as proved by their successful operation for some months past at the Granite Mines, I now propose to deal with the reduction of costs in stoping effected by their use.

A comparative statement of stoping costs under various methods is as follows:

Stoping by hand labour	$3.50 per ton.
Stoping by 3¼ in. rock drill (piston)....	2.90 per ton.
Stoping by 2¼ in. rock drill (piston)....	2.08 per ton.
Stoping by 2 in .hammer drill	1.53 per ton.

In the above statement no allowance is included for development charges, compressed air, or depreciation of plant generally. In reference to this point, however, it may be of interest to mention that the total costs, including all charges of mining transportation, milling and realization, etc., at the Granite Mines, have recently been reduced from $5.32 to $3.25 per ton, although the high cost of labour and supplies locally shows no diminution, a result mainly attributable to the adoption of the hammer drills.

It must be borne in mind, in considering the value of the above figures in comparison with larger mines' costs,

that they refer to a mine equipped with a plant capable of crushing 1,500 tons per month only, and that the greater proportion of the stopes worked recently carry a reef with an average width of only 15 inches.

On account of the simplicity and small number of moving parts, the repairs and general upkeep of the hammer drills work out at approximately only $5.00 per month, which compares favourably with these charges in the case of the piston drills. Owing to its compact tube-like design, the hammer drill withstands the invariably rough handling without the breakages so common with piston drills.

The advantages in general handiness, increase in progress and consequent reduction of cost in raising with the hammer drill are even more marked than in the case of stoping by its use.

CANADIAN MINERALS AT THE BRUSSELS EXHIBITION.

(Written specially for the Canadian Mining Journal.)

In view of the fact that Canada made such a large display of minerals at the Liege Exhibition, in 1905, it is worthy to note the increased and intelligent interest this branch of our natural resources is arousing at the present exhibition.

Much wonder is expressed at the rapid development of the Dominion, the variety of its minerals and the vast extent of territory that is open to the prospector. But many predictions of the extent to which the mineral industry will be carried, seem overdrawn.

Those who have worked in Belgium and other countries with the knowledge of what has been done under most unfavourable conditions grant to Canada greater possibilities than even we ourselves appreciate.

Canada's undeveloped water powers, coupled with the immense coal areas, represent to them an asset of reserved energy that will be the greatest factor of development in the years to come. To enter into details of the installation of the mineral exhibit would require much time and space. All the principal mining interests are fully represented. As an educational section this one is not equalled in the entire exhibition. Through the great coal measures of Nova Scotia we pass to New Brunswick, with its shales and large gypsum deposits, then to Quebec rich in asbestos and other minerals; Ontario, with its silver and nickel mines unequalled in the world; Manitoba and Saskatchewan, with structural materials and natural gas proven at a few points; Alberta, rich in coal, anthracite and bituminous. British Columbia's large areas of coal on the coast and in the interior valleys, with the rich deposits of gold, silver, lead and copper ores throughout the province, give it prominence over the others. The interested visitor, after following the mineral occurrences as arranged, looking at the map of the Dominion, sees that only about one-half of the rim has been touched. During my visit to Brussels I came in touch with a number of persons interested in the development of some of the Canadian properties; they spoke in high terms of the exhibit in the Canadian section, and of the good work the government was doing through this medium.



So long as your government can come to us, as in the case of Liege, 1905; Brussels, 1910, and show that the statements made have been carried into actual fact ,we will be mutually benefitted. In 1904, your mineral production was a little over $60,000,000.00, of which you were proud. For last year you show an output of over $90,000,000.00. These are the facts that impress us most.

Since 1905 much Belgian capital has found its way into legitimate mining in Canada, and recently large in-

terests have been acquired by us in the Pictou coal field, to which point not a few miners from Belgium will find their way.

Your new railway lines will also place mining on a better footing and bring out new and valuable properties now unworked. As I understand it, the finding of your most valuable mineral deposits is attributable to railway construction, thus giving credit to the new lines building it is possible to anticipate newer fields and a larger output in the near future.

THE DINNER HOUR.

By John Ravenor Bullen.

We slacked her down at the dinner hour and bundled out under a tree,
Did Solomon Jopp and "Hurricane Hank," and Joe, which is the same to me.
"You can say what you mind," said Solomon Jopp, as he fanned his face with his hat,
"This drillin' fer oil's a pretty fine game—but you never knows where you're at."
"That's right enough," said "Hurricane Hank," as he swallered a chunk of meat
And savagely spat at a yeller wasp that buzzed in the blazin' heat.
"There's ways," said he, "as I've always said, for makin' a mint of gold,
But it's always the ones as should get the luck, it's always them as gets sold."
"It's true," said Solomon Jopp, "it's true, we never have had no chance"
As the wasp stung Hank on the tip of his ear, and he danced a Salome dance.

"Now you calls to mind," said Solomon Jopp, "the man from Jingermeror,
Who comed with a million of money and meant to make a million more.
He'd twenty-six alphabets after his name and the devil knows what beside,
And a portable hencyclepedia called 'The Oil-well Driller's Guide.'
He staked out the territ'ry down to the west and hired out a triplet of rigs,
And the whole blamed country near died with delight, from Gilligan down to Giggs.
Well, he punctured the earth like a pepper-pot lid with a hundred of holes and more,
And he punctured a hole in his million of gold ere he left for Gingermeror."
"Correct," said "Hurricane Hank," "correct," as he sprawled in the shade of the tree
And chewed big chunks of tobacco down on the top of the cakes and tea.

"On the nethermost hand," said Solomon Jopp, as he blinked a dusty eye,
"There was Jonathan Blob, the laziest squab, which none will ever deny.
He drilled one well in Tillarmeroo and now he's a big-money shark,
And he's counting his dollars all day and all night, seven million ain't far off the mark.
He's rigged all the time in the slickest of styles, 'nough to make a blind quadriped jump,
Wears a shiny top-hat, drinks his glass of champagne—him!! the darnedest that ere wrenched a pump.
You can say what you mind," said Solomon Jopp, as he harpooned his knife through his hat,
"This drilling fer oil's a pretty fine game, but you never knows where you'e at."
Then we cussed and cussed as we always cussed when we left the shade of that tree,
But we started her up as we always did, did Solomon, Hank, and Me.

PERSONAL AND GENERAL.

Mr. Thomas Kiddie has returned to Vancouver from a visit to a deposit of magnesite and some gold properties in Atlin district, B.C.

Mr. Elias Rogers, of Toronto, president of the Crow's Nest Pass Coal Company, Limited, visited Vancouver and Victoria, B.C., during July.

Mr. Lionel E. Hill has been appointed assistant to Mr. Ernest Levy, of Rossland, B.C., manager for the Le Roi No. 2, Limited, and the Van Roi Mining Company, Limited.

Mr. O. B. Smith, superintendent of the Granby Company's mines at Phoenix, B.C., lately visited the Hidden Creek Copper Company's property at Goose Bay, Observatory Inlet, B.C.

Mr. Andrew Bryden, formerly manager of the Dunsmuir colliery at Extension, Vancouver Island, B.C., is to superintend the work of opening new coal mines in the Nicola district for the Coal Hill Syndicate.

Mr. E. Hodgson, of Victoria, B.C., well known in connection with coal mining on Vancouver Island, recently spent a short time in the Lethbridge district, Alberta, on business connected with coal and oil prospecting.

Mr. Frederick H. Morley, M.E., of Denver, Colorado, U.S.A., has been commissioned to obtain information relative to mining properties in Portland Canal district, British Columbia, whence he went about the middle of July.

Mr. J. L. Howard, of San Francisco, California, president of the Western Fuel Company, lately paid one of his periodical visits to his company's collieries near Nanaimo, Vancouver Island, B.C. Only recently he returned from a trip to England.

Mr. C. H. Dickie, of Duncans, B.C., managing director of the Portland Canal Mining Company, has gone to Portland Canal to witness the commencement of ore concentration operations in the mill the company expects to have running in August.

Mr. Wm. Fleet Robertson, Provincial Mineralogist, left Victoria on July 11 for the Chilcotin country, in the southern portion of Cariboo district. He will make an exploratory examination of parts of Clinton and Bella Coola mining divisions, which lie between Fraser River and the Coast, about parallel 52 to 53.

The Jeffrey Manufacturing Company, main office and works, Columbus, Ohio, are changing the location of their Denver office from No. 1711 Tremont Place, and after August 1st will occupy a commodious suite of rooms in the First National Bank Building. This company besides maintaining a large selling force in over a dozen of the leading cities of this country, also maintain a corps of engineers at their branch offices situated in the following cities: Chicago, St. Louis, Denver, Montreal, Pittsburg, Charleston, W. Virginia, Boston, New York, and Birmingham. There are also nearly 100 Jeffrey agencies in additional cities in this country and abroad.

ON THE DISTRIBUTION OF ASBESTOS DEPOSITS IN THE EASTERN TOWNSHIPS OF QUEBEC.

By John A. Dresser, Ottawa, Ont.

(Published by permission of the Director of the Geological Survey of Canada. Annual Meeting, Toronto, 1910)

Introduction.

At the last meeting of this Institute a short paper was presented by the writer on the mode of occurrence of asbestos and chomite in the Eastern Townships of Quebec.*

In the interval further work has been done in the area, under the auspices of the Geological Survey, and certain relations have been ascertained between the productive and the unproductive parts of the serpentine belt in which these minerals occur. It is the purpose of this paper to show some of the geological relations of the serpentine belt and how they determine the distribution of the mineral deposits, and to apply the conclusions as an aid to prospecting for and estimating the value of further discoveries. For these purposes a brief review of the district is necessary.

Review of the District.

The part of the province of Quebec which lies south of the River St. Lawrence consists of a portion of the wide flat valley, or a plain bordering the St. Lawrence, and a hilly region, extending from the plain to the boundary line between the Province of Quebec and the United States. The northeastern part of the hilly region in the Gaspe Peninsula forms the Shickshock Mountains; the southern part is generally known as the Eastern Townships. It is to the latter part of the region, and especially the portion between the St. Francis and Chaudiere Rivers, that this paper relates. These rivers are about 100 miles apart, and from the area between them all the asbestos and chromite hitherto mined in Quebec has been obtained.

Series of parallel ridges running northeast and southwest are the principal features in the relief of the district. These are grouped into three principal ranges which are about twenty-five miles apart. One of these extends along the international boundary line near Lake Megantic, a second forms the hills of Capelton, Stoke and Weedon, passing near the city of Sherbrooke, and the third forms the hills of Broughton, Leeds and Ham, and farther to the southward rises into Sutton Mountain.

Sutton Mountain, the highest point in the district, has an altitude of nearly 3,100 feet. Several other hills rise 2,500 feet or higher, and there are considerable areas which are between 1,500 feet and 2,000 feet above sea level. The St. Lawrence plain varies in elevation from 100 to 400 feet.

The district is drained by the Chaudiere, Becancour, Nicolet, St. Francis and other rivers which cross the ranges of hills in a northwesterly direction and empty into the St. Lawrence. The tributaries of these rivers occupy the structural valleys between the ridges, and generally run either in a northeasterly or southwesterly direction. They frequently empty into the larger rivers by falls or rapids and so furnish some of the principal water powers of the district, such as the falls of the Magog at Sherbrooke, or the Wattopekah at Windsor Mills.

The Quebec Central and the Grand Trunk Railways give easy access to the greater part of the mining district. The principal mines are near the stations of Thetford Mines ,Black Lake and East Broughton on the former, and Danville, on the latter line of railway.

Mineral Production.

Asbestos (chrysotile) is the most important mineral now mined in the Province of Quebec. It comprises in value about half the total mineral production of the province and in 1907, the latest date for which full returns are available, this district furnished 84 per cent. of the world's supply.

The mineral was discovered in Canada in the early days of the Geological Survey, about 1847, and thirty years, later, 1877, it began to be commercially developed. Since that time there has been a constantly-increasing production, as may be seen by reviewing the production* of one year in each decade since the industry was begun:

Year 1878 production	50 tons	value....	$.....
Year 1888 production	4,404 tons	value....	255,007
Year 1898 production	16,124 tons	value....	471,131
Year 1908 production	66,548 tons	value....	2 555,361

The increase in production during the last decade has also been accompanied by a marked increase in price. To quote from the returns of production by Mr. McLeish, cited above, "The statistics indicate that during the past six years there has been only a slight increase in the quantity shipped as crude, although the average price has nearly doubled; while, on the other hand, the shipments of mill stock have increased over 125 per cent., with an increase of over 50 per cent. in the average price per ton obtained."

To state this in concrete form, the average prices of crude asbestos and mill stock in 1903 were $115.46 and $19.79 respectively; in 1908, $200.04 and $29.84.

In consequence of the successful development of the industry in recent years, prospecting is active and the search for new productive areas is being vigorously prosecuted.

Geology of the District.

General.—The central parts of the main ranges of hills are composed of igneous and sedimentary rocks of early age, in part at least Pre-Cambrian. Flanking these are sediments of later Cambrian and Ordovician age, within which are isolated intrusions of granite which are believed to have been injected in Devonian time. On the southeast side of the Sutton and Leeds range of hills there is a series of basic intrusive rocks generally known as the Serpentine belt. It is in this that the asbestos and chromite deposits of the Eastern Townships are found.

Local.—The sedimentary rocks of the district are schists, slates, sandstones and quartzites of Cambrian and Ordovician age. They are highly altered rocks and much distributed in position by folding and faulting. They have a general northeasterly strike and dips at high angles.

* "Mineral Deposits of the Serpentine Belt of Southern Quebec." Journal of the Canadian Mining Institute, Montreal, 1909.

* "The Production of Asbestos in Canada," 1907-8." By John McLeish, Chief of Division of Mineral Statistics, Department of Mines of Canada.

The igneous rocks in which the mineral deposits occur are all intrusive in the sediments. They have been injected at different times, although many of the different varieties of rock have been formed by differentiation from a single intrusion. At the contact of the intrusives with the sedimentary rocks large amounts of breccia have been formed, the sediments are baked and hardened, yet dykes are rare and there has not been any notable fracturing of the sediments. The intrusions have been gradual in their action.

The area occupied by igneous rocks is often and conveniently called the "serpentine belt," since serpentine is the rock which contains the principal mineral deposits. Thetford, through the Townships of Thetford, Coleraine, Wolfertown, Garthby, South Ham, Wotton, Tingwick, Shipton and Cleveland. It probably also forms a large part of the serpentine belt further to the southwestward in the counties of Sherbrooke and Brome; but this area has not yet been studied in detail. The country rock of the mines at Thetford, Black Lake and Danville belongs to this series.

The rocks of this phase are believed to have been formed by differentiation from a single magma. Serpentine is metamorphic rock that has been derived by alteration from peridotite and in the hand specimen it is not easy to distinguish one from the other. They are both com-

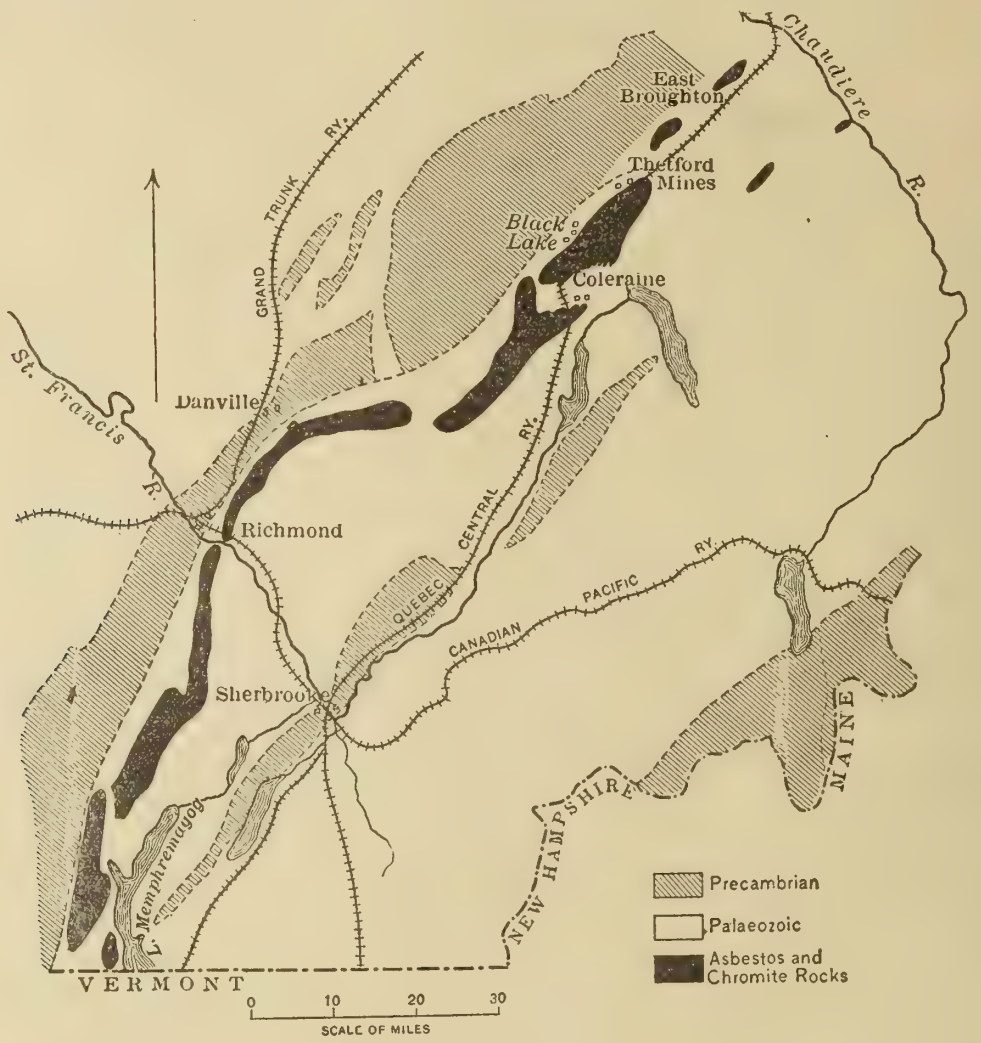


Fig. I.

In the serpentine belt two phases of igneous rocks may be distinguished which differ in the values they contain, in the state of preservation, and perhaps also in age. They will be referred to as the Thetford phase and the Broughton phase from townships in which they are well developed. Their general characters are shown by a comparative view of the rocks which compose them.

Thetford Phase:—Serpentine, Peridotite, Pyroxenite, Gabbro, Diabase, Porphyrite, Granite, Aplite.

Broughton Phase:—Serpentine, Soapstone, Greenstone schists.

Thetford Phase:—The Thetford series makes up the principal part of the serpentine belt. It includes the band of igneous rocks that extends southwesterly from Broughton Mountain near the northeastern boundary of monly called serpentine. Pyroxenite is a fairly distinct rock, being often coarse grained. Gabbro, diabase and porphyrite are conveniently grouped under the name of diabase in the field, since they pass into one another by gradual transition and are not easily distinguished. Granite—in its fine grained acid phases aplite—is sometimes differentiated *in situ* from the other rocks, in others it has been intruded a little later showing the differentiation to have taken place previous to intrusion.

Broughton Phase.—The rocks of the Broughton phase form a narrow band that extends from range III of the Township of Broughton southwesterly as far as the Robertson mine in Thetford. Through several ranges in Broughton it is confined to lot 13, but crosses the township towards the northwest as far as lot 2 in range XI.

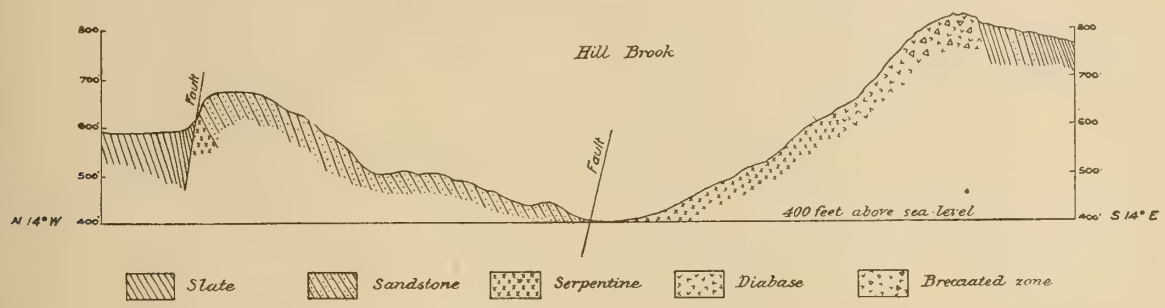
In Thetford it occurs principally in range V. Similar rocks also appear in ranges I, II and III of Tring, in or near lot 24, at the D'Israeli Asbestos Mine in Garthby range III, lot 16, and in other isolated areas in Leeds and Ham.

This phase contains the mines and prospects of East Broughton and those in the vicinity of Robertson.

The rocks have not yet been examined in detail, but they resemble the rocks of the Thetford phase in essential respects. The chief difference is in the state of preservation of the rocks, although there may have been also difference in their original composition. Probably they originally contained more pyroxenite. In the Broughton phase there is little, if any, peridotite accompanying the serpentine, which indicates that the alteration to serpentine is nearly complete.

sometimes extends to the top or outer edge of an intrusion, but the acid rocks whenever present are nearest the tops of sheets or the margins of other intrusions. Thus between the Danville Pinnacle and the St. Francis River, a distance of eight miles, the serpentine belt is in the form of a thick sheet dipping to the southeast at a high angle. Serpentine occurs along the northwest or footwall side, and diabase wherever present is on the southeast or upper side. The mines at Asbestos are in similar position with regard to the pyroxenite and diabase hills on the southeast and may be on the northeasterly extension of the sheet referred to above.

At the Robertson mine in the 16th lot of the range of Thetford, serpentine forms the lower or northwestern half of a sheet dipping southeast at an angle of 50 degrees, and schistose diabase the upper or southeastern portion.



DIAGRAMMATIC SECTION ACROSS THE SERPENTINE BELT

in range XIII, township of Cleveland, between lots 5 and 9

Scale . horizontal - 900 feet to ½ inch.
" vertical 300 " " " "

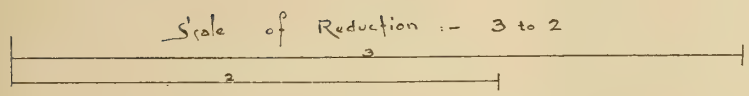


Fig. II

In the place of pyroxenite, which appears in the Thetford phase, there is its alteration product, soapstone, in the Broughton phase. The greenstone schists of Broughton probably had originally a composition similar to the diabase, or some closely related rock, in Thetford. Like the Thetford phase, they are doubtless differentiated from a single magma.

Granite has not been found in the Broughton phase, except in an isolated occurrence in range I, lot 24 of Tring, nor are any important bodies of chromite known in these rocks. These are the principal indications of different original composition in the two phases.

Structure of the Igneous Bodies.

The rocks of the Broughton phase and portions of the Thetford phase occur in bands, which follow the dip and strike of the enclosing sediments, and thus form sills or intrusive sheets. Other portions of the Thetford phase occupy elliptical areas sometimes narrowly connected with one another which are uncovered portions of a batholith or thick laccolith. The rocks are arranged in the following order: 1st, serpentine; 2nd, pyroxenite; 3rd, diabase,—in sheets, from the base upwards; in batholithic masses, from the centre outwards.

Where serpentine is in excess of the other rocks it Several exposures in Broughton show soapstone in the upper, and serpentine in the lower parts of a sheet.

This arrangement of the rocks agrees with the relative basicity, and density of the principal minerals, and with the order in which they generally crystallize.

Order of Crystallization.		Specific Gravity.	Rocks Formed
1.	Olivine	3.32	Peridotite (Serpentine)
2.	Pyroxene	3.20	Pyroxenite (Soapstone)
3.	Feldspar	2.70	With pyroxene forms, diabase, etc.

Olivine crystallizing first would, in the lighter portion of the magma remaining fluid, settle towards the bottom of the sheet, even if at a high dip, and form peridotite, which later has been altered to serpentine. Closely following olivine, pyroxene crystallized and likewise settled, forming pyroxenite. By later alteration this has become soapstone.

Where pyroxene and olivine became mixed together, probably through crystallizing simultaneously, they formed by alteration the harder variety of serpentine in the Thetford phase, or the talcose serpentine of the Broughton phase.

Where pyroxene was mixed with feldspar, which crystallized next in general order, diabase and the related rocks were formed. This separation would be more nearly complete, the more slowly the cooling took place.

Granite has been formed in sheets in only two cases as far as known. On lot 24, range I of Tring, it occurs as a differentiate at the top of the sheet. In the other instance, in the Townships of Cleveland and Danville, it appears to have been injected later than the serpentine in which it occurs principally as dykes.

In the areas that are regarded as uncovered portions of a batholith, such as the hill between Thetford Mines and Black Lake, or between the west side of Black Lake and the Wolfestown road, the Belmina road, or the area about Little Lake St. Francis, serpentine occurs in the central part and is partially, or wholly, enclosed by pyroxenite, which in turn is generally bordered by a rim of diabase. The outer edge of the diabase usually contains fragments of the adjacent sediments and so passes into breccia. The accompanying cut (Fig. 3) shows the arrangement of the rocks as seen along a section from the Thetford River to Bisby Creek. The section follows the power line of the St. Francis Hydraulic Company from the property of the Dominion Asbestos Company southward.

A mile northwest of the northern end of this section the sediments dip towards the southeast at an angle of 70 degrees, and within a few yards of the contact, four miles northwest of the section, the dip is 75 degrees in the same direction.

The first igneous rock is diabase which in the outer portion sometimes contains fragments of sediment forming a breccia. The diabase may be seen near the Roman Catholic church in Black Lake. The section is then drift covered until the serpentine is reached near the lake road. Following the line of section, the serpentine continues across the hill above the Standard and Dominion mines, though with a considerable amount of pyroxene in the higher and southern part of the hill, and passes beneath a heavy covering of drift. Near the Quebec Central Railway, 560 yards north of Chrome siding, there is an exposure of pyroxenite and diabase at the south side of this serpentine area.

The drift covered area extends for two miles along the line of section until the second area of igneous rocks is met. This consists of breccia, diabase, pyroxenite, serpentine, pyroxenite, diabase and breccia in succession. The succeeding sediments stand vertically for half a mile south of the contact and at a distance of two miles dip towards the southeast at an angle of 75 degrees.

It will be noted that Thetford River and Bisby Creek occupy similar positions in erosion valleys, cut in the transition rock between the diabase and serpentine; that the general dip of the sediments on either side of the belt is southeasterly and that the dip, which is practically vertical near the contact on either side, is generally higher on the southeast than on the northwest.

No sediments have been found in the drift covered part of the section, but three miles west of the section, sedimentary slates strike towards this area nearly at right angles to the line of section. They dip away from each of the igneous ridges thus indicating a synclinal trough between them, which has been deeply filled with drift.

The structure of the serpentine belt as shown in this section, suggests a thick laccolith similar to that which contains the nickel deposits at Sudbury, but further investigation does not support the comparison very well. Parallel ridges such as occur here are not common, being found in only a few instances in the distance of nearly 100 miles thus far examined. Such cases seem to represent the dying out of one intrusive ridge and the beginning of another near and parallel to it.

The dip of the sedimentary rocks is in the same direction on either side of the belt and at high angles. The arrangement of the rocks in the two ridges is the same, while if they were parts of a laccolithic sheet they should appear in reversed order on the two ridges. It, therefore, seems probable that the igneous ridges are formed along two lines, perhaps minor anticlines, which have

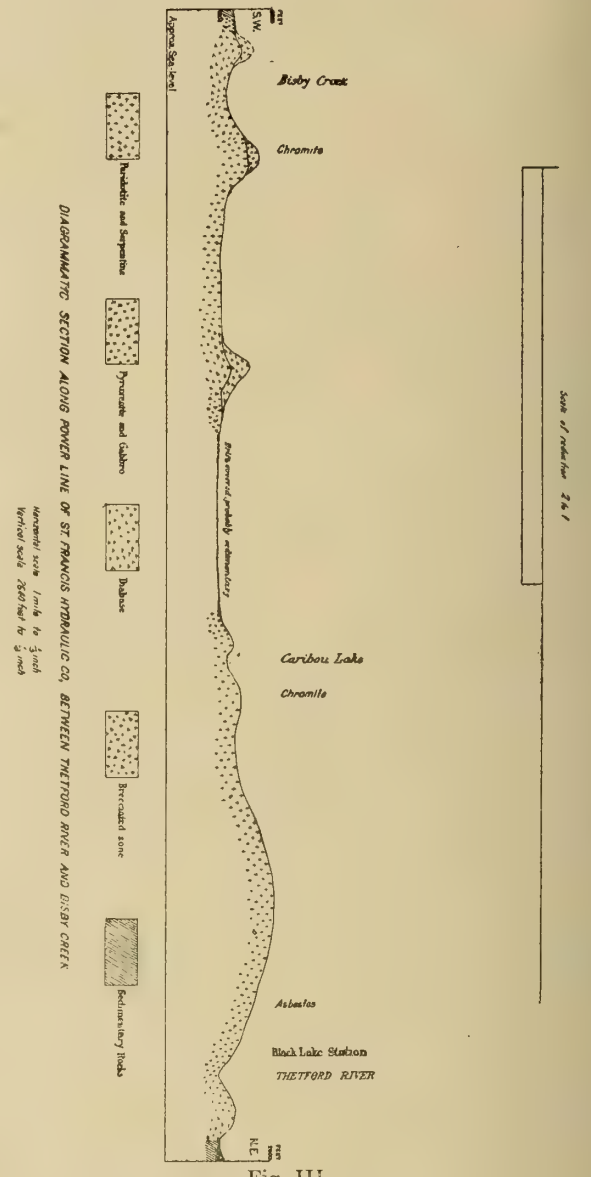


Fig III

afforded an easier ascent for the magma. They may be connected at no great depth beneath the sediments, yet they diverge sufficiently to permit of similar effects from differentiation taking place in each.

The arrangement of rocks by which the most basic rock is at the centre and the mass becomes more acid towards the outer edge is a common one in igneous intrusions of this class. It is theoretically accounted for by differentiation according to gravity taking place in a slowly-rising magma, thus bringing the more acid material, which formed the diabase and related rocks everywhere, in contact with the sediments. As the intrusion gradually rises, the acid margin is carried upward, forming an envelope over the advancing batholith. This is

seen in this district in such hills as Broughton, Adstock, and Big Ham Mountains which rise in cone, or saddle shapes, and are encased in diabase in the upper portions. Near the bases of these hills the diabase passes into gabbro, and where erosion has been especially heavy, pyroxenite and in places serpentine are exposed.

Location of Deposits.

Thetford Phase.

Character of the Rock.—The asbestos deposits of the Thetford phase of rocks are found only in the purest serpentine. This in a general way is indicated by softness of the rock, but serpentine impure from the presence of soapstone is also soft, but is not as valuable for asbestos. Therefore soft serpentine is favourable for asbestos only when there is no soapstone present.

As shown in the arrangement of the rocks above, the purest serpentine occurs in the lower parts of sheets and in the central portions of batholithic masses. As the trend of the serpentine belt is northeasterly, sheets in this district must dip either to the southeast or northwest. Where sheets dip to the southeast, as between Danville and Richmond, the best rock is found along the northwest side of the serpentine belt. In Garthby range II, where the dip is to the northwest, the best rock is near the southeast side of the intrusion.

In batholithic masses the purest serpentine, which would be found at the centre were the mass reduced to a horizontal plane surface, is best exposed around bases of the peridotite-serpentine hills, but especially near the north side. Thus the mines of Thetford are at the extreme northern edge of the serpentine hill which extends southwards to Caribou Lake, and the mines of Black Lake are situated along the northwest side of the same hill. The King mine in Ireland is on the northern edge of the hill of serpentine and peridotite which extends southward to the Lambly mine in Coleraine, while the Belmina and Chrysotile mines are on the northern and southern borders respectively of the hill which separates them.

Effects of Erosion.—The better exposure of asbestos-bearing serpentine on the north side is due apparently to glaciation, the ice having eroded the hills on the north side, against which the glacier moved, more deeply than on the south, or lee side. While equally good serpentine may, and probably does, extend around and through these central hills it is generally covered by harder and less productive rock except where erosion has been especially heavy.

Asbestos has been found on the south side of two of the larger hills, at Chrysotile, and at the old Lambey mine near Coleraine, but the northern side has thus far proven more productive.

Serpentinization.—Besides the purity of the original peridotite, and its exposure by erosion, alteration to serpentine is a necessary condition for the formation of asbestos. The precise nature and cause of this change, from peridotite to serpentine and, consequently, the parts of the rock mass in which it is most likely to take place, are as yet imperfectly known.

Peridotite is a rock consisting principally of the mineral olivine, which is composed of silica, magnesia and iron. In the change to serpentine, water is taken in to the amount of about 12 per cent., while iron and silica are probably in part removed. The serpentine thus produced is a softer rock than the original peridotite and shows few grains or crystal faces. Pure serpentine can thus be easily distinguished from fresh peridotite. But the greater part of the rock in the district is only partially altered to serpentine. Other conditions being equal, it appears to be more productive the farther the alteration has gone. Consequently the degree of alteration must be taken into account, and this is a somewhat difficult feature to determine. Hardness is in part a guide, but examination by means of the microscope is often necessary to certainly determine the degree of alterations of the rock.

An important part, at least, of the change from peridotite to serpentine is due to the action of water. Whether this is due to meteoric waters such as now circulate through the rocks, or to magmatic waters which came in with intrusions of igneous rocks is a question for further investigation, as it bears on the importance of the granites as an indication of asbestos. But in any case the water reached the rocks, which it has altered, by means of fissures and fractures which are, consequently, an important indication of the part of the rock mass that is likely to be best serpentinized and to contain asbestos.

Fractures.—The parts of the rock mass which are altered to serpentine appear to depend in a considerable measure at least on the amount of fracturing of the rock, which is also a necessary condition for the forming of asbestos veins.

Where there has been much fracturing the rock is largely or wholly serpentine. Where other openings are not found the peridotite is commonly serpentinized along joint planes. In such cases veins of asbestos sometimes occur in a rock which, on the whole, is still a comparatively little altered peridotite. The hills on the south and west sides of Black Lake furnish a good example.

Serpentinization seems to proceed from any crevice into the wall rock on either side, and is generally followed by the formation of asbestos veins proportional in width to the band of serpentine. The asbestos veins in such cases are about one-third of the width of the serpentine band on either side of them.

The degree of serpentinization of the rock as a whole, and the amount of asbestos thus depends in a measure on the amount of fracturing. The fractures may be joints, or cleavage planes due to regional foliations, or the casting off of concentric shells from rectangular joint blocks probably induced by increase of bulk due to hydration.

Fracturing is thus both a cause and an effect of serpentinization. But in either case it is an indication of well serpentinized rock, provided the peridotite were originally pure.

Where the rock is too greatly fractured the veins of asbestos become so short as to be of little or no value. Thus when serpentine is in contact with sediments it is usually finely shattered and the asbestos, if any, is too short to be useful and occurs as slip fibre. The shattering of serpentine near the contact also suggests a primary gneissic structure, but a determination of the full cause of it requires further study.

Influence of Granite.—As a result of experience the presence of granite in an area of serpentine is generally regarded as a favourable indication of the occurrence of asbestos but the casual connection, if any, is not easily apparent. Granite is often contemporaneous with the diabase and in some cases also with serpentine. In such cases the granite is in irregular masses, and it is difficult to see what connection they could have on the occurrence of asbestos beyond indicating a very complete differentiation of the rock.

In other cases the granite has been intruded a little later than the other rocks and forms dykes and sills. The fracturing which was accompanied by the injection of these dykes would favour the development of

asbestos veins. Hence it is possible that they may be effects of the same cause, rather than that granite is any part of the cause of the occurrence as asbestos veins. It is possible and perhaps probable, as has been suggested by Dr. A. P. Low,* that the action of heated waters accompanying the injection of the granite dykes has aided in the serpentinization of the peridotite.

Broughton Phase.

The serpentine of the Broughton phase differs from that of the Thetford phase in being finely shattered and in containing asbestos principally in the form of "slip" or parallel fibre. It is also softer than the rock at Thetford and often has a talcose feel. Deposits of soapstone and sometimes of talc are found associated with it. It carries very little chromite even in disseminated grains and no deposits of important size. There is also no granite in the Broughton and related rocks, except in an isolated occurrence in the Township of Tring, which probably belongs to this series.

The whole series occurs in intrusive sheets with the serpentine at the base, soapstone and greenstone schist, when present, in ascending order to the top of the sheet. In some cases, however, serpentine makes up the whole or greater part of the sheet and so extends to both walls.

In the serpentine there are blocks and masses of a harder rock which have not yet been examined microscopically and which contain no asbestos. These occur more plentifully towards the base of the serpentine and often make up the greater part of the rock near the lower edge of the sheet. Accordingly the pits are usually situated a little above the extreme base of a sheet.

Summary.

The results of this investigation which seem to have a practical bearing on the location and estimation of asbestos, may be briefly summarized. Aside from the evidence of asbestos actually seen, the conditions which it is important to observe as far as known are:

1. Purity of the serpentine.
2. Fracturing.
3. Presence of granite.

1. The purity of the serpentine is the most important feature. It depends on (a) the purity of the peridotite, or original rock. (b) Its degree of serpentinization.

(a) The purity of the original rock depends on the composition of the magma and its differentiation in cooling, the latter factor being largely influenced by gravity. The purest serpentine is accordingly found at the base of sills, or intrusive sheets, and in the central portions of batholithic masses.

The exposure of the central parts of batholithic masses in this district depends in a large measure on glacial erosion, which, in this district, has uncovered the most productive rock on the north side of the larger hills.

(b) The fractures are due to jointing, and regional compression; also probably to the increase of volume accompanying serpentinization and possibly to original flow structure around the margin of batholithic intrusions. Hence they are likely to be more abundant around the edges of serpentine and in zones of special regional foliation.

3. The granite, where intrusive, has accompanied a fracturing of the peridotite, a condition which is favourable to the formation of serpentine and asbestos. Magmatic waters accompanying the intrusions may also have aided in serpentinization. Granite dykes are, therefore, thought to be a favourable indication of the presence of asbestos veins.

*Report on the Chibougamau Mining Region, Geological Survey of Canada, 1906.

THE CLAY AND SHALE DEPOSITS OF NOVA SCOTIA AND PORTIONS OF NEW BRUNSWICK AND PRINCE EDWARD ISLAND.

By Heinrich Ries.

(From Summary Report of Geological Survey.)

The investigation of the shale and clay deposits in the above-named region occupied the summer of 1909. The writer was assisted in the work by Mr. Joseph Keele. The object of the study was to ascertain as far as possible what geological formations were clay and shale-bearing, and which of these deposits were adapted to the manufacture of clay products.

With this end in view, the clay and shale deposits were examined as thoroughly as was possible in the time at our disposal; and samples were collected for testing in the laboratory. The last was an important part of the work; since one can tell but little from the appearance of the material in the field.

The different brick plants in operation were also visited, and samples of their products taken for crushing, transverse, absorption, and freezing tests.

Nova Scotia.

The geological formations of Nova Scotia range from the Pre-Cambrian to the Triassic, and they are overlain nearly everywhere by a mantle of pleistocene material of variable thickness.

In certain formations the character of the material is such that there is little probability of its being of any value to the clay-working industry, and these are considered first.

Formations of No Probable Value to the Clay-worker.

Pre-Cambrian.—This consists of crystalline rocks of either igneous or metamorphic character, which underlie a large portion of southwestern and southern Nova Scotia proper, and a large part of northern Cape Breton, as well as scattered areas in southeastern Cape Breton. None of the Pre-Cambrian rocks are of plastic character, nor do they become plastic when finely ground. They have no doubt been weathered to residual clays in the past; but these have probably been removed by glacial action. Only one deposit of residual material came to our attention, and this was a pocket on Coxheath Mountain, near Sydney, the clay there having evidently been formed by the decomposition of a light-coloured felsite, which occurs in some abundance in that region. The clay deposit is too small to be of any economic value. In recent years several attempts have been made to utilize this rock in the manufacture of firebrick, but up to the present time they have not been successful. Unfortunately some

persons have promulgated the idea that the felsite could be used by itself for brick manufacture; but this is impossible, since the material is lacking in plasticity, and could not be utilized unless some bonding material was mixed with it. If a good fireclay could be found in the neighbouring Sydney coal field, it might serve as a binder for the felsite.

It is possible that veins of feldspar or quartz of sufficient purity and thickness to be workable, might be found in the Pre-Cambrian area, but diligent inquiry failed to discover any.

Silurian.—The rocks of this system underlie a narrow area on the south side of the Annapolis Valley, and irregular areas in the eastern half of Pictou and northern half of Antigonish Counties. They are economically important because of the deposits of iron ore which they contain. Associated with these are somewhat extensive beds of shale, but most of them are rather slaty in their character, and of exceedingly doubtful value for the manufacture of clay products. On weathering they might produce plastic clays, but even so, the majority of them would be rather ferruginous. A few samples were collected for testing, in order to definitely determine their value.

Devonian.—The Devonian rocks underlie a narrow bel tof irregular width extending through the central part of the province, and underlying some small areas in southwestern Cape Breton, to the northeast and southwest of St. Peter Bay, as well as on the northeastern side of the Straits of Canso, near Hastings.

These rocks were examined at a number of localities, and were found to be either too schistose in their character, or where of argillaceous nature contained too much silica, present either as disseminated sand in the shale, or interbedded sandstone layers. Were it not for the sandstone layers, the material, though siliceous, could no doubt in some cases be used for brick manufacture.

Permian.—This underlies a discontinuous area extending from Chignecto Bay eastward along the north shore to a little beyond Merigomish harbour. No shales of any value were found in it.

Triassic.—The Triassic rocks form one belt following the Annapolis Valley, and another one along the north shore of Cobequid Bay, tapering out east of Truro. They are usually sandy in their character, and not to be looked upon as a source of either clay or shale.

Important Clay-bearing Formations.

From what has been said above, it will be seen that the formations likely to yield clay or shale deposits of value muts be the lower Carboniferous, Millstone Grit, Coal Measures, and Pleistocene. These are few in number, but nevertheless they underlie areas of considerable size.

Lower Carboniferous.—Underlying, as they do, a rather extensive area in central Nova Scotia, and another in Cape Breton, it is to be regretted that the lower Carboniferous rocks, it is to be regretted that the lowed into by clay-product manufacturers. The formation is, however, somewhat variable in its character, carrying, as it does, beds of shale, conglomerate, gypsum and limestone. Those shales closely associated with the gypsum beds may be of value for common brick manufacture, although they frequently contain considerable quantities of impurities, such as gypsum nodules, concretions of iron carbonate, or sandy streaks. At some points though, as near Pugwash, the shale occurs in large beds, and works up well to a plastic mass: the more so as it is slightly weathered. At that locality it supports one of the most active and best equipped brick plants in the province.

Northeast of Shubenacadie, also, promising shales were found in the lower Carboniferous, while in the so-called limestone series around Sydney there were found a number of beds which appear promising for brick manufacture, provided the sandstone layers do not occur too thickly.

Millstone Grit.—This is well exposed in the area north of the Pictou Coal Measures; south and southeast north of the Pictou Coal eMasures; south and southeast of Hawkesbury; and west and southwest of the Sydney coal field.

One cannot predict the universal distribution of promising clay or shale beds in the Millstone Grit, but small beds are not uncommon. Unfortunately, outcrops are scarce in many of the areas underlain by the rocks of this age, which increased the difficulty of finding clays or shales in it. Several deposits of fair importance were seen, and may be referred to in passing. In the Sydney region, a pit has been opened near the Steel works, exposing a bed of soft bluish shale, not less than 5 feet in thickness. A second deposit occurs near the coke oven plant of the Dominion Iron & Steel Company, and a third one outcrops along the east shore of Sydney harbour, near Victoria Mines post-office. Although the tests of these have not yet been completed, it is highly probable that they represent a grade of material considerably higher than brick clay.

In the Pictou coal region, a rather heavy bed of mottled, shaly clay has been found northeast of Woodburne station, on the Intercolonial Railway. Preliminary tests have shown its adaptibility to the manufacture of pressed brick. It may be said here, that there is some doubt as to whether this bed lies in the Millstone Grit or Permian conglomerate, but the former view seems the more reasonable .

The Millstone Grit contains at least one shale bed of some thickness in the Joggins area; but it is probably of red burning character.

(To be Continued.)

CORRESPONDENCE.

Editor Canadian Mining Journal,
Toronto, Ont.

Sir:

Noting the suggestion in your Rossland correspondence in issue of May 1st that the new Canadian dollar be made of some more valuable metal than silver, I would suggest—though very likely this has occurred to others before me—that the Canadian dollar be composed of an alloy of gold and silver. The silver dollar is entirely too large, especially if any attempt be made to give a dollar's worth of silver in the coin, while the gold dollar is uncomfortably small.

It might be urged against this plan that it would offer opportunities for counterfeiting, but I cannot see that the metallic composition of the coin would in any wise have any tendency to give counterfeiters a greater opportunity than they now have with ordinary gold and silver coins.

It seems to me that such a coin as suggested would be distinctive, as well as in every wise satisfactory.

Very truly,
Horace J. Stevens,
Editor the Copper Handbook,
Houghton, Mich.

Mr. C. L. Hower, late of Johnson, Pennsylvania, is supervising development work on coal properties in western Alberta for the German Development Company, of Ottawa.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

The Montreal "Witness," July 11th, had a short editorial comment on fatalities in English coal mines. The "Witness" comments on the fact that in 1908 thirteen hundred persons lost their lives in mines, and refers to a recent debate in the British House of Commons concerning the Whitehaven disaster. The "Witness" remarks that "the one cheerful feature of the debate was the information that advance in life-saving has been made, and that in fifty years the fatal accidents have been reduced from five per thousand to less than one and one-half per thousand of the men employed. But the figures for 1908, as one member remarked, are still an indictment of the management of the pits." It should be remembered in considering these figures that in the fifty years referred to by the "Witness" the decrease in loss of life in coal mines has been accompanied by an increase in the tonnage of coal produced, which, for so small a country as Great Britain, is nothing less than remarkable. Reflections on the management of British coal mines will come more gracefully from Canadian newspapers when the accident rate in Canadian coal mines compares more favourably with the British fatality rate than is the case to-day. Although when the rate of mine fatalities in Canada is compared with that of the United States we have cause for congratulation, yet, unfortunately, we have fully as much cause for reflection when our figures are compared with those of Great Britain, France and Belgium.

The "Witness" refers to the Home Secretary's action in introducing a bill to the British Parliament for the organization and training of rescue corps. While we have no wish to depreciate the value of these appliances and the necessity for their adequate provision and the training of men in their use, yet it must be remembered that the proper way to reduce accidents is by preventing as much as possible the causes from which they arise. Your correspondent has on several previous occasions pointed out that the term "rescue apparatus" is a misnomer. The probabilities of being able to rescue any large number of men at coal mine explosions is always open to grave doubt. Up to the present time, and, we think, in the future, the proper use of breathing apparatus will be in checking the growth of incipient fires by enabling the underground fire brigade to approach within effective range of the fire, and in preventing such a fire from developing into a disastrous conflagration with dire results to both life and property. We have always argued that the provision of breathing apparatus, accompanied by the proper training of men in their use, is needful and should commend itself to every mine owner who has any regard for life or property; but their general use is not likely to be followed by any marked decrease in the fatalities incident to coal mining. The great majority of coal mine fatalities arise from falls of roof and side and from accidents connected with the mining machinery. On this source of fatalities the provision of breathing apparatus and the erection of rescue stations can, of course, have no effect whatever. If the Montreal "Witness" will compare the Canadian coal production of 10,500,000 tons per annum with the British coal production of 270,000,000 tons and put side by side with these figures the number of lives lost in the coal mines in each case, they will realize that if the British figures are to be considered as an indictment of the management of the pits a good deal could be said about the matter on this side of the water.

The Technical Education Commission.

The Federal Commission on Technical Education is expected to sit at Glace Bay about the beginning of August. From the remarks of the Chairman of the Commission at the opening sessions in Halifax the scope of this Commission's enquiry seems to be much wider than would be expected from the name that has been given to it. All matters affecting the general environment of industrial workers will apparently be taken under review. Preparations are being made to have representative officials and workmen of the collieries give evidence before the Commission, and it is expected that the members of the Commission will visit the coal mines themselves and thus gather their information at first hand.

The Colliery Relief Societies.

The new scale of contributions and relief which resulted from the consolidation of the Colliery Relief Societies of the Dominion Coal Company, came into effect on the 1st of July, and deductions are now being made on the new basis. The relief payable to members is exceedingly liberal and should prove adequate to take care of all ordinary cases of sickness and accident. The members' monthly contribution is fifty cents, and the Coal Company will contribute equally with its employees. The weekly benefit for disability caused by sickness or accident is six dollars. In the case of death an immediate benefit of one hundred dollars is payable, and the widow will receive eight dollars per month for five years, with three dollars per month for each child until the age of fourteen years. Thus the widow of a member having four children would receive an income of twenty dollars per month for at least five years, in addition to the death claim of one hundred dollars. Provision is made for special grants to members suffering the loss of eyes or limbs. Each local branch will manage its own affairs, but all funds will be deposited in a central treasury. The general affairs of the Society will be administered by a Board of Directors on which the company and its employees will have equal representation. The assets and liabilities of the old societies have been taken over by a new society, and the Coal Company has deposited a sum equal to the accumulated surpluses of the former branches to the credit of the new society. It is expected that every employee of the company will eventually become a member of the Benefit Society, for which may safely be prophesied a long and useful life. In opening the proceedings of the first meeting of the general board of directors of the new society, Mr. Butler, the general manager of the Coal and Steel Companies, said that apparently the relations between the employees of the Coal Company and the management were entering upon a new and better era, and he forecasted for the new society that it would prove a strong factor in promoting harmonious relations between the management and their employees.

ONTARIO.

Cobalt.—A regular storm of protest is coming in from Gowganda and Porcupine, where the Government roads are being built, with the aid of prison labour. The labour unions have taken the matter up, and have petitioned the authorities to stop the practice. One of their strongest claims is that there are a great number of men in the district who are unable to obtain employment and that the action of the Government in using prisoners on the roads is taking away from these men the opportunity to make a living. The labour situation in the mining camps is quite satisfactory, although there is a considerable surplus of unemployed. During the past winter the possibilities of a strike for this summer were hinted at, but there has been no sign of it. The large element of foreign labour in the camp practically precludes a successful strike being made, and aside from that wages are so good, as a general thing, that there is very little cause for complaint.

The shipments from Cobalt for the first six months of 1910 show an increase of only two tons over the production for the corresponding period of last year. It is expected, however, that silver will show an increase of approximately two million ounces. This is due to the increased quantity of concentrates being

shipped, and the consequent falling off in the shipments of low grade ore. The Cobalt ore shipments for the six months totalled 14,915 tons, while the Gowganda output was 372 tons. The production of bullion in Cobalt for the same period amounted to 187,597 ounces.

Another new surface vein showing very high values in silver has been uncovered on the Lawson property. It was found near the Foster line and has already been traced for about 200 feet. It is irregular as to width, but where the stringers come together it shows up to twelve inches of rich ore.

The statement of the Crown Reserve for the first six months of the present year shows a profit of $536,064. The returns from ore shipments amounted to $709,569, while operating expenses and royalty charges totalled $173,505. Dividends to the amount of $530,644 were disbursed, leaving a balance of $5,420. The value of the ore on hand is estimated at $30,000.

Work has been started on the new concentrator for the Hudson Bay mine. It will have twenty stamps with an estimated capacity of sixty tons a day. An important concession has been made by the Government, by which the mining company is allowed a reduction of the royalty in the shape of a rebate for every ton of ore milled. The mine has formerly been paying a royalty of fifteen per cent. on the gross value of the output.

At the annual meeting of the Lang Caswell Company it was decided to end the pool and issue certificates to the shareholders. It was announced that a new vein four to six inches wide, and assaying about 150 ounces, had been uncovered. Only surface work is being carried on at the present time, but it is probable that underground operations will be resumed this fall. In the crosscut from the lowest level of the Little Nipissing, the No. 2 vein has been cut. The vein was wider than on the upper level and showed good values. It is probable that in the near future the winze will be sunk another seventy-five feet and a new level opened up.

Another new vein has been found on the Nipissing property near Peterson Lake. It is of good width and shows considerable silver. During the month of June this company produced 350,658 ounces of silver, valued at $185,847, and shipped silver to the value of $180,427. A new shaft has been started near the Chambers-Ferland line to develop a number of veins that have been found in that section.

The Kerr Lake has declared the regular quarterly dividend of five per cent. with a five per cent. bonus, payable Septembr 15th. When this has been paid the shareholders will have received a total of 81 per cent. on a capital of $3,000,000.

Professor Richards, of Boston, has been in camp for some time, and among other things has been paying particular attention to the different concentrators. He delivered a very interesting address before the local branch of the Canadian Mining Institute on "Recent Investigations into Ore Dressing." He stated that there was every probability of there being a fine set of mills in the near future. None of them, he believed, had gone far enough to arrive at any very definite conclusions, but they were proceeding in the right direction.

Underground work has been recommenced at the Columbus property. The company has been re-organized and is now under entirely different management.

Mr. Ludwig Rose, a representative of the German Government, has been in the district for some time past, studying different methods of mining and concentration. He is looking particularly into those properties where very high grade ore is produced.

The last few months since the introduction of power air and electricity, there has been a very considerable decrease in the gross earnings of the T. & N. O. Railway. This is largely due to the falling off in the consumption of coal, which now practically amounts to nothing. So far no figures are available relative to the saving of the new power over steam generated power. This is on account of the fact that air meters have not yet been installed, and that air is at present being sold on the basis of so much per drill per shift. That the saving is great cannot, however, be doubted. Formerly power in the camp cost on an average $150 per horse-power year. Now electric energy can be bought for $50 per horse-power year, and the air, while sold on a different basis, probably does not cost much more.

A writ of execution has been issued against the Goulds Consolidated, one of the companies leasing their ground from Peterson Lake. A part of the surface equipment has been seized.

J. S. Bradley, who has been heading the fight against the Cobalt Central management, states that he now has sufficient powers of attorney sent him by the shareholders to overthrow the present control, as represented by Thomas Nevins and his associates. He has tried to do this several times before, but up to date has not succeeded.

At a depth of twenty feet below the main level of the Waldman, to the west of the shaft, ore has again been found in the vein. On the level the values had been cut out by a fault and it was on the other side of this that the ore was picked up. In this same section of the Gillies Limit, the Wyandoh shipped its first car of ore a short time ago. Part of it was high grade and part medium.

During the first six months of 1910 the McKinley-Darragh produced almost as much silver as in the whole of the preceding year, while the Savage produced as much as in the whole of its previous history. Three veins are now being worked on this latter property, which is in splendid condition with every indication of becoming an important shipper.

The first shipment from the new mill of the Nova Scotia, consisting of twenty-six bars of silver weighing 26,700 ounces and valued at $14,685, was sent to England a few days ago. The Nova Scotia mill is a combination of pan amalgamation and cyaniding, and is a decided departure from the general run of mills in the district. The cyanide process is in use at the O'Brien, Nova Scotia and the Buffalo, the latter being the only one that has published data relative to the working costs. On this property only the slimes from the concentrating plant are treated. These averaged about 13 ounces silver and an extraction of only 66 per cent. was made. This seems very low, and it would appear that close slime concentration would work to as good advantage. Experts were called in some time ago, however, and several changes have been made in the process by which a much higher extraction is expected in the future.

A new ore shoot has been opened up on the 100 foot level of the Keeley mine in South Lorrain. Where cut the vein was about twelve inches wide of high grade ore. A big vein carrying about 200 ounces has also been found on the property of the Howard Syndicate near Ox Bow Lake.

It is stated that the Coniagas will resume its regular quarterly dividend of three per cent., which will be payable the first of August. Up to date this company has paid 29 per cent. on its capital of $4,000,000. Developments on the third level are very satisfactory, the No. 2 vein giving wider and richer ore than it did on the level above.

Porcupine.—It is stated that Mr. A. E. Wallberg, who practically controls the Mines Power, Limited, of Cobalt, has purchased a lease of a water power, on the Mattagami River, in close proximity to the Porcupine camp. It is situated in the Temagami Forest Reserve, about nine miles from the boundary of Tisdale Township, and has an estimated capacity of 6,000 horse-power under a head of 120 feet. Survey parties have been sent in to make detailed plans of the water power and to lay out roads and transmission lines. It is doubtful if work will be started before next winter, because, although the district shows every sign of becoming of great importance, development has not proceeded sufficiently to absolutely prove it. The work accomplished during the next few months, however, will go a long way toward proving up the district. The installation of a plant of this sort would prove of immense benefit to the new camp. Situated as it is at a considerable distance from the railroad, and with no immediate possibility of a branch line being built,

wood will be the only fuel available for some time to come. The immediate supply of this, however, will soon become exhausted, as very extensive developments that will require a large amount of power have been projected by some of the properties. A small stampede has lately taken place into the country around Great Pike Lake, which lies about forty miles to the southwest of Porcupine. A number of samples showing high values in free gold have lately been brought out.

Another big vein has been discovered on the Timmins property. Not enough work has been done yet to define its extent, but where opened up it shows some spectacular values in free gold. On the 100-foot level of the main shaft some of the richest ore yet discovered on the property is being found. The vein is ten feet wide and values will run hundreds of dollars to the ton.

On account of the poor transportation facilities, provisions are very high, and all over the district men are being laid off until such time as the winter roads are in shape and supplies can be brought in at reasonable prices.

A rich discovery has been made on the property of the Standard Gold Mines Company in the Reserve. The vein is stated to be over twenty feet wide.

What the Government has refused to do, build a spur into Porcupine, will be undertaken by a private company if it can obtain the necessary permission. A number of business men made application a short time ago for permission to form a company and build a private line. The matter is now being taken up with the Government and definite word is expected very shortly.

A very important deal has just been put through whereby Mr. Lorne McGibbon, president of the La Rose, and Mr. Frank Armstrong have acquired the seventeen claims known as the Dobie properties. These were some of the first claims staked in the district, and some good finds are stated to have been made.

Gowganda.—As an evidence of the work being done in the Gowganda and Elk Lake sections it may be stated that altogether forty plants have been installed in those sections. Several of these have been shut down, but there is every possibility of others being installed next winter, and it is likely that some of those not working now will recommence before long. The Hitchcock claims at Elk Lake, which have been incorporated into the Royal Westmount Company, are making a very favourable showing.

The Millerett has shipped another carload of ore, bringing the total shipments since the first of the year to approximately 300 tons.

The deepest mining in the district is on the Reeves Dobie, where high grade ore has been found at a depth of 200 feet. During the coming winter this property will install two Nissen stamps, to reduce some of its low grade ores.

BRITISH COLUMBIA.

The occurrence of ore containing molybdenum at Aspen Grove is reported from Nicola district. The mineral was found there last summer, but not much development work has yet been done on the claim on which it occurs.

Drilling contests are not so frequent at annual celebrations in towns in the mining districts of the province as they were several years ago. At Nelson last month, on Dominion Day, J. Johnson and A. Erickson, of Silverton, Slocan Lake, won the double-drilling contest with a hole drilled in granite 37 3-4 inches in 15 minutes, using 8-lb. hammers and 7-8 inch drills. John Madson and Andrew Selba, of Rossland, were second with a hole 37 1-8 inches deep. A. Erickson won the single drill event with a hole 16 1-2 inches in depth, Frank Johnson, of Salmo, coming second with 14 1-2 inches. Two Rossland boys, Arthur Johnson, aged 13 years, and Fred Chenowith, aged 15 years, gave an exhibition of drilling, making a hole 15 inches deep in granite in eight minutes with 5-lb. hammers and 3-4 inch steel. At Republic, Washington, U.S.A., on July 4, Johnson and Erickson did better than at Nelson three days earlier, for they drilled a hole 39 3-4 inches, as compared with that of 37 1-2 inches drilled by two Republic miners, who won the second prize. The first prize was $200.

Recently a shipment of pig lead from ore smelted at the Consolidated Mining & Smelting Company of Canada's smeltery and refined in its electrolytic refinery at Trail, was made to Kiobe, Japan. This company supplies several lead works in Canada—two in Montreal, Que., and one in Vancouver, B.C.—with lead made from British Columbia ores, for corroding purposes and manufacture into pipe, sheet-lead, shot, etc., and the surplus over the quantity taken by the Canadian market is shipped to the Orient and Australia, chiefly to the former.

East Kootenay.

The Crow's Nest Pass Coal Company is completing, at its Coal Creek colliery, near Fernie, a boarding house for miners, which building, the Fernie "Free Press" states, will probably be one of the best appointed and most comfortable establishments of its kind erected in Canada. The building is three storeys high, a frame superstructure on a stone foundation. It is plastered throughout, steam heated, and lighted by electrity. In it there is accommodation for 50 men, allowing each man a comfortable bedroom, and, as well, there is accommodation for the family in charge.

Operations at the North Star mine, near Kimberley, Fort Steele mining division, yielded a net profit of $11,759.84 for the fiscal year ended May 31, 1910, according to the report of the directors of the North Star Mining Company, lately made public. This report states that "about 3,000 tons of ore was shipped. Mining and exploration work carried on during the first part of the year was encouraging, and an interim report was issued to the shareholders in January, 1910, stating that the work was showing a measure of success, but nothing definite could be announced until further exploration work was done. The work was continued until the beginning of March, and conditions looked encouraging when, unfortunately, Mr. N. McL. Curran, manager at the mine, contracted lead-poisoning and was compelled to resign his position. At the same time scarcity of water and severe snow storms made it impossible to carry on work economically, so it was decided to close the mine temporarily, until weather conditions should improve and the services of a competent man could be obtained." A cash distribution of $26,000, equal to two cents per share, was made to the shareholders on February 1, 1910. The late manager reported that the steam plant and tramway had been kept in running order and buildings in good condition.

Ainsworth Division.

Shipments of ore through Kaslo in June were not large, owing chiefly to a postponement of output of zinc ore from the Lucky Jim mine pending completion of an aerial tramway from the lowest adit down to the Kaslo & Slocan Railway. The Kootenian gives the following as the tonnage figures for the month:—Silver-lead: Rambler-Cariboo, 130 tons; Whitewater, 42 tons; Whitewater Deep, 25 tons; total, 197 tons. Zinc: Lucky Jim, 39 tons ore; Whitewater, 140 tons concentrate; Whitewater Deep, 350 tons concentrate; total, 529 tons. Total of silver-lead and zinc products shipped in June, 726 tons. For six months to June 30, the total output, including both silver-lead and zinc ore and concentrates, was 5,179 tons.

The Kootenay Silver Lead Mines, Limited, has been incorporated with an authorized capital of $2,000,000, half of which is to be treasury stock, to acquire and operate the Highland silver-lead mine and concentrating mill, near the Town of Ainsworth, Kootenay Lake. Up to date there has been about 5,500 feet of development work done on the Highland group. The mine is equipped with an air compressor, machine drills, and all requisite accessories for practical mining and ore production. There is accommodation for about 60 men in the mine buildings. An automatic aerial tramway, rather more than a mile in length, connects the mine and mill. The mill requires eight men to run

it at full capacity of 200 tons of ore per 24 hours, but ordinary tonnage will be about 150 tons daily. Mill machinery is operated by water power. It is claimed that there is in sight sufficient ore to supply the mill for 300 days running three 8-hour shifts. A new adit, starting on the northeast side of the mountain, is being driven; it is in 175 feet and will reach the ore body within 100 feet additional distance. A car load of sorted ore from near the surface of the ore body this adit will cut at depth, returned 72.3 per cent. lead and 25 ounces silver per ton. It is planned to drive another adit from the opposite side of the mountain, after sufficient treasury stock has been sold to provide money for this development, to cut the ore shoots at about 300 feet below the old workings. This work will probably be commenced in August and it will take about five months to drive the 700 feet necessary to reach the ore. A published record of shipments over one period of eleven months shows a tonnage of 2,609 tons with an average of 69.5 per cent. lead and 23.3 ounces silver per ton; gross value, including lead bounty, $111,523.

The West Kootenay Mining Corporation, Limited, lately registered in London, England, intends putting a 10-stamp mill on the Joker group, at the head of the south fork of Kaslo Creek.

Rossland and Trail.

The Rossland "Miner" has announced that it has been decided to close the Le Roi mine. It appears that diamond-drilling and other exploration work has failed to find other large shoots of ore of a grade that can be mined and smelted at a profit. There are still large bodies of ore in the mine, but these are of so low a grade as to make them unprofitable under existing conditions. The managing director, Mr. A. J. McMillan, has gone to England to consult his co-directors as to the future course to the company. Meanwhile work is to be entirely suspended.

The Consolidated Mining & Smelting Company's War Eagle mine, of the Centre Star group, which some time ago was not in nearly so promising a condition, now has ore bodies opened and being mined stated to warrant the claim that it is one of the best gold-copper mines in British Columbia. At no time for years has its condition been more satisfactory, according to the statements of those believed to be well informed, so that the expectation of excellent results seems to be based on good grounds.

At Trail on July 9 a valedictory banquet and presentation were given to Mr. Jules Labarthe, who lately resigned the position of superintendent of the Consolidated Mining & Smelting Company's smelting works and refinery at Trail, to take the management of the Mason Valley Mines Company, Yerington, Lyon County, Nevada, U.S.A. The presentation was in the form of a handsome silver tray, made from silver smelted and refined at Trail. It bore this inscription: "Presented to Mr. and Mrs. Labarthe by the staff of the Trail smelter on the occasion of their departure from Trail, B.C., 1910." In the published report of the proceedings the following eulogy appeared: "Mr. Labarthe has been connected with the big plant at Trail since 1907, and it is largely due to his business acumen and thorough knowledge of the mining and smelting industry in the Kootenay that the plant has reached its present high standard of efficiency, it being one of the largest and best-managed concerns of its kind on the continent."

Similkameen.

The Hedley Gold Mining Company has ordered from the John McDougall Caledonian Iron Works Company, Limited, a 600 horse-power Doble impulse water-wheel, with special needle nozzle and auxiliary relief. This wheel is to be direct-connected to a 350 k.w. generator and is to supply power both for the company's mines and reduction works. The latter consist of the 40-stamp mill built several years ago by the Daly Reduction Company, with cyanide plant, etc. These were acquired last year by the Hedley Mining Company, which has since operated them in conjunction with the Nickel Plate group of mines. The quantity of ore put through the mill last year was about 31,000 tons, from which 16,200 ounces of gold was recovered. This year's tonnage is larger, and the company is paying its stockholders quarterly dividends at the rate of 12 per cent. per annum.

Coast District.

The business office of the Canadian Collieries (Dunsmuir) Limited is to be removed from Victoria to Vancouver. The executive office of the company, which lately acquired the property on Vancouver Island of the Wellington Colliery Company, Limited, will remain in Victoria.

A large occurrence of copper ore in a locality known as Green Lake, situated some 30 miles from the head of Howe Sound, in New Westminster mining division, is being developed. Construction of a railway inland from Howe Sound has been commenced, so that eventually transportation facilities will be available.

The Hidden Creek Copper Company's copper mine at Goose Bay, Observatory Inlet, the latter being an arm of Portland Canal, was recently examined by representatives of the Granby Consolidated Mining, Smelting & Power Company, Limited. There is a very large body of copper ore on the Hidden Creek Company's property, and should the mine not be sold, its present owners plan to erect smelting works near by for the reduction of this ore.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—As the result of the disturbance at the Cumberland Coal & Railway Company's colliery at Springhill, the troops have been called for, and several detachments will leave for the scene of the trouble to-day.

For some days past the miners who are on strike have become very restless, and several incipient riots have occurred. The men who are all members of the United Mine Workers of America have been on strike for more than a year, and the management at the mines has been steadily filling their places with men imported from outside points.

From four hundred to five hundred men are working. During the past few weeks the strikers have been ordered to vacate the houses owned by the company, so that they could be occupied by the men at work in the colliery. This was the cause of the recent outbreak. Several hundred of the strikers and their sympathizers have assembled on different occasions and hurled stones through the windows of the houses. The town police and the officers in the employ of the company are unable to control the situation, and the management has asked for the military.

So far no person has received any serious injury, and the damage to the property is not great, but it is claimed that matters are gradually growing worse. On Saturday the representatives of the company made application to Judge Watterson, of New Glasgow, the County Court Judge for the district, for troops, and after the condition of affairs had been placed before him, a requisition for the military was sent to Colonel MacDougall, at Halifax.

The railway authorities at Halifax were communicated with, and arrangements were proceeded with at once for a special train.

QUEBEC.

St. Hyacinthe, July 23.—The news of the blowing in of a gas well of such a flow as to merit the term "gusher" in St. Barnabee County has aroused considerable excitement in the district. The existence of gas or oil has been suspected for many years, the first knowledge that such probably existed dating back for over

seventy years. At that time a farmer, while digging out stumps discovered water bubbling out of the earth and the news became common property in the neighbourhood. Lacking experience and capital, however, the finder allowed the matter to drop.

Some two years ago, Mr. Henri Grenon, hearing reports of the find, visited the Ontario oil fields and there became acquainted with Mr. Lauffer, an expert in oil well operations. Returning to St. Hyacinthe, Mr. Grenon succeeded in forming a small company with Mr. Samuel Girard as president, and Mr. Joseph Langevin secretary. They secured options on seven hundred acres of land and began drilling. Last week Mr. Lauffer, for the first time noticed a distinct odor of gas and immediately made preparations for capping the well when it blew in.

The flow of gas shortly began and is of such a volume as to justify the belief that a valuable gas field lies beneath the company's property. The present pressure at the valve is stated to be steadily in the neighbourhood of 125 pounds, with but very slight fluctuations in the flow. If the flow proves to be permanent there will be enough of the gas from this well to supply the town of St. Hyacinthe with both light and power.

ONTARIO.

Cobalt.—The Dominion Reduction Company has decided to erect a 100-ton custom concentrator on Kerr Lake, to treat the low grade ore from that section of the camp. It is understood that arrangements have been made to erect the plant on the property of the Crown Reserve, and that this company's ore will be the first to be treated. The Cobalt Central mill in that section also treats custom ores, but the location is against its being used to any great extent.

Cobalt.—A thirty-ton car of low-grade ore was despatched from the Little Nipissing, on Peterson Lake, this week, making the seventh shipment since last February. The ore will run in the neighbourhood of 500 to 550 ounces. Besides this car of low-grade, there is a twenty-ton car of high-grade that is being loaded now, and will be shipped this week. The high-grade will probably run over 3,500 ounces, and this is the hand sortings of the winze ore. The management has the work in such shape now that a shipment is expected to be made every month. This will make the eighth car since February, when the mine made its initial appearance on the list of shippers.

Porcupine.—An event in the development of the Porcupine camp occurred recently, when the Timmins mill was started for the first time. This was an initial venture in the history of Porcupine and the whole town awaited the outcome with more than ordinary interest.

The results of the day's operations at the mill were promising.

Considerable satisfaction is expressed at the gratifying outcome of the work on the Timmins properties, and everyone is now convinced that Porcupine, as a gold camp, is here to stay.

It is announced that the Timmins interests have ordered a thirty-stamp mill, and that the same will be installed as soon as it can be got into the mining camp. Such a plant would handle about 200 tons of ore a day, and, with the excellent returns indicated from the day's run, would place the gold field in an enviable position as a large revenue producer.

BRITISH COLUMBIA.

Vancouver, B.C., July 23.—According to Mr. A. D. McRae, vice-president of the Canadian Collieries (Dunsmuir) plans are under way for a rapid development of the coal properties on Vancouver Island.

"Engineers under the direction of Mr. W. L. Coulson, manager of the mining department, are now laying out plans for increasing the production of our coal mines at Ladysmith and Comox. We expect to increase the production at least 50 per cent. before the end of this year and two years hence will b in a position to min 10,000 tons of coal daily, or three times the amount now being extracted," said Mr. McRae.

"This, of course, will mean the employment of many hundreds of miners in addition to the present working forces. At present we can not supply the demand for coal and vessels are obliged to await their turn for coaling at the bunkers."

COMPANY NOTES.

AMALGAMATED ASBESTOS.

The annual report for the year ended May 31, 1910, of the Amalgamated Asbestos Corporation, Limited, has been mailed to the shareholders. It shows profits for the year of $517,969.80, after all operating expenses have been met. From this is taken $375,000 for bond interest, leaving $142,969 available on the preferred stock. Only the initial quarterly dividend on the preferred stock has been paid, April 1, thus leaving a surplus of $110,157.30 on the year's operations. The amount available for preferred dividends, if such were required to be paid in full during the first year, would be $11,719 in excess of the amount required. The full year's dividend on preferred stock amounts to $131,250, against an available sum of $142,969 for the year just closed.

At first glance this appears distinctly disappointing, but we are informed that a great deal of necessary development work has been carried on out of earnings, and this naturally would be a severe drain on the revenue for dividend purposes. It is believed that this development work will place the company in an especially favourable operating position, enabling the management to cut down the ratio of operating expenses to gross to a figure very much below the present cost. Properly, however, the major portion of this heavy disbursement should have come from capital account, though if the preferred dividend can be maintained as in 1909-10, the holders of that stock will have little to complain of.

The general balance sheet shows that the company has cash of $5,944 and accounts receivable, $63,598. Asbestos on hand, valued at contract sale prices, totals $621,013. Accounts payable and pay rolls total $121,428, and bills payable $377,662, making current liabilities of $499,090.

The president, Mr. E. B. Greenshields, in his official report, congratulates the shareholders on the satisfactory result of the year's operations, considering how the operations were hampered by development work. He also states that out of the $110,157 surplus will be paid $21,875, two months' interest on preferred stock, and $21,300 for directors' fees, depreciation, etc., leaving $66,982.30 to be carried forward. The company has contracts on hand amounting to $3,637,000.

Mr. Greenshields states that the cost of all the improvements on the different properties will amount to about $250,000 when finished.

Mr. Thomas McDougall, former general manager of the Quebec Bank, has been elected president of the Amalgamated Asbestos in place of Mr. E. B. Greenshields, retired.

The directors elected were: Hon. James M. Beck, Harry A. Berwind, Percy P. Cowans, George D. Crabbs, Theodore W. Cramp, E. B. Greenshields, Robert T. Hopper, H. Malcolm Hubbard, Hon. Robt. Mackay, Howard Ellery Mitchell, R. H. Martin, H. H. Melville, Thomas McDougall, John M. McIntyre and William McMaster.

Mr. P. P. Cowans and Mr. John M. McIntyre replace on the board Mr. Hugh A. Allan and Dr. R. V. Mattison, who have resigned.

Subsequent to the meeting of shareholders, the directors met and

elected the following officers: President, Thomas McDougall; first vice-president, Hon. Robert Mackay; second vice-president, Howard Ellery Mitchell; third vice-president, R. H. Martin; secretary and treasurer, R. P. Doucet.

Mr. Greenshields, in his remarks on the annual report, which was adopted, said:

"The year has been a satisfactory one for the company, especially so when it is remembered that during the first year most of the mines were taken over as separate going concerns, and had to be worked for a good while as practically separate properties, and that the improvements inaugurated had to be done during the producing season, and so interfered a good deal with the ordinary work of the mines.

"These betterments are now nearly completed, and the properties are already showing greatly increased production, the Kings Mines having had a record month in June. This great mine is the company's most valuable asset, and the shareholders should be gratified in knowing that, considering the quality and quantity of its product, and also the great extent of its territory, it is the finest asbestos property in America."

CROWN RESERVE.

The Crown Reserve half-yearly statement to June 30 shows:

We shipped during that period 51 cars of ore, 13 cars being high grade and 38 being low grade, of a total net value of	$709,569.53
Bank interest	2,500.00
Ore on hand	30,000.00
	$742,069,53
Our operating expenses for the same period, including a large amount of development work, were	109,644.18
	$632,425.35
Less royalty to the Ontario Government for the same period	63,861.26
Showing a net profit on our operations for the three months of	$568,564.09
Out of this amount dividends have been paid as follows:	
No. 8 paid 15th April, 1910	$265,322.10
No. 9, payable 15th July, 1910	265,322.10
	530,644.20
Leaving a balance which will further strengthen our substantial surplus of	37,919.89
Surplus December 31st, 1909	$549,275.42
Surplus as above	37,919.89
Surplus at 30th June, 1910	$587,195.31

LAKE SUPERIOR.

The Lake Superior Corporation's fiscal year ended June 30 last. The annual report of the company is now in preparation, and a favourable showing is looked for. For the past year the corporation has been improving and expanding its plants, and constructing new works for the diversification of its products. Most of this new construction work is now nearing completion, and the earning power from now on will be practically doubled. The Lake Superior Corporation has sufficient business on its books to keep its plant fairly well employed to the latter part of November. One of its largest consumers is the Canadian Pacific Railway Company, which gives the corporation practically all of its steel requirements. For the past few years the Canadian Pacific has placed on an average of close to 90,000 tons of steel rail orders a year with the Corporation. The growing demand for structural steel has brought the attention of the Lake Superior Corporation's management to the necessity of constructing a structural steel mill, with the result that a mill will be built in the near future. The Dominion Steel Company is now receiving the bulk of the structural steel business, but when the new mill of the Lake Superior is completed, the management expects to get its share of the structural orders placed.

ACADIA COAL COMPANY.

New directors for Acadia Coal have been elected as follows:—Sir Montagu Allan, president; Emile Francqui, of Brussels, vice-president; H. S. Holt, second vice-president; Mr. Beaudry Leman, secretary-treasurer.

The other directors are: Mr. Charles S. Hosmer, Hon. R. Dandurand, Martial Chevalier, Andrew A. Allan, Hubert Biemans, Colin Campbell, Lambert Jadot, of Brussels, and Bryce J. Allan. Mr. C. J. Coll remains general manager.

As announced some time ago, Belgian capital has been interested in the property, and about a million will be spent improving the property.

CONIAGAS MINE DIVIDEND.

The regular dividend of three per cent. quarterly on the stock of the Coniagas Mines, Limited, will be paid on the 1st of August, in accordance with the resolution passed at the last meeting of directors.

STATISTICS AND RETURNS

VAN ROI.

Cable:—"Mill report for the month of June:—Total amount rushed 3,013 tons, yielding 120 tons of lead concentrates, assaying 142.4 ounces silver, 54.8 per cent. lead, 14.8 per cent. zinc; nd 170 tons zinc concentrates, assaying 38.0 ounces silver, 1.3 er cent. lead and 45.3 per cent. zinc. Total approximate value, 12,303 (£2,537). Mill ran 536 hours. Estimated expenditure or corresponding period on development, ore production and illing, $13,430 (£2,769). South reef, No. 4 level—Along the anging wall eastwards advanced 49 feet, low grade; westards, 128 feet. Average width is 4¾ feet; average value is 8 ounces silver, 7¾ per cent. lead, 12 per cent. zinc. No. 3 evel towards south reef advanced 63 feet."

SILVER MARKET.

Samuel Montagu & Company write under date July 14: The ringency in delivery to which we referred last week, became tensified; so much so that it could be described only as a corner to which the market had been engineered by the Indian speculative group. Anxiety to profit by the high prices paid by the government brought about an actual shortage on this side; but the storage of one or two millions of actual silver deliberately withheld from the market, stamps the present situation as artificial.

The effect of the squeeze on the price of spot silver was to raise the quotation to 25⅝ on the 9th and 11th inst. This is the highest price for over two years, namely, since March 20th, 1908.

The corner had been rendered practicable by bear sales of forward silver having been made some two months back to the extent of about a million sterling. These sales were not speculative in the ordinary sense of the word, but were made in the course of business as a hedge against exchange, and similar sales have been on many previous occasions bought in or carried forward when due, without appreciable disturbance of values. But, in this case, these forward offerings had been bought up, plus all surplus silver ready for delivery, the actual silver was locked up, and the sellers when their sales matured, found that

they had been caught napping and had to pay anything from two to four per cent. for the purpose of meeting their obligations.

To bring about this stringency large speculative risks have been taken, and are still borne by the group responsible for the corner, who have not unloaded any of their huge holdings. To cope successfully with the situation thus created, a favourable market must be awaited, and, if that be practicable, there remains the delicate operation of feeding the demand rapidly without provoking a fall in prices.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending July 23rd, and those from January 1st to date:

	July 23. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	180,617
Buffalo	50,010	1,183,678
City of Cobalt	.....	422,735
Chambers Ferland	59,400	960,600
Cobalt Central	.....	293,286
Cobalt Lake	.....	260,900
Cobalt Townsite	.....	116,860
Colonial	.....	148,900
Coniagas	60,400	926,056
Crown Reserve	203,900	3,794,558
Drummond	.....	664,200
Hargraves	.....	221,170
Hudson Bay	.....	297,835
Kerr Lake	300,142	5,879,958
King Edward	.....	221,296
La Rose	227,400	6,925,941
McKinley-Darragh	95,240	1,870,689
Nipissing	484,600	6,478,867
O'Brien	.....	758,086
Peterson Lake	101,710	432,420
Provincial	.....	65,000
Right of Way	75,900	957,647
Silver Cliff	.....	159,990
Timiskaming	.....	1,002,570
Trethewey	49,260	641,110
Waldman	.....	63,992
Wyandoh	.....	48,300

Ore shipments for the week ending July 23rd were 1,716,962 pounds, or 858 tons.

Total shipments from January 1st to July 23rd were 34,977,261 pounds, or 17,488 tons.

Shipments of ore from Cobalt camp for the week ending July 16th consisted of 1,095,300 lbs., or 548 tons, divided among nine mines. Kerr Lake and Nipissing were the big shippers. Rather infrequent shippers represented were the Townsite and Hargraves mines. Since the first of the year the camp has shipped 33,260,299 lbs., or 16,630 tons. Shipments for week and year in lbs. of ore are:

	July 16. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	180,617
Buffalo	54,000	1,124,668
City of Cobalt	.....	422,735
Chambers Ferland	64,000	901,200
Cobalt Central	.....	293,286
Cobalt Lake	.....	260,900
Cobalt Townsite	48,860	116,860
Colonial	.....	148,900
Coniagas	.....	865,656
Crown Reserve	64,000	3,590,658
Drummond	.....	664,200
Hargrave	41,370	221,170
Hudson Bay	.....	297,835
Kerr Lake	300,000	5,579,816
King Edward	.....	221,296
La Rose	152,000	6,698,541
McKinley-Darragh	95,980	1,775,449
Nipissing	293,000	5,994,267
O'Brien	.....	758,086
Peterson Lake	.....	330,710
Provincial	.....	65,000
Right of Way	.....	881,747
Silver Cliff	.....	159,990
Timiskaming	.....	1,002,570
Trethewey	.....	591,850
Waldman	.....	63,992
Wyandoh	.....	48,300

QUEENSLAND GOLD RETURNS.

The gold returns of Queensland for June were as follows:

	Tons crushed.	Yield in ozs.
Charters Towers	17,600	(12,900 (*400
Croydon	400	300
Gympie	13,400	5,700 (4,200
Mount Morgan	10,800	(*9,900
Ravenswood	1,600	1,900 (1,900
Other fields	6,900	(*1,100
Alluvial	.....	300
Total yield in ozs.		41,600

The following calls were made and dividends paid:

Charters Towers	£4,800	£15,000
Croydon	600	nil
Gympie	3,700	7,200
Mount Morgan	nil	50,000

—Reuter.

* From copper ore.

NEW SOUTH WALES OUTPUT.

Sydney, July 7.—The gold yield of New South Wales for June amounted to 12,147 ozs., valued at £43,588. The yield for the six months ended 30th June was 100,129 ozs., valued at £360,638.—Reuter.

BRITISH COLUMBIA ORE SHIPMENTS.

The Convention and Lucerne mines made what were probably trial shipments, to the Consolidated Company's smelter at Trail this week. The following are returns of the ore production and movement for week ending July 16th:

Rossland Shipments.

Centre Star	4,049	107,576
Le Roi No. 2	587	18,027
Le Roi No. 2, milled	300	8,400
Le Roi	490	8,458
I. X. L.	8	139
Other mines	.....	258

Boundary Shipments.

	Week	Year.
Granby	20,071	671,503
Mother Lode	6,500	174,705
Snowshoe	2,014	92,379
Oro Denoro	304	7,038
Jack Pot	275	2,971
Other mines	.....	587
Total	29,164	949,183

Total	5,434	142,858
Slocan-Kootenay Shipments.		
St. Eugene, milled	2,775	77,700
Van Roi, milled	800	22,400
Whitewater, milled	250	5,750
Queen, milled	420	11,760
Granite-Poorman, milled	250	7,000
Nugget, milled	110	3,080
Richmond-Eureka	60	2,464
Standard	39	702
Emerald	5	1,097
Sullivan	498	6,972
Queen Victoria	290	1,809
Convention	5	5
Lucerne	3	3
Other mines	.....	35,607
Total	5,505	170,443

The total shipments, including the estimated milling, were for the week, 40,103 tons, and for the year to date, $1,262,484 tons.

B. C. Copper Company's Receipts.

Cranbrook, B.C.

Mother Lode	6,500	174,705
Oro Denoro	304	7,038
Jack Pot	275	2,971
Total	7,079	184,714

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	20,071	671,503
Other mines	.....	120
Total	20,071	671,623

Consolidated Company's Receipts.

Trail, B.C.

St. Eugene, concentrates	138	9,315
Van Roi, concentrates	90	758
Le Roi No. 2, part concentrates.	587	18,027
Centre Star	4,049	107,576
Le Roi	490	8,458
Snowshoe	2,014	92.379
Richmond-Eureka	60	2,464
Standard	39	702
Emerald	5	1,097
First Thought (U. S.)	158	2,584
Sullivan	498	6,972
I. X. L.	8	139
Queen Victoria	290	1,809
Convention	5	5
Lucerne	3	3
Other mines	.....	15,177
Total	8,434	267,465

The total receipts at the smelters, including concentrates, were, for the week, 35,584 tons, and for the year to date, 1,123,-802 tons.

Le Roi No. 2—Cable: "Josie mine report for June—Shipped 2,702 tons. The receipts from smelter are $82,759 (£17,064), being payment for 3,498 tons shipped, and $3,511 (£724), being payment for 183 tons concentrates shipped. In all, $86,270 (£17,788)."

DOMINION COAL FOR JUNE.

Dominion Coal output for June was 359,121 tons.

Shipments, June 1910	337,145
Shipments, June 1909	393,541
Decrease, June, 1910	56,396
Shipments, 6 months, 1910	1,296,125
Shipments, 6 months, 1909	1,245,883
Increase, 6 months, 1910	50,242

SCOTIA'S COAL SHIPMENTS.

Nova Scotia Steel and Coal Company reports as follows for June:—

Shipments, June, 1910	87,938
Shipments, June, 1909	95,950
Decrease, June, 1910	8,012
Shipments, 6 months, 1910	330,502
Shipments, 6 months, 1909	274,506
Increase, 6 months, 1910	55,996

BRITISH COLUMBIA ORE SHIPMENTS.

Nelson, July 9.—Interest in Sheep Creek camp continues to increase and many visitors have been on the ground during the past week, but no new deals or strikes of importance have been received at the close of the week, other than those already reported. Ore shipments are well up to the average for the year.

Appended are shipments and smelter receipts in detail:—

Boundary.

Property	Week	Year
Granby	21,316	651,432
Mother Lode	10,500	168,205
Oro	29	6,734
Jack Pot	1,005	2,696
Snowshoe	2,250	90,355
Nickle Plate (Hedley)	60	442
Other mines	.....	163
Total	35,160	920,019

Rossland.

Rossland	4,169	.....
Le Roi No. 2 (Centre Star)	630	17,392
Le Roi No. 2 (milled)	300	8,100
Le Roi	164	7,968
Great Western	9	9
May Flower	13	38
Other mines	.....	399
Total	5,285	137,433

Slocan-Kootenay.

St. Eugene (milled)	2,775	74,925
Whitewater (milled)	600	16,200
Van Roi (milled)	800	21,600
Granite Poorman (milled)	250	6,750
Queen (milled)	420	11,340
Nugget (milled)	110	2,970
Yankee Girl	126	2,965
St. Eugene	357	9,177
Whitewater	40	735
Queen Victoria	340	7,519
Sullivan	257	6,474
Second Relief	30	94
East Mount	69	450
Ferguson	71	612
Standard	37	663
Eureka	85	2,404
Mine Queen	37	344
Other mines	37	24,515

Total shipments for the week, 46,849 tons, and for year to date, 21,41,179 tons.

Smelter Receipts.

Granby, Grand Forks	21,316	651,552
Consolidated Co., Trail	8,833	259,095
B. C. Copper Co., Greenwood	11,534	177,635
Total tons	41,683	1,088,282

COMPANY NOTES

KERR LAKE DIVIDEND.

The directors of the Kerr Lake have declared the usual quarterly dividend of 25 cents, and the usual extra dividend of 25

SHARE MARKET.

(Courtesy of Warren Gzowski & Co.)

Miscellaneous.—July 25th, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	16½
Dominion Coal Company	..	..
Dominion Steel Company	..	..
Nova Scotia Steel	..	81
Granby	30	34
Consolidated Smelting	60	70
Crow's Nest Pass	..	88
Dominion Coal & Steel Corporation	51	51⅝

Cobalt Stocks.—July 25th, 1910.

Amalgamated	.03	.03⅞
Beaver Consolidated	.20	.20½
Buffalo	1.75	2.25
Chambers Ferland	.19	.19¼
City of Cobalt	.23½	.23¾
Cobalt Central	.08¼	.11
Cobalt Lake	.15¾	.16¼
Coniagas	4.10	5.15
Crown Reserve	2.60	2.64
Gifford	.03¾	.04½
Foster	.09	.12
Green Meehan	.01	.02
Great Northern	.07	.07½
Hudson Bay	80.00	89.00
Hargraves	.17½	.17¾
Kerr Lake	7.00	7.55
La Rose	3.50	3.77
Little Nipissing	.14⅞	.15¼
McKinley Darragh Savage	.94	.96½
Nancy Helen	.02½	.04¼
Nipissing	10.35	10.45
Nova Scotia	.32½	.33
Otisse	.03⅞	.04
Peterson Lake	.17¼	.17⅞
Right of Way	.19	.23
Rochester	.14¾	.15
Silver Leaf	.06⅛	.06⅜
Silver Bar	.05	sellers
Silver Queen	.11	sellers
Timiskaming	.59	.59¾
Trethewey	1.20¼	1.20¾
Watts	.04	.10
Ophir	.21½	.35
Wettlaufer	.62	.75

New York Curb.—July 25th, 1910.

Boston Copper	15	20
British Columbia Copper	4⅝	4⅞
Butte Coalition	16¾	17¼
Canadian Mines	6	6¼
Chino Copper	11¼	11⅜
Davis-Daly Copper	1⅝	1¾
Ely Consolidated	.19	.22
Gila Copper	5	6
Giroux Mining	6⅝	6 11/16
Goldfield Consolidated	8¼	8 5/16
Green-Canadian	6¾	7
Harcuvar Copper	..	..
Inspiration Copper	6⅞	7
Miami Copper	18⅜	18⅝
New Baltic Copper	5	8
Nevada Con. Copper	18¼	18½
Ohio Copper	1 3/16	1⅝
Rawhide Coalition	.13	.14
Ray Central	2¼	2 5/16
Ray Consolidated	16½	17
Union Mines	1 1/16	1 3/16
Yukon Gold	3 15/16	4

TORONTO MARKETS.

July 25.—(Quotations from Canada Metal Co., Toronto).
Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 35 cents per lb.
Copper, casting, 13.10 cents per lb.
Electrolytic, 13.10 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

July 25.—Pig Iron (Quotations from Drummond, McCall Co., Toronto.)
Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee No. 2, $23.00 (f.o.b. Toronto).
Midland No. 1, off the market.
Hamilton No. 1, $20.50 (f.o.b. Hamilton).
Hamilton No. 2, $20.00 (f.o.b. Hamilton).
Clark's, $20.25 (f.o.b. Toronto).
Cleveland, $20.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

July 22.—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.65 to $1.70 per ton.
Foundry coke, prompt, $2.10 to $2.25 per ton.

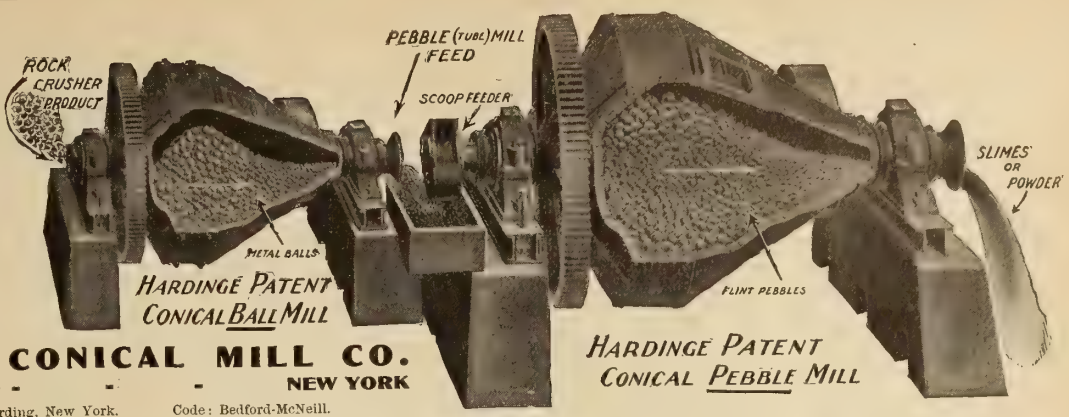
July 22.—Tin (Straits), 33.37½ cents.
Copper, Prime Lake, 12.60 to 12.70 cents.
Electrolytic copper, 12.37½ to 12.50 cents.
Copper wire, 14.00 cents.
Lead, 4.50 cents.
Spelter, 5.35 cents.
Sheet zinc, (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.20 cents.
Aluminium, 22.50 to 23.25 cents.
Nickel, 40.00 to 47.00 cents.
Platinum, ordinary, $34.00 per ounce.
Platinum, hard, $36.00 per ounce.
Bismuth, $2.00 per lb.
Quicksilver, $47.00 per 75-lb. flask.

SILVER PRICES.

	New York. cents.	London pence.
July 7	54½	25 3/16
" 8	54⅞	25⅜
" 9	54⅞	25⅜
" 11	55¼	25⅝
" 12	55⅜	25¼
" 13	54	25
" 14	54¼	25⅛
" 15	54½	25¼
" 16	54½	25 3/16
" 18	54⅝	25¼
" 19	54¾	25 5/16
" 20	54⅝	25¼
" 21	54⅝	....
" 22	54½	25 3/16

STEP REDUCTION
Wet or Dry

A mining Co. that has paid over *$109,000,000* in dividends and is now mining *10,000.* tons of ore per day, has contracted for the use of Hardinge Mills, and says, "It is the best fine grinding device we have ever gotton hold of."



HARDINGE CONICAL MILL CO.
37 Wall Street, - - - NEW YORK
Cable Address: Halharding, New York. Code: Bedford-McNeill.

MEN OF WEALTH



Are almost invariably the greatest believers in Life Insurance because they recognize the value of a "Cash" estate absolutely secured, and therefore they aim to maintain a considerable portion of their estate in the form of Life Insurance.

The North American Life Assurance Company appeals to business men because of its long record of success and its able and progressive management.

Assets, over $10,500,000. Net Surplus, over $1,000,000. Good Agency openings for energetic men.

HOME OFFICE, TORONTO ONTARIO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

J. S. CARTER, General Agent, 217 McDermott Ave. Winnipeg.

I. E. SUCKLING, General Agent, S. E. Cor. King & Yonge Sts. Toronto

A Revelation

THE CF Co LTD

We firmly believe that the Economy effected in Steam Consumption and the Steady, Reliable Service given by Fairbanks-Morse Steam Pumps will prove a revelation to most engineers.

The design is fundamentally correct, as the pump relieves itself without setting up internal strains. There is an entire absence of short stroking, straining, or blowing out of valves so noticeable in some pumps when working under heavy load.

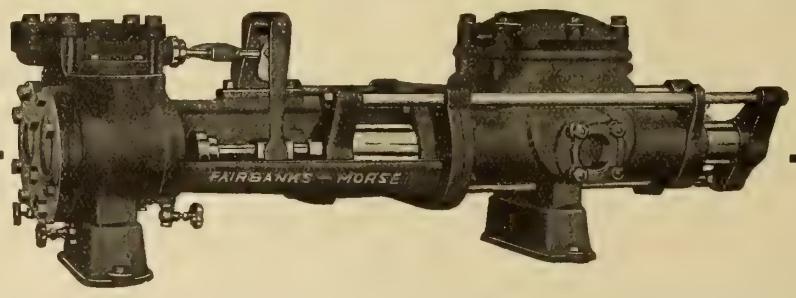
We build Fairbanks-Morse Pumps for Steam, Electric or Belt Power. Also Underwriters' Pumps.

FAIRBANKS-MORSE PUMPS—All sizes for any pressure

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

MONTREAL
ST. JOHN, N.B.
TORONTO



WINNIPEG
CALGARY
VANCOUVER

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management

Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,
Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer
85 Front Street East, - Toronto, ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. Sc.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYERS, E.M., B. SC.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

GROCH & GROCH
Consulting Engineers and Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

JOHNSON, F. M. G.
Ph.D. (Breslau) M. Sc. (McGill) F.I.C.
CONSULTING & ANALYTICAL CHEMIST
Eastern Townships Bank Building
MONTREAL.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. MCPHERSON, K.C. J. M. LAING
MCPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: MCPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

S. F. KAVANAGH
Assayer
Minning Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Civil Engineers.
Contractors. Assayers.
Mining Properties bought and sold.
Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont.
Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

Smith & Travers Diamond Drill
Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

LONGYEAR & HODGE
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq.. Buffalo, N. Y.

HAULTAIN, E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

G. W. DIXON
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, ROOM 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

"Mica and Phosphate Mining Property in the Township of Gore and Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building,
Montreal

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price.

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lak Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for map on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map o Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotlan Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon an Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superio between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lak Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1075. Report on the Gowganda Mining Division 1908, accompanied by a map, by W. H. Collins.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

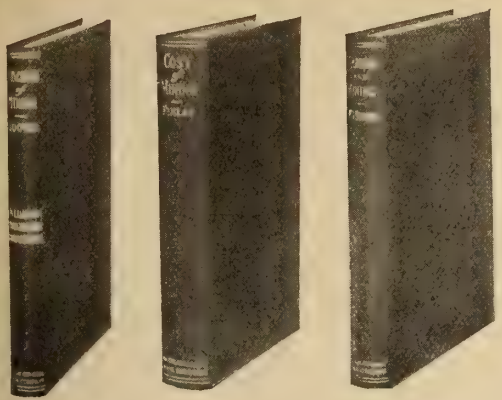
1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economi geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature re ported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL. 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Aluminum Powder

Manufactured By

THE
CANADIAN BRONZE POWDER WORKS

Montreal Office - - 324 Craig Street West

Works, Valleyfield, Quebec

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Modera

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTI

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

ASSAYERS' SUPPLIES

Agents in B.C. for

BATTERSEA goods, Clay and Blacklead crucibles, Scorifiers, Muffles and Plumbago.

BRAUN'S Modern Laboratory Appliances.

WAY'S Pocket Smelters.

Chemical and Physical apparatus, Chemically pure Acids and Chemicals, Platinum, Quicksilver, Cyanide and all heavy Chemicals.

Complete Assay Outfits furnished at short notice.

We carry a large stock and guarantee satisfaction.

The B.C. ASSAY & CHEMICAL SUPPLY COMPANY, Limited

513 Pender St. - Vancouver, B.C.

University of Toronto
FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

BOOKS

PUBLISHED BY THE

Canadian Mining Journal

COBALT, SUDBURY AND MOOSE MOUNTAIN, 100 pages, well illustrated,. Price **$1.00.**

MINERAL RESOURCES OF CANADA, 136 pages, 32 color reproductions of the most important minerals, also Mineral Map of the Dominion. Price **$1.00.**

DOMINION COAL COMPANY MINING AND TRANSPORTATION, by F. W. GRAY, 128 pages, well illustrated. Price **$1.00.**

DAVIS HANDBOOK OF THE COBALT SILVER DISTRICT, price **$1.50** paper cover, **$2.00** hard cover.

Every one interested in the mineral industry of Canada should have a copy of these books in his library.

BOOK DEPARTMENT

Canadian Mining Journal

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canada Metal Co.....v
Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii
Hardinge Conical Mill Co.....xvii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix
Ryckman, Kerr, MacInnes & Mahon xxi

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd,, Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd. ...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST. JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Crow's Nest Pass Coal Co.
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
McKee & McLeod Co.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.
Canada Metal Co.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co. Ltd.
Peacock Bros.

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

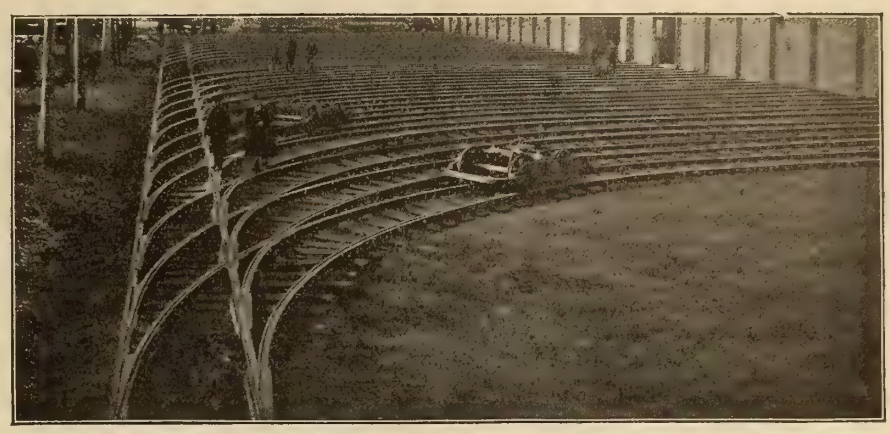
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse

Type "H F" Polyphase Constant Speed Motors



Particularly adapted to mine service where the motors are required to start under severe conditions with a comparatively low starting current. Their design embraces the best possible balance of the various necessary operating characteristics:

¶ Air gap between rotor and stator to give safe operation for long periods without adjustment.

¶ Practically uniform efficiency between half load and 25% overload, allowing operation over a wide range of outputs.

¶ Provisions for free circulation of air, assuring cool operation.

Westinghouse "H F" Motors are made in standard capacities from 5 to 500 horepower (larger sizes built to order) for 25, 40 and 60 cycle operation:—See Circular 1152.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

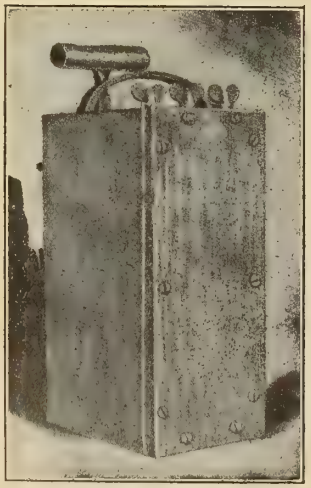
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines

Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

A Ten-by-twelve Tent for $9.90

Made of 8-Ounce Duck



THIS is a photographic illustration of a special tent we have had made on a quantity-order basis. In no other way could we supply a tent of this size and quality of canvas for $9.90.

Made of 8 ounce duck, with double sewn seams and re-inforced strain points.

Used either with an outside ridge pole, or a ridge rope stretched between trees. An ideal prospector's tent with plenty of wall.

Dimensions—Height, 7 feet; Length, 12 feet;
Width, 10 feet; Height of walls, 3 feet.

Complete with guy ropes,..... **$9.90**

Poles and pegs if desired, **95c** extra

A "Black-Fly"-Proof Netting

A SPECIAL FLY NETTING with *smaller mesh* than the ordinary mosquito netting, so that it is proof against Black Flies, and all other insect pests. This netting we have had made to meet a special demand from the north country; per yard—9 cents, or piece of 24 yards for..... **$2.00**

36 INCHES WIDE, WHITE OR GREEN.

THE ROBERT SIMPSON COMPANY LIMITED
TORONTO

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

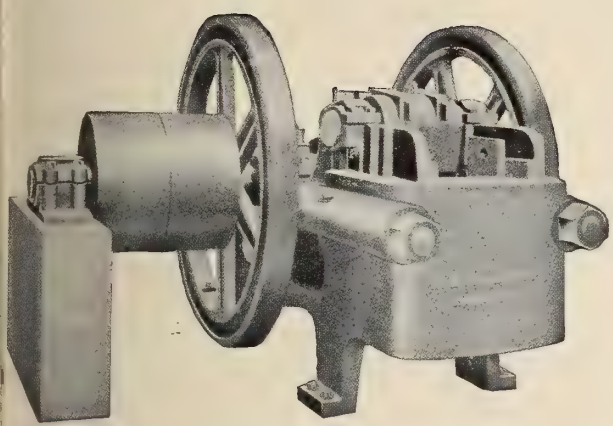
ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

L 31 TORONTO No. 16



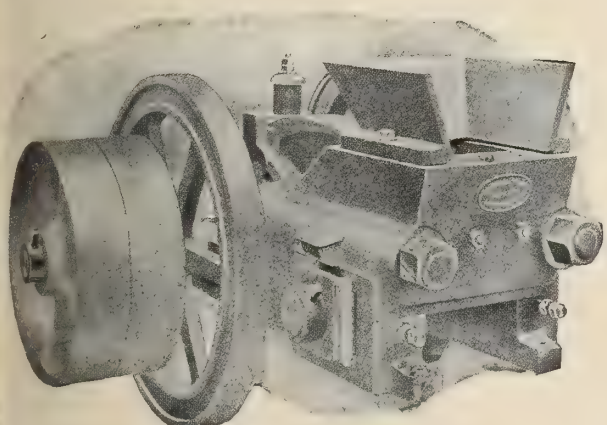
Blake

and

Dodge

CRUSHERS

in Stock



ALSO:-

Huntington Mills
Concentrator
Stamp Mills
Rock Drills
Drill Steel
Rails
Fuse
Cars
Etc.

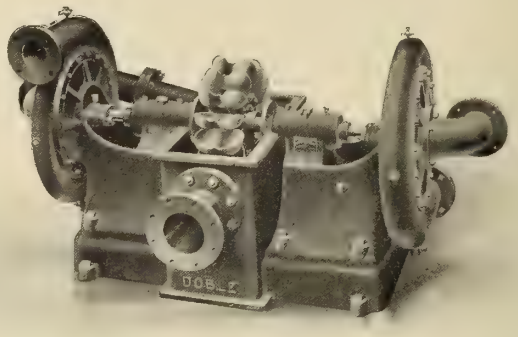
MUSSENS LIMITED

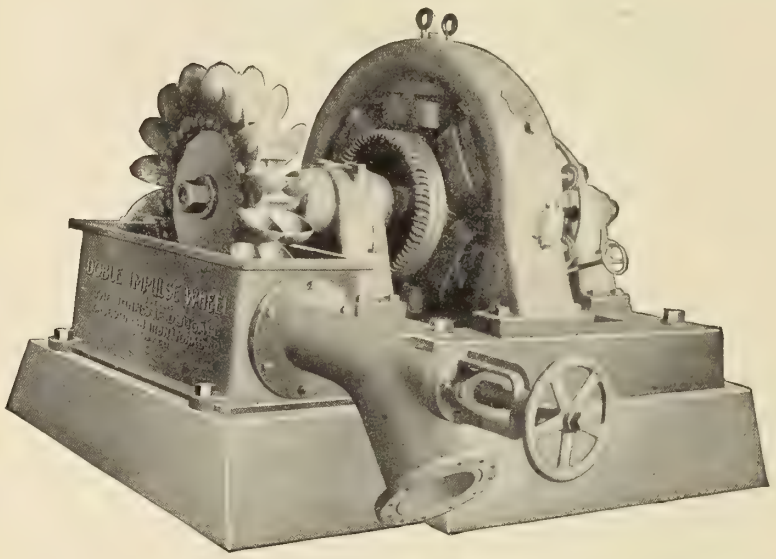
MONTREAL, 318 St. James St. | **TORONTO,** 73 Victoria St. | **COBALT,** opp. Right of Way Mine | **WINNIPEG,** 259-261 Stanley St. | **CALGARY,** Crown Bldg. | **VANCOUVER** Mercantile Bldg.

DOBLE WATER WHEELS

In successful operation under heads from 25 feet up to 2,200 feet and in capacities up to 9,000 H. P. from a single jet and runner. The cover has been removed from the runners in these illustrations to show the patented ellipsoidal buckets.

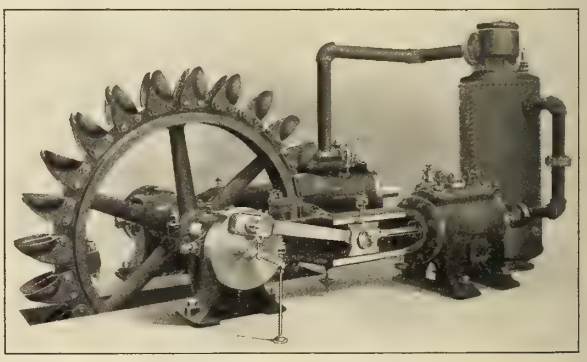
At the right are two of our Worthington centrifugal pumps, St. Jerome, Quebec, having a total capacity of 320 Imperial gallons per minute against a total head of 72½ feet operated by one of our Doble tangential water wheels 100 H. P. under 110 feet head.





The illustration in the centre shows the Doble patented needle regulating nozzle. One of our Doble tangential water wheels 180 H.P. under 310 feet head is there shown direct connected to a direct current electric generator. Cobalt, Ont.

At the foot of the page is shown one of our Doble tangential water wheels 237 H. P. under 620 feet head driving an air compressor, Lardo, B. C. We design and build these wheels specially to meet operating conditions and to secure the highest efficiency from the water available.



The John McDougall Caledonian Iron Works Co.

LIMITED

Works: Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

BELLISS ENGINES

Have won the approbation of the well informed engineers of Canada: not only the theoretical man, but the practical Commercial Engineer, who has the spending of the money.

When the Engineer has a reputation for safe Engineering to maintain, why does he recommend the Belliss Engine?

BECAUSE—

It is absolutely reliable.

It will go right into service when started up; all its finishing and adjustments having been made in the builders Works.

Its running is ceaseless, noiseless, "cost less."

The first engine of the type built 20 years ago is still running 625 r.p.m. day in and day out all the year round and shows no sign of wear.

Is it surprising that Belliss Engines have been installed by such leading firms, institutions and Cities as Dominion Iron & Steel Co., Canadian Locomotive Works, Dominion Bridge Works, Universities of McGill, Toronto, Queens, Saskatchewan; Cities of Montreal, Edmonton, Lethbridge, Westmount, Verdun, Brockville, Renfrew.

Builders: Belliss & Morcom Ltd., Birmingham, England.

Canadian Agents: Laurie & Lamb, Engineers, Board of Trade Building, Montreal

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be tne stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO. LIMITED

COBALT, ONT.
P. O. Box 310

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

Smith Premier Typewriter

Model No. 10

A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



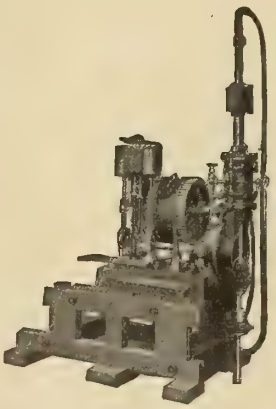
DIAMOND DRILLING VS. A SUBSTITUTE

The "justasgood" process of ore drilling is advertised as much cheaper than the "real thing"—"just think of the high price of diamonds."

Nova Scotia is a locality, perhaps the only one, where diamond drills and the "justasgood" are used in the same formation, so that a fair comparison can be made of the two processes.

The following "Deadly Parallel" is made up from figures published in the report of the mines department for the year ending September 30th, 1909. *See Canadian Mining Journal for July 15th.*

DIAMOND DRILL		SHOT DRILL
3378	Total feet drilled	2198
$.79	Total cost per foot	$2.17
.58	Labor and management per ft.	1.17
.038	Diamond or shot loss per ft.	.057
13	Rate of drilling per shift in coal formation—feet	6



Sullivan Steam-Driven Diamond Core Drill

Please note, **first**, that the cost of diamond wear was **less** than the cost of shot wear **second**, that labor cost is the heaviest item of all, and that shot drilling was twice as expensive as diamond drilling in this particular.

When **accuracy** and **reliability** are considered, the showing is much more in favor of the Diamond Drill.

Do you need drills or drilling work? Let us send Catalogue 655, or make you a price per foot on testing your property by contract.

Air Compressors — Hammer Drills
Coal Cutters — Rock Drills

SULLIVAN MACHINERY CO.

CLAREMONT, N. H. **CHICAGO, ILL., U. S. A.**

BIRMINGHAM, BUTTE, COBALT, ONT., DENVER, EL PASO, JOPLIN, KNOXVILLE, NEW YORK, NELSON, B. C., PITTSBURG, SYDNEY, AUS., SEATTLE, SPOKANE, SALT LAKE, ST. LOUIS, SAN FRANCISCO, PARIS, FRANCE

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

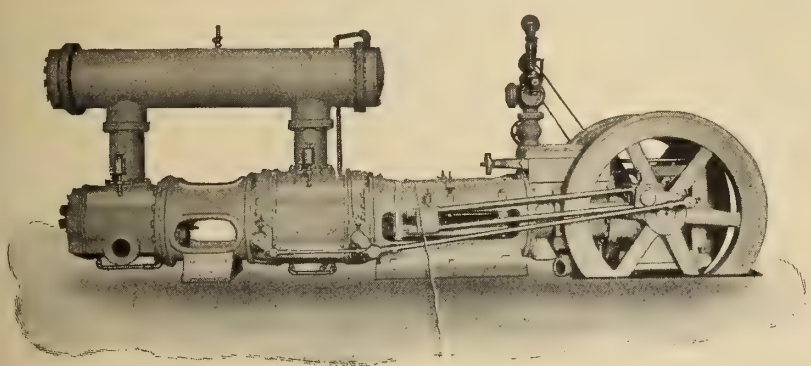
Address nearest office to-day.

THE PATERSON MANUFACTURING COMPANY, LTD.
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Straight Line, Steam Driven Compound Air Compressors

High *efficiency, simplicity* and ease of accessibility are distinct characteristics of the Class C-2 Compressor.

Corliss Inlet Valves on Low Pressure Air Cylinder, giving exceptionally large direct intake areas, practically unlimited life, quiet operation at all speeds and sustained high volumetric efficiency.



A simple direct Corliss Valve motion in which all complications have been eliminated and best efficiency obtained.

Sole Agency for B.C. Drill Steel in Cobalt Territory.

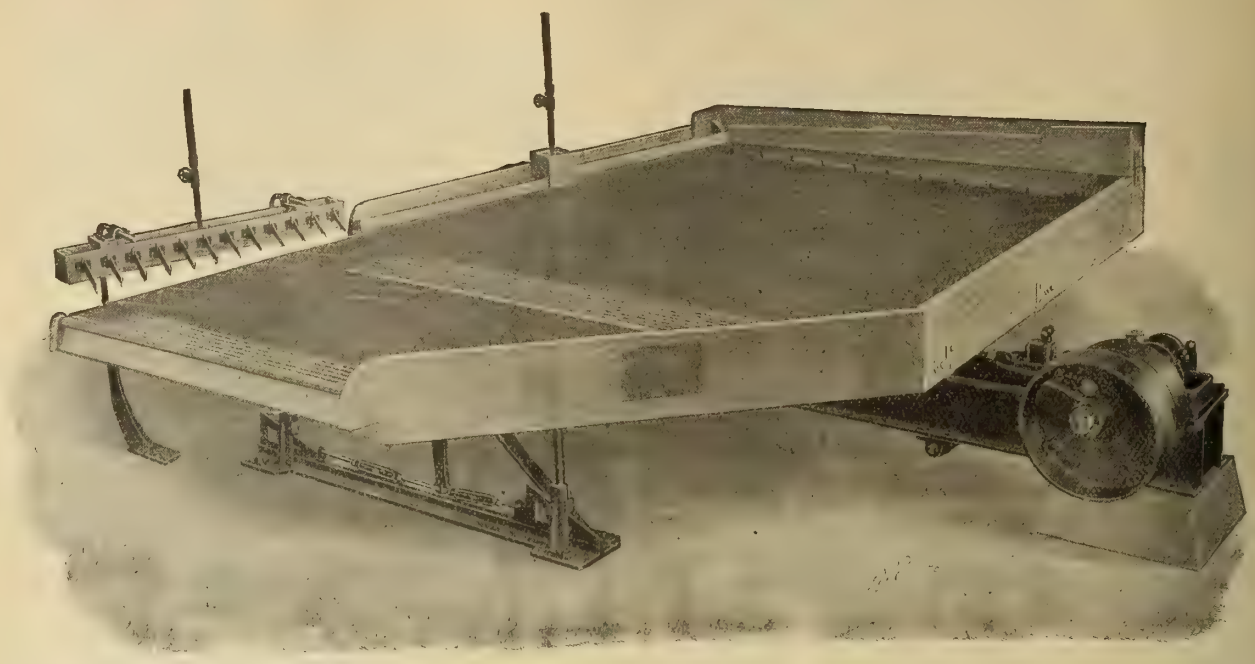
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

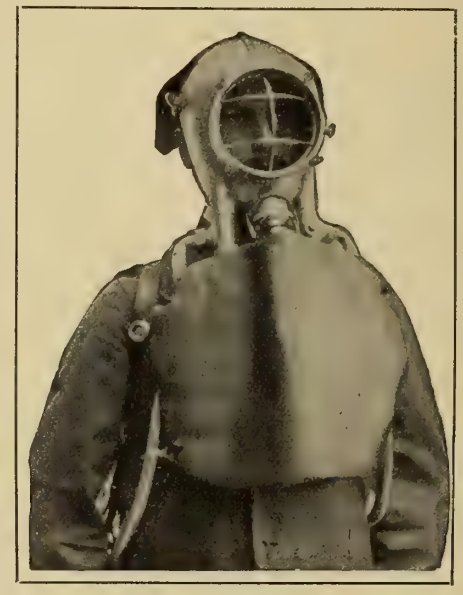
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

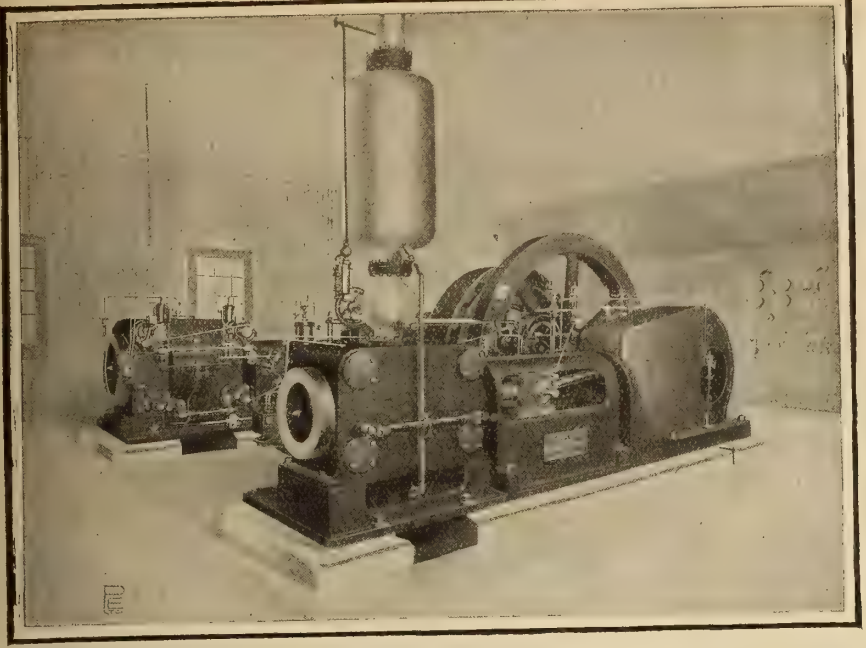
Successfully used at the following
EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Meriбach	1907
Wharn-Silkstone	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



POWER PLANTS FOR MINES

Engines and Boilers designed to suit your particular requirements.

Illustration shows the Engine Room of the O'Brien Mine Plant at Cobalt, Ont. equipped by us with Cross Compound Heavy Duty Goldie Corliss Engine. We have also installed in this plant, four 66" x 14 ft. and two 72" x 16 ft. Boilers.

THE GOLDIE & McCULLOCH COMPANY, LIMITED, GALT, ONTARIO, CANADA

WESTERN BRANCH
248 McDermott Ave., Winnipeg, Man.

QUEBEC AGENTS
Ross & Greig, Montreal, Que.

B.C. AGENTS
Robt. Hamilton & Co., Vancouver, B.C.

WE MAKE Wheelock Engines, Corliss Engines, Ideal Engines, Piston Valve Saw Mill Engines, Boilers, Heaters, Tanks, Steam and Power Pumps, Condensers, Flour Mill Machinery, Oatmeal Mill Machinery, Wood-Working Machinery, Transmission and Elevating Machinery, Safes, Vaults and Vault Doors.

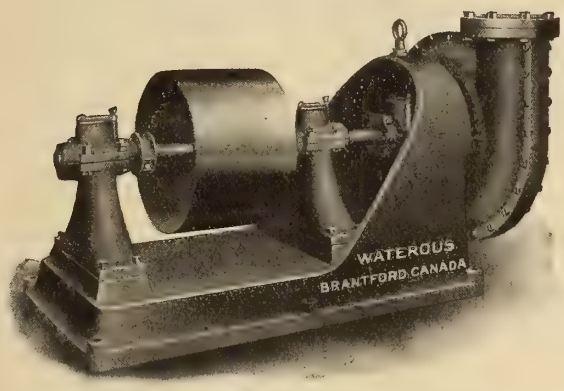
Ask for Catalogues, Prices and all Information.

For Mine Drainage

where compact, durable and easily operated machinery is desirable

OUR SPLIT-BASE PUMPS

will fill every requirement.



—ENGINE, MOTOR OR BELT DRIVEN—

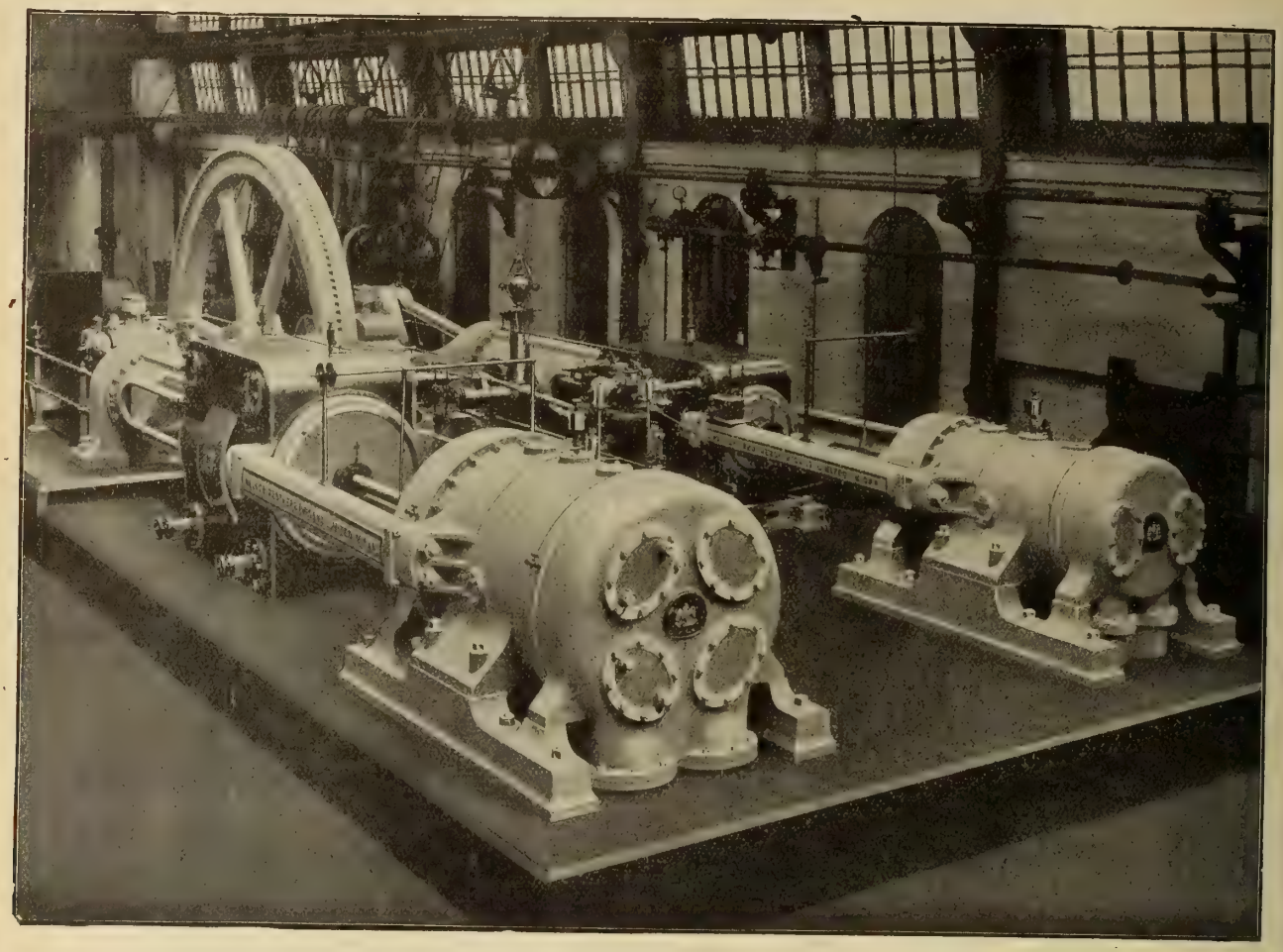
In sizes of 4, 6, 8, 10, 12 or 14 inch opening

Write for Catalogue No. 200

The Waterous Engine Works Co., Ltd. Brantford Canada

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

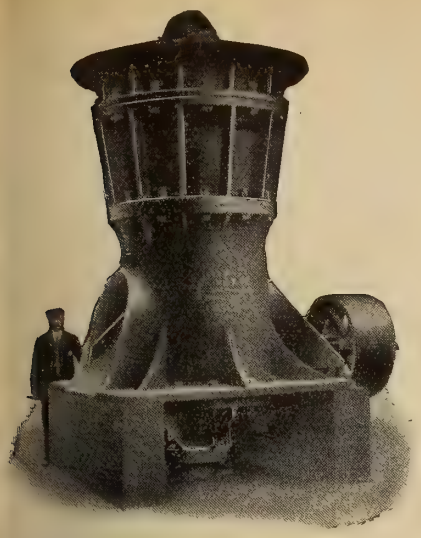
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President

C. A. MACPHERSON, Sec-Treas.

COAL MINING MACHINERY

Revolving Tipples, Screens, Picking Belts, Chutes, Car Hauls, Complete Plants Designed and Built, Mine Cars, Hoists, Pulleys, Transmission Machinery and Conveyors.

Correspondence Solicited

THE BROWN MACHINE COMPANY, Ltd.

ENGINEERS

NEW GLASGOW = NOVA SCOTIA

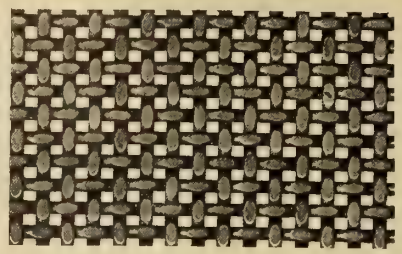
ROLLED WIRE SCREEN

Rolled Steel Wire Cloth

A flattened Steel Wire Cloth has the same smooth surface as perforated metal, with the added advantage of doubling the screening area.

Your enquiries are solicited.

"A SUBSTITUTE FOR PERFORATED PLATES."



Rolled Steel Mining Cloth

Owing to the increase in the demand for the above materials, we have recently installed a very heavy Rolling Plant and now have facilities for rolling any desired size and weight.

Prices and details on application.

Hamilton, Ont. **THE B. GREENING WIRE COMPANY, LIMITED** Montreal, Que.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

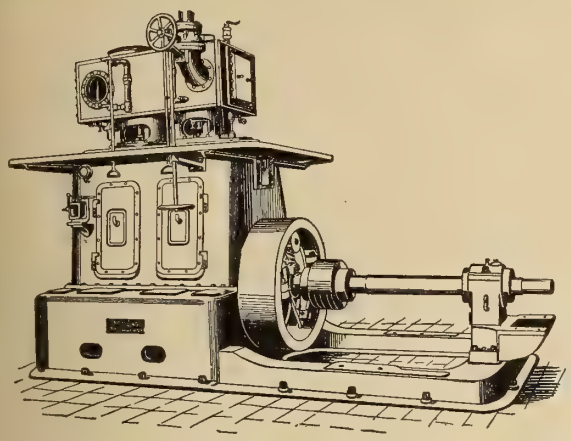
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Cost Nothing For Repairs



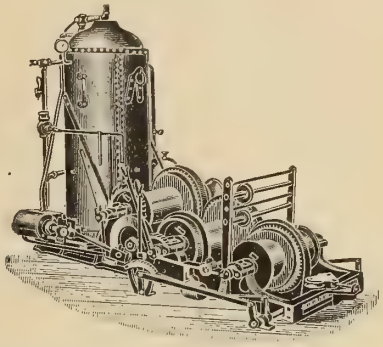
A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que. R. W. Robb, Manager
Traders Bank Building, Toronto, - - Wm. McKay, "
Union Bank Building, Winnipeg, - - W. F. Porter, "
609 Grain Exchange Building, Calgary, Alta. J. F. Porter "

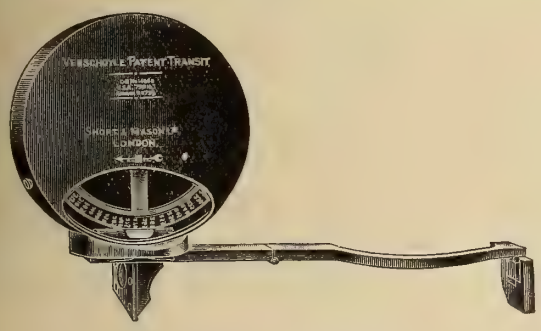
M. Beatty & Sons
Limited
Welland, Ontario
MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.
Sole Canadian Maker Williams "Faivrette" Clams
Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments
FOR
Civil, Mining Engineers & Surveyors

2½ INCH NEEDLE.

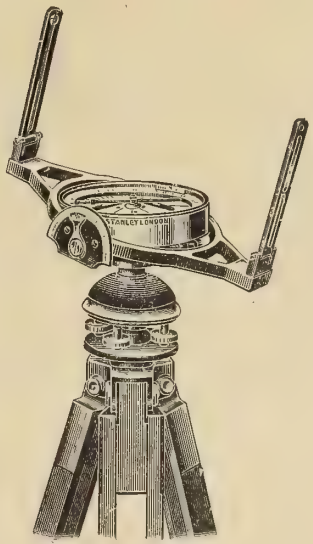


WEIGHT 15 OUNCES.

THE VERSCHOYLE POCKET TRANSIT
combines the useful features of the Abney Level, Prismatic Compass and Clinometer
For preliminary surveys of every description
Catalogue On Request

Eugene Dietzgen Co.
LIMITED,
TORONTO, - 10 SHUTER STREET

STANLEY, LONDON



The cheapest and strongest simple dial yet made.

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our J65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK

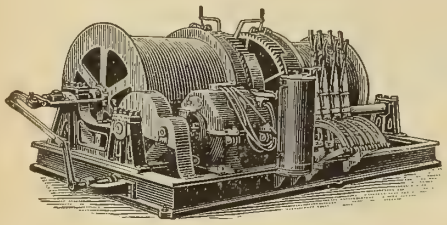
W. F. Stanley & Co., Limited
Great Turnstile, London, England

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

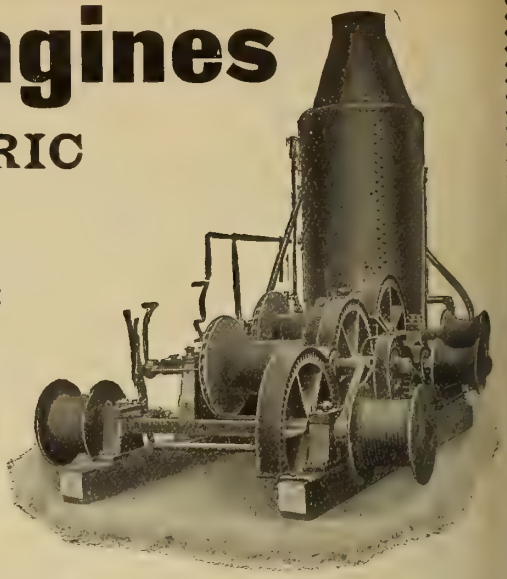
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.

MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.



WHERE IT'S ALWAYS COOL

Get away for the week-end for a rest, a comfortable fishing trip, or change of air and scenery.

ASK FOR A WEEK-END PAMPHLET

HAVE YOU TRIED

KAWARTHA LAKES
STONEY LAKE, ETC
Reached via Bobcaygeon, Peterboro or Lindsay — Immediate connection with C.P.R. trains.
ASK FOR ILLUSTRATED FOLDER

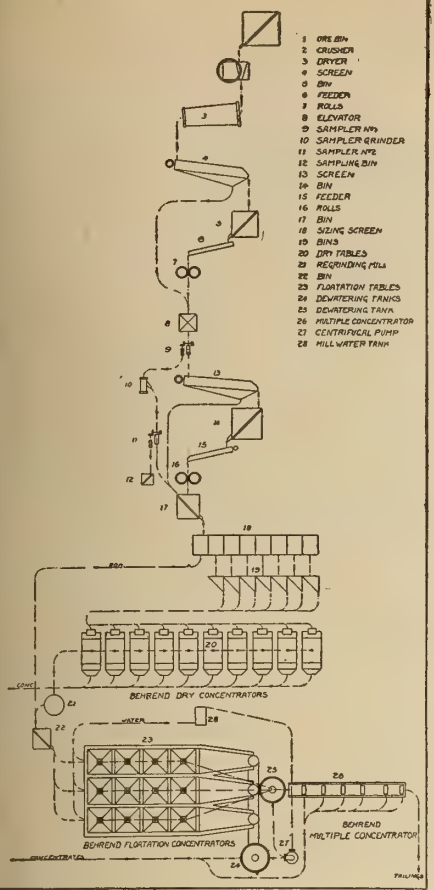
POINT AU BARIL
"THE FINEST SUMMER RESORT ON THE GEORGIAN BAY"
Steamer "Wanakewan" leaves C.P.R. Station wharf for Island Resorts—Immediate connection.
ASK FOR ILLUSTRATED FOLDER

MUSKOKA LAKES
BEST REACHED VIA BALA
Lv. Toronto:
9:40 a.m. daily 12:15 p.m. week days
6:05 p.m. week days 10:10 p.m. daily
ASK FOR ILLUSTRATED FOLDER

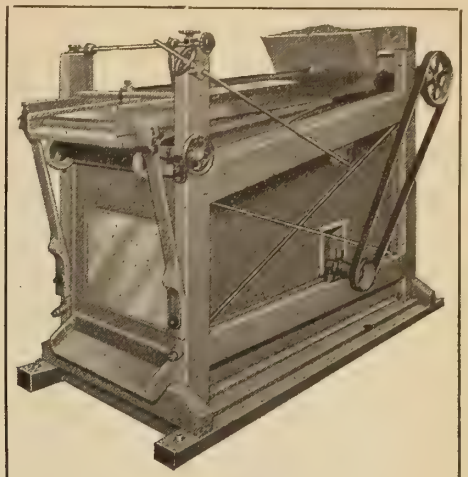
CANADIAN PACIFIC RAILWAY

THE LINE FOR ALL VACATION SPOTS

R. L. THOMPSON - - District Passenger Agent - - TORONTO



FLOW SHEET
OF A
MODEL PLANT
FOR THE
BEHREND SYSTEM
OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED
32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

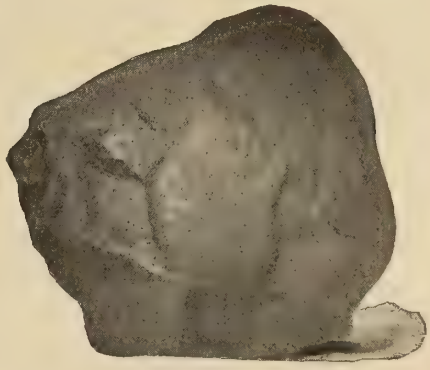
NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,
108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

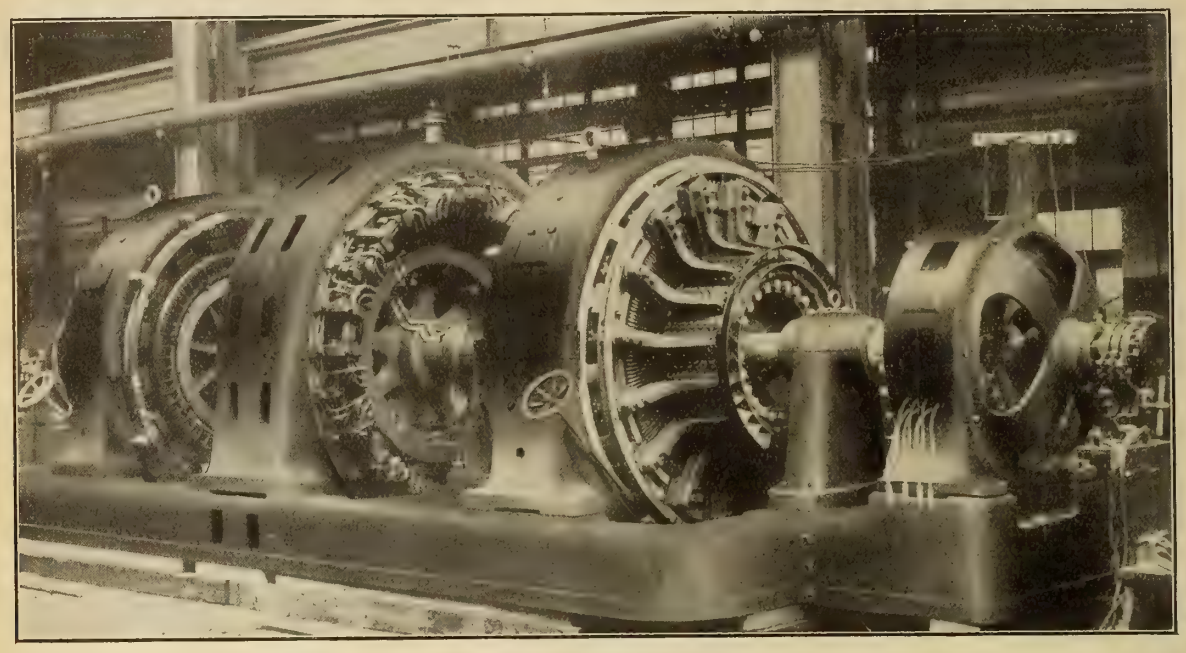
Scranton, Pa.	- -	314 Peoples Nat. Bank Bldg.
Duluth, Minn.	- -	710 Torrey Bldg.
Denver, Col.	- -	225 E. Maple St.

When wanting goods write nearest office.

Bruce Peebles & Company, Ltd.

EDINBURGH, SCOTLAND.

Contractors to the Admiralty War Office, etc. Manufacturing and Contracting Electrical Engineers.



One of two 1,500 H. P. Motors supplied to the Newcastle on Tyne Electric Supply Company.

Watertight Motors for Mines.

Slow Speed Haulage Motors.

A.C. & D.C. Dynamos & Motors.

Traction Motors.

La Cour Convertors.

VANDELEUR & NICHOLS

Cables "Vandeleur." Sole Canadian Representatives, Dineen Building, Toronto.

The Davis Handbook of the Cobalt Silver District

Illustrated with Photographs

PRICE

Paper Cover = = $1.50

Stiff " = = = $2.00

by H. P. Davis

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = **Canadian Mining Journal** = *Toronto*

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Safest and Best Quality.

Catalogue of Braun's Laboratory Appliances is interesting reading to the Assayer and Chemist, and is yours for the asking.

What is Your Address?

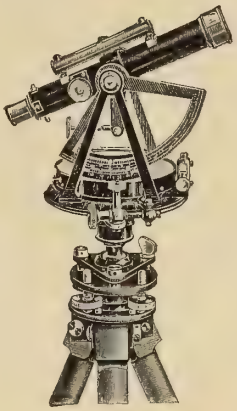
LYMANS, Limited,
MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.



Casartelli's Improved Mining Theodolite

With Telescope and Levels, 4½-in. compass, 6-in. horizontal circle, and vertical arc, reading to three minutes. Tangent adjustments. Ball and socket motion, and parallel plates, complete in case, with set of jointed legs.

Simpler than any other instrument of equal utility. Strong, yet convenient in use, it is always absolutely precise.

JOSEPH CASARTELLI & SON
Scientific Instrument Makers,
43 Market Street,
MANCHESTER, - - Eng.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co., Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire-threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.
And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.
Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

Specify Distinctly  Allen's Stag Brand

"STAG" BRAND.



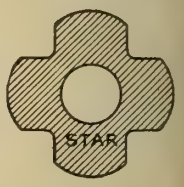


SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock





SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

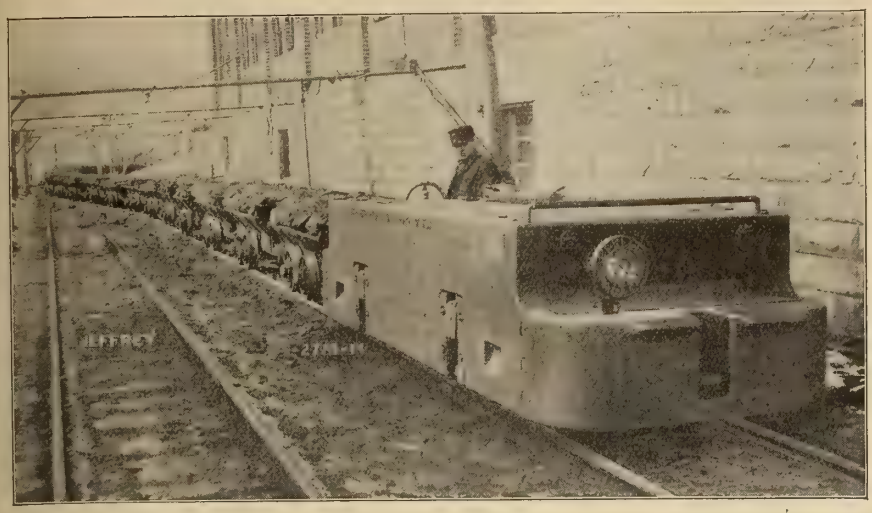
Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL

Jeffrey Electric Locomotives



Lead in Design and Construction.

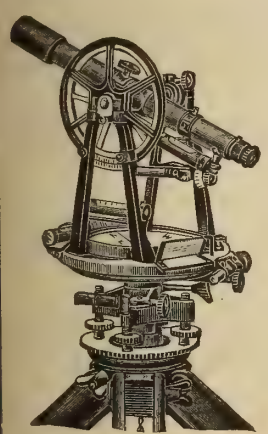
Every detail is considered and all materials selected after thorough testing and careful inspection and the latest models represent the most practical Mine Locomotives on the market.

We solicit an opportunity to demonstrate the value of our Locomotives.

Illustrated books "Care of Electric Mine Locomotives in Service." X 12 and the Jeffrey Catalog. X 17 will be sent on request.

The Jeffrey Manufacturing Co.

Canadian Office and Works: Cote and Lagauchetiere Streets, Montreal.
Toronto Office: 8 Temperance Street.



C. L. Berger & Sons

37 WILLIAMS STREET
BOSTON, - MASS.

SPECIALTIES:
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196

Measuring Tapes



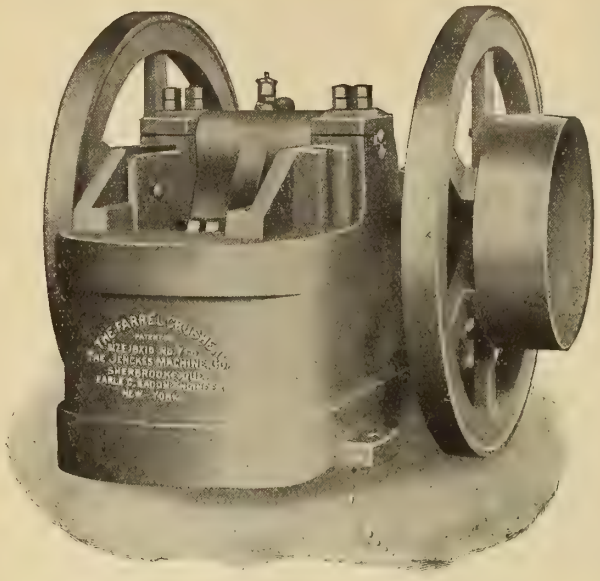
K & E Measuring Tapes possess every desirable quality—clearness, accuracy and durability. They are made in largest variety to meet every requirement of engineering work.

All **K & E** Steel Tapes have the KECO finish, which produces an even black tape line with brilliant, bright steel graduations and figures. The KECO finish guards against rusting and obviates the necessity of greasing the line to protect it.

Send for Complete Catalogue.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.
General Office and Factories
HOBOKEN, N J.
New York Chicago St. Louis San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices:

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver

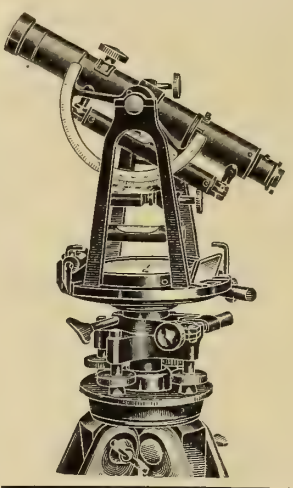
Power & Steam Pumps, Condensers, Travelling Cranes

Write for Catalogue



THE SMART-TURNER MACHINE COMPANY, Limited

HAMILTON, CANADA



DAVIS DERBY.

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers

(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 Beaver Hall Hill, MONTREAL

Write for pamphlet No. 42 M.

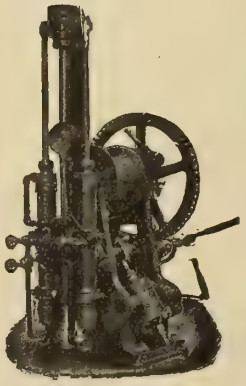
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins,
ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, August 15, 1910 No. 16

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, or the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the postoffice at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 481
(a) Students and Employers 481
(b) Concerning Nova Scotian Gold 482
(c) The Intellectual Proletariat 483
(d) Standardization Again 483
(e) Unwise London 483
(f) The Lucky Jim 483
(g) Editorial Notes 484
Consolidated Mining and Smelting Company of Canada, Limited 484
Bathurst District, New Brunswick, by G. A. Young..... 488
Losses by Fire at British Columbia Mines..... 492
Our European Letter 494
Coppers' By-Product Coke Ovens and Direct Ammonia Recovery Process 496
Bitter Creek, B.C..... 498
The Clay and Shale Deposits of Nova Scotia and Portions of New Brunswick and Prince Edward Island..... 499
The Folsom Dredge Working Placer Ground in California, by F. C. Perkins..... 500
Canadian Manufacturers Association 501
Personal and General 503
Special Correspondence, etc..... 503

STUDENTS AND EMPLOYERS.

In a series of resolutions the Mining and Metallurgical Society of America has given expression to its opinions upon the instruction of mining students in practical mining. These resolutions we shall quote in their entirety:

> Resolved, that it be recommended to mining and metallurgical operators that facilities be granted to undergraduates of technical schools to inspect the operations of their mines and reduction works; and, moreover, that such undergraduates be afforded the privilege of gaining actual experience in carrying out the various operations.
>
> Resolved, that the instructors in our mining schools be urged to impress upon their students the importance of supplementing their technical education by experience in practical operations and association with working conditions and workmen, both of which are essential to ultimate success.
>
> Resolved, that operators, consulting engineers, and managers be urged to consider the importance of developing and maintaining a trained force of young technical graduates in their various departments, and in taking such graduates into their employment, and be urged to devote the requisite personal attention to these graduates in order to insure the proper development of such assistants, believing, as we do, that this co-operation will be of mutual value to the operators and the graduates by creating a trained force that will be of value to the industry.

The subject having thus been dealt with in a general sense, it is next proposed to go further and to decide such questions as that of the length of time to be devoted to such apprenticeship, etc.

Unquestionably this is a commendable effort. Not only will it safeguard the profession, but it will also tend to improve the breed. To gain practical knowledge of mining and smelting the student relies mostly upon his own luck in getting a "job" during his summer vacation. In the greater proportion of cases he is forced by circumstances to accept work that has little or no bearing upon his future career. Hence valuable time is lost, and energy that should be devoted to the study of his profession is diverted to the sordid task of collecting enough money to put him through college.

It is true that in Canada every effort is made by the professorial staffs to obtain suitable employment for students. To this end mine owners and operators are canvassed early in each year. But results are not uniformly satisfactory. There is, naturally, more or less rivalry between our mining schools. Hence not a few

deserving students are forced to depend upon their own efforts, and often they are left in the lurch.

Incidentally we feel inclined to agree with the statement of one member of the committee that drafted the resolutions cited above. It is his opinion that a firm stand should be taken against the idea that it is necessary or even advisable for a young engineer to engage in manual labour during his course of training. There is no inherent virtue in getting dirty. Certainly a young man must know the value and meaning of a day's work. He should not be unfamiliar with pick, shovel, and drill. But he should realize that this phase of his experience can easily be overdone.

In the main, the practical experience now obtainable by our mining students is of the helter-skelter variety. He may spend one summer in an assay office, another prospecting, and yet another surveying, whilst his object in life is to become a mine manager. His professors can assist him only to a limited extent, and unless the mine manager takes a friendly interest in him, he is compelled to switch his energies into channels that he knows to be unprofitable. We need not expand upon this topic. Our student readers at least will catch our drift.

. . . . . .

There are three bodies upon whom falls the duty of providing better and more uniform facilities for students who require actual acquaintance with working conditions. These bodies are first the professors, secondly the mine managers, and thirdly the Canadian Mining Institute. The latter two bodies may advance the objection that this smacks of paternalism. A little reflection will show, however, that this is not the case. The Institution of Mining and Metallurgy has set a good example. Such of its members as are operators or managers of mines have been requested to take on one or two graduates of designated mining schools. We can well afford to follow this example.

Finally, we would urge most strongly that, instead of fostering the present rivalry, the professors of our various mining schools consult each other with a view to rendering uniform the conditions under which Canadian mining students secure professional employment. This is probably the first and the most important step, and now, near the beginning of the academic session, is the best time. Another consideration makes this step extremely desirable. This is the fact that any recommendations formulated by a convention of professors could be at once submitted to the Royal Commission on Technical Education.

CONCERNING NOVA SCOTIAN GOLD.

Early in August we visited several old gold mining camps in Nova Scotia. Our readers are not unfamiliar with the questions that have been raised concerning gold mining in our easternmost province, and, in the hope that a ray of light may be thrown upon the subject, we shall venture herewith to set down a few general impressions gathered during our visit.

The outstanding advantages that first strike the traveller are the accessibility of many of the mines, the good roads connecting them with their sources of supply, the cheapness and apparent abundance of labour, and the plentifulness of water and timber. To be added to these is the natural beauty of the surroundings, and the relative scarcity of mosquitoes and black flies. So much for the bright side.

In a certain camp that shall be nameless the most superficial inspection shows that something is wrong. A mill test, for instance, consisting of a few tons of ore was about to be put through a five-stamp battery. No steps had been taken to determine the gold contents of the ore, the plates were dirty, the mill was dirty, and, so far as we could learn, it was the intention of the operators to "sweeten" the run with some very rich nuggets that had been found a few days before. All this, of course, was being done innocently. But we have no doubt that the parcel of ore would be credited—equally innocently—with the total yield. Lest we be misunderstood, let us repeat that in the instance quoted there was not the remotest intention of gulling anybody. The facts, such as they were, were explained fully to us. But the result is bad. No real evidence is gained, and, in all probability, the management is confirmed in the practice of wasting time and money in putting worthless quartz through a mill of very limited capacity. If any ore requires assaying carefully and systematically, the narrow spotty veins of this type require it.

Of careful mining there is no evidence. The head frames are of the rudest and clumsiest description. The shafts are badly timbered. The narrow, irregular underhand stopes are unspeakable. They are eloquent of lost labour and wasted time. Supervision, close and careful, is unthought of. The object of one and all appears to be to discuss the whereabouts of the next bonanza.

And it is the search for the bonanzas, the fabulously rich rolls and pockets, small in extent and irregular in occurrence, that not only incites the novice to spend his money, but also destroys the efficiency of the mine as a whole.

There have been two kinds of failures in Nova Scotia gold mining. The one has been due to over-equipment, equipment out of proportion to the possible yield of the mine; and the other is attributable to the feckless gophering of men who do not know what a mine is. Either kind may succeed; but chances are very much against them.

Somewhere in between lies the golden mean. The intelligent study of the ore shoots, the proper development of the mine in relation to these shoots, the elimination of barren ore, the just co-ordination of plant and mine, the utilization of water power wherever possible, and, above all, the keeping of full and continuous ass

ecords, assay maps, and mill returns, will go far toards solving the question of profits.

The conviction is being brought home more and more o us that Nova Scotian gold mining will pay the priate venturer (provided he be competent), where it ill not in many cases yield sufficient profits to the joint ock company.

One hint that no wise person will overlook is this,—ek the advice of the old stagers, men who have lived nd wrought all their lives in the camps, men who are ie sole repositories of the inside history of gold min-ig in Nova Scotia. These men may not be able to adise upon technical subjects, but they can give you with onderful wealth of detail the story of each vein, of very rich shoot, and of every important mill test. In umbers there is safety. From a few such personal naratives sufficient exact data can be distilled to give the ivestigator a start in the right direction.

The gold is there. It remains for the mining engineer o show that the profits are also there.

THE INTELLECTUAL PROLETARIAT.

A clever phrase was coined some time ago to describe hose German university graduates who are turned oose with no practical training. Mr. C. R. Corning ientions it. It aptly applies also to the Anglo-Saxon 'arts'' product. The phrase is ''intellectual proletarat.''

The perennial flood of graduates whose education has itted them for no special calling and has probably hanlicapped them in the race, shows signs of diminishing. Iore and more young men are learning that the counry needs their services in a practical every-day, wagearning capacity. More and more is it becoming unashionable to belong to the ''intellectual proletariat,'' he great unemployable.

If the latest records of our mining schools are to be rusted, the profession of mining engineering is attractng larger numbers than ever before. Mining is essenially a practical occupation. Mining engineering is a rofession second to none. It calls for sound practical xperience, thorough business knowledge, high ethical oncepts, and dignified professional methods. How can ny sane person prefer to enrol himself with the inept nd unfit ''intellectual proletariat,'' when a profession ike this is open to him!

For several reasons we welcome the phrase. One reason we shall give. A certain professor of Latin, a worthy man whose joy it is to stir up unprofitable but highly picturesque rows in academic and religious circles, once dubbed mining students ''educated plumbers.'' No better retort could be devised than the phrase that heads this editorial.

To quiet the still, small voice of conscience we must subjoin this rider. We believe that no young man who intends to take up any profession can afford to neglect the broader university studies. He must not be led to believe, however, that they are anything but stepping stones.

STANDARDIZATION AGAIN.

Mr. T. A. Rickard is not getting off easily. The phlegmatic Englishman is not easily stirred. But he does resent some things. Mr. Rickard, being an Englishman, an Englishman who has suffered much attrition by travel and contact (metamorphic) with his fellows, has taken it upon himself to correct certain loosenesses in the literary habits of his countrymen. He has been at it for some time. But the storm did not break until after the publication of his paper, ''The Standardization of English in Technical Literature.''

In the discussion that follows this paper it is evident that Mr. Rickard will have no bed of roses whereon to lie. Whilst each of his critics is formally commendatory to begin with, each has a club behind his back, and each gets in his lick.

The windiest buffet of all is dealt by Mr. W. H. Shockley. Mr. Rickard had asked: ''Why should we write settle *down,* settle *up,* put *down,* put *up,* why should we not use synonyms for these words?'' The object of the interrogation is to display the superfluousness of the preposition in each case. ''This,'' says Mr. Shockley, ''is the sort of question that properly belongs to a lisping baby. After wandering wearily over the earth we come home and in our arm chair settle down. When we settle up an account we settle it completely; the up is used intensively . . . Condensation. . . is alien to the English tongue, whether written or spoken.''

We hope and believe that Mr. Rickard has met a foeman worthy of his steel—or graphite. The joust should be a merry one.

UNWISE LONDON.

Our London correspondent informs us that the press reports of the Stewart (B.C.) gold discoveries were responsible for the flotation of a company capitalized at $1,000,000. Four hundred thousand shares were issued, at 50 cents. The flotation is reported to have been successful.

This is the way of unwisdom. Already the glowing statements of yesterday have been discredited. English shareholders will have one more reason to regret dabbling in Canadian mining ventures. We repeat the rule (and we have already reiterated this so often that it must be painful to many of our readers) that the person who takes a long-distance shot at a mining venture without disinterested technical advice has no just grounds of complaint if he finds that he has been fooled.

THE LUCKY JIM.

News comes from Nelson, B.C., that the loss by fire at the Lucky Jim mine was not nearly so serious as first reports would have led us to expect. In fact, according to the statement of Vice-president G. W. Loper, the fire consumed only old buildings that were shortly to be torn down, and some timber that had been collected for the construction of ore bins. Work has already been resumed.

Press despatches make special mention of the prompt and effective interest taken in the matter by the Government of British Columbia.

EDITORIAL NOTES.

A financial contemporary predicts an immediate and effectual curtailment of copper outputs. This, it is stated, will be in part voluntary and in part forced, according to the strength or weakness of the operator.

The railway spur to the Whitehorse copper and iron fields is completed. This taps copper and iron deposits of which great things are hoped.

The great Lakeview gusher, California, is yielding about 35,000 gallons of oil per diem. Since blowing in, five months ago, this well has produced 5,000,000 gallons. It is now showing signs of subsidence.

The law compels mine operators on the Rand to keep exact and complete clerical records of all gold, amalgam, and cyanide residues handled and weighted. Two men, at least, must be present during the operations. Other consecutive precautionary measures are taken, all with a view to prevent stealing. Three large concerns have thought it necessary to retain the services of a staff of detectives to supplement the organized protection afforded by the law. This should be the very last step resorted to. It works harm and brings discontent.

A pure white diamond, 191 karats in weight, has been found at the Premier mine, South Africa. Its value uncut is placed at $150,000.

The striking miners of Greensboro, Pennsylvania, resorted to gun practice. Some thousands of workmen, armed with rifles, prepared to resist the state troops. Canadians may congratulate themselves upon the fact that such a scene is hardly possible in this country. Organized resistance to constituted authority is not popular here. Moreover, despite the growlers, the Industrial Disputes Act is proving to be "good medicine."

At Empire Gulch, Colorado, a 900-foot shaft filled with water to within 80 feet of the collar, is being pumped out by means of compressed air. The compressor is driven by an electric motor which gets its power from a transmission line. The pump can be withdrawn to the surface at any time. The whole arrangement is clean, simple and effective, and there is no danger of losing the pump.

Mr. Roosevelt declined the honour of opening the Toronto Exhibition. He has lately been pressed to attend the forthcoming session of the American Mining Congress. Probably a Canadian Mining Institute smoker would draw the retiring gentleman. It is time for something to happen. The continent's safety demands that someone be sacrificed to provide a safety-valve for the Colonel.

CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA, Limited.

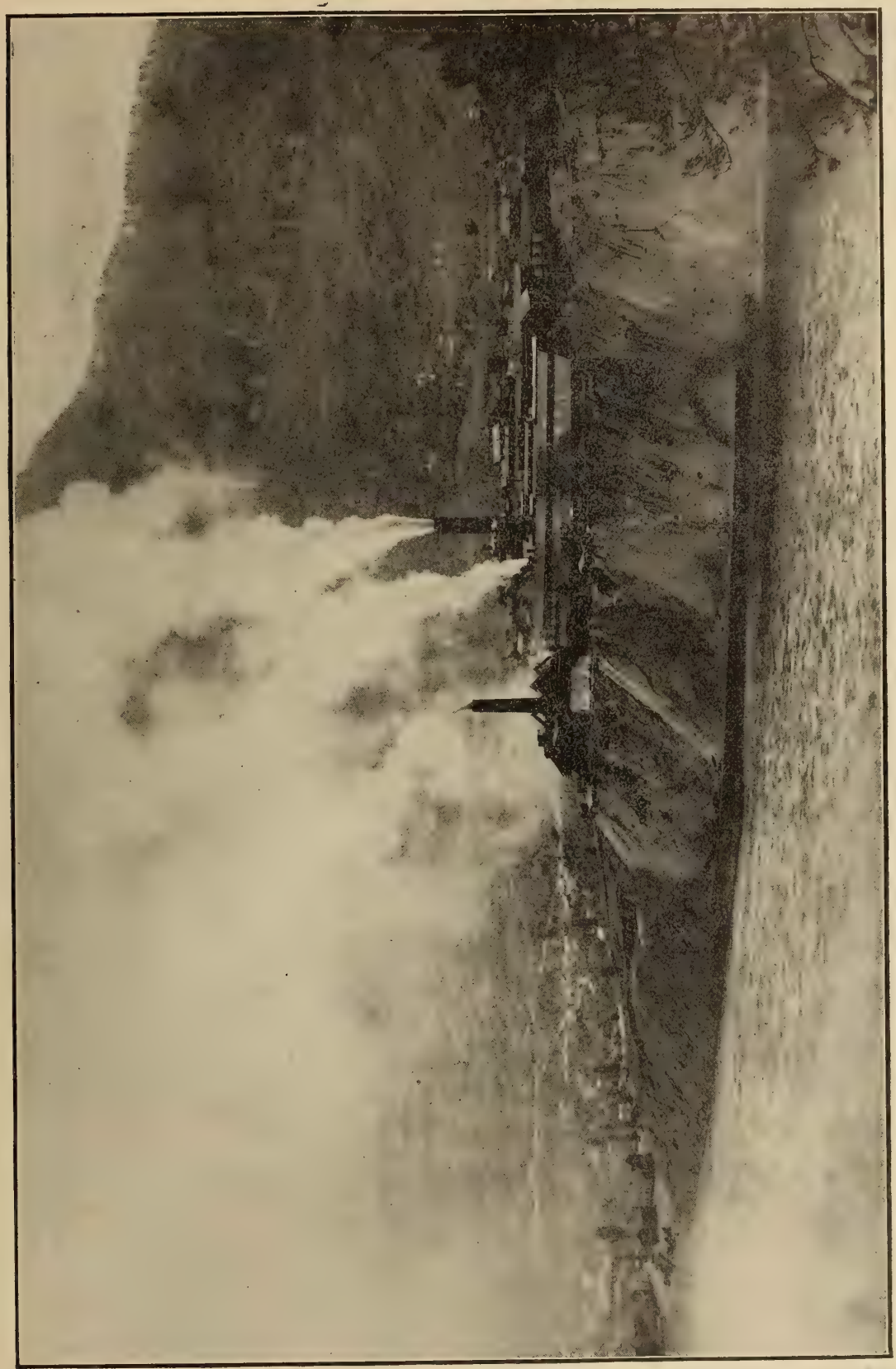
(Written for The Canadian Mining Journal.)

Below are given statistics showing the tonnage of ore received at Trail, B.C., of the Consolidated Mining & Smelting Company of Canada, Limited, together with the quantities and value of the several metals produced therefrom during the company's fiscal year ended June 30th, 1910. For purposes of comparison, corresponding figures for the fiscal year to June 30th, 1909, are also shown.

The extensive mining and smelting operations of the Consolidated Company make it an important factor in the mining industry of British Columbia. That this is so in marked degree, is evident when it is remembered that the value of the metals produced by the company during its last fiscal year is within $200,000 of one-fourth of the total value of all minerals produced in the province during the last calendar year. That is to say, this company alone produced in twelve months, approximately twenty-five per cent. of a total value equivalent to that of the production of all mines, quarries, brickfields, cement works, etc., that contributed to the mineral production of British Columbia in 1909, as set forth in the Annual Report of the Minister of Mines for that year.

The Consolidated Mining & Smelting Company's operations are varied as well as extensive. Its gold-copper mines at Rossland are now the mainstay of that town; its big lead mine in East Kootenay, with accessory concentrating mill, has long occupied a similar position in relation to the town of Moyie; its Richmond-Eureka silver-lead mine during the two years last past has had the largest payroll in the immediate vicinity of Sandon, Slocan; in the Boundary district its Snowshoe copper-gold mine has contributed to the business and prosperity of Phoenix, though in much smaller degree than the neighbouring big mines of the Granby Company; while in the southern part of the same district its construction work in connection with the re-opening of the No. 7 gold-silver mine has transformed a locality in which mining activity had ceased several years ago. Similarly, its operations at the Sullivan lead mine, during the last six months have brought new life to the neighbourhood of Marysville, East Kootenay, and at the Queen Victoria copper mine, to the camp near Beasley Siding, in Nelson mining division.

The part this company has taken and continues to take in sustaining the Town of Trail is, perhaps, more manifest, since that is the centre of its important activities. Its influence on numerous other parts of the Kootenay and Boundary districts than those above-mentioned, is not nearly so plainly evident, but were the big works at Trail to be closed, stagnation would speedily result in most of the producing mining camps of the extensive area from which its supplies of ore are drawn.



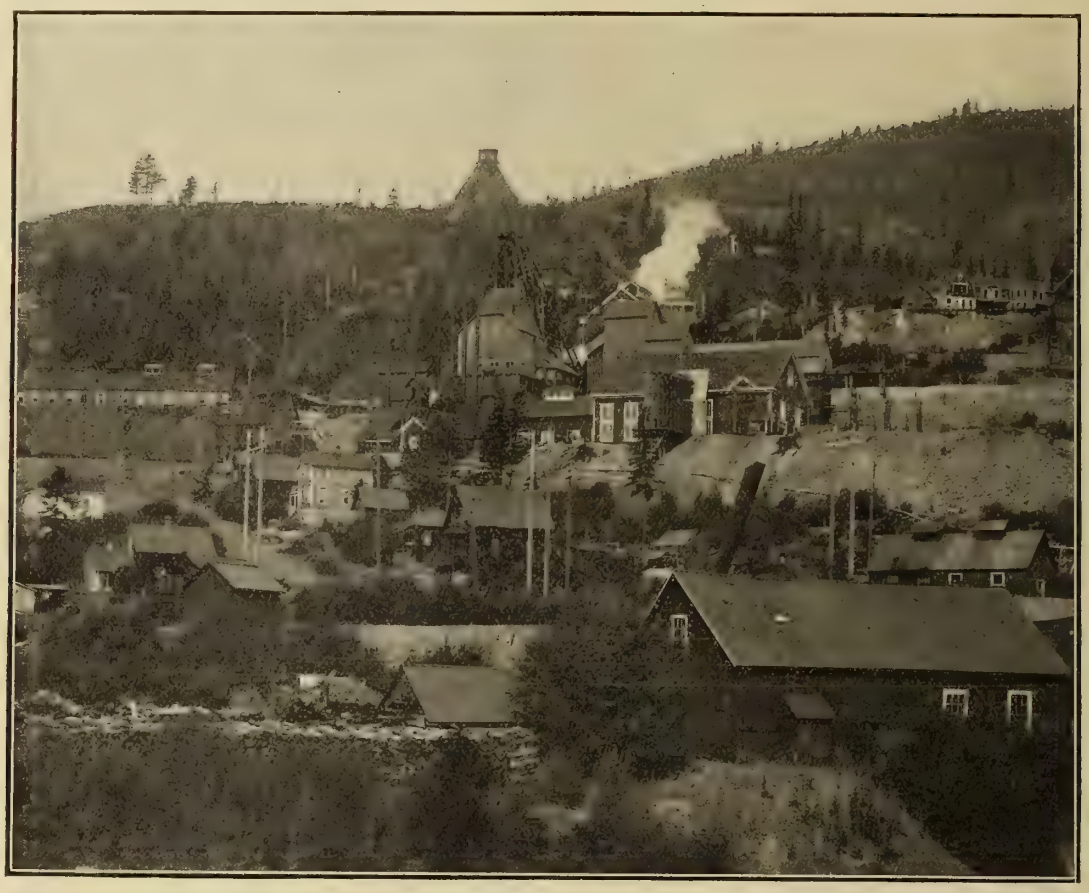
CONSOLIDATED MINING AND SMELTING COMPANY'S SMELTER, TRAIL, B.C.

To all familiar with the list of shipping mines published weekly by the provincial press, it is well known that while the Boundary smelteries receive a much larger tonnage of ore from a few mines, it is the Trail works chiefly, that, under existing conditions, makes it practicable to produce ore in many parts of the Kootenay. Were the position looked into more closely it would be seen, too, that even distant cities are benefitted by the operations of the Consolidated Company, for lead from its electrolytic lead refinery—the first of its kind to be established anywhere—supplies works for corroding lead and manufacturing other lead products in Montreal in the east, and in Vancouver in the west.

The close of this company's fiscal year is therefore a time of more than ordinary interest to those concerned in the progress of mining in British Columbia, though, thanks to the commendable policy of publicity adopted some time ago and now well established, it is always

Ore Receipts During Fiscal Year.

From Company's mines—	Tons.	Tons.
Centre Star	194,013	
Snowshoe	183,311	
St. Eugene	19,195	
Sullivan	5.656	
Richmond-Eureka	3,731	
Queen Victoria	778	
		406,684
From Other Mines—	**Tons.**	**Tons.**
Nelson District	10,604	
Kootenay Lake and Slocan	14,782	
Rossland	43,303	
East Kootenay	3,695	
Other districts	6,389	
		78,773
Total of ore received		485,457



CENTRE STAR.

practicable to ascertain results as to tonnage of ore received and smelted week by week, while quantities of metals produced are generally made known monthly.

The financial statement for the year under notice is not yet available, but since that is of less importance to those who are not stockholders in the company than is information relative to mining and smelting operations, the customary delay of about three months before that shall be made public, will be taken as a matter of course. From the industrial point of view the interesting features of operations are disclosed in the appended statistical tables and other information. The headings of the several tables will serve to indicate the particular nature of the information they respectively contain:

Production During Fiscal Year.

Metals.	Quantities.	Value.
Gold	137,614 oz.	$2,814,676
Silver	2,162,406 oz.	1,134,881
Lead	42,365,816 lb.	1,182,980
Copper	5,974,959 lb.	779,230
Total gross value		$5,911,767

The tonnage of ore smelted was as follows: In copper furnaces, 430,851 tons; in lead furnaces, 56,274 tons. Shipments of gold-copper matte and lead bullion, respectively, were: Matte, 7,072 tons; lead bullion (to Trail refinery), 22,117 tons.

Refinery Production.

Production at the Trail refinery was as under:

	Quantity.	Value.
Lead	21,184 tons.	$1,182,980
Fine Gold	14,017 oz.	289,241
Fine Silver	1,991,357 oz.	1,045,957
Total value		$2,518,178

(Note.—This value is included in total production given above.)

The proportions of value of the several metals included in the total production during the fiscal year are as follows:

Value of gold	47.6 per cent.
Value of silver	19.2 per cent.
Value of lead	20.0 per cent.
Value of copper	13.2 per cent.
	100 per cent.

During the year just closed the tonnage of ore received was 485,457 tons, as compared with 347,417 tons smelted during the fiscal year immediately preceding. Ore receipts from the company's mines were appreciably larger, having been 406,684 tons last year, as against 319,865 the year before. Of the increase, 11,000 tons was from the Centre Star group, and 73,000 tons from the Snowshoe. The St. Eugene did not ship to the smeltery as much as in the previous year, but the Richmond-Eureka tonnage was larger, while the Sullivan and Queen Victoria were new acquisitions by the company. It should be added that the figures in the first table relating to the St. Eugene show concentrates shipped, not the tonnage of ore mined, which was probably about 140,000 tons.

Totals to June 30th, 1910.

The figures given in the following table show the respective totals of ore received, metals produced, and gross value, for all years from 1894 to June 30th, 1910, inclusive, excepting only metal contents of ore on hand at the close of this period, and the value of same. They are as under:

Tons of ore received	2,457,016
Gold produced (ounces)	952,056
Silver produced (ounces)	16,999,873
Lead (lbs.)	220,869,555
Copper (lbs.)	43,453,814
Gross value of metals produced	$42,646,025

It is noteworthy that the total value of the production of all the lode mines of the province during the 16-year period, 1894-1909, was $163,598,343, so that the value of the production of the Trail smeltery for the same period was nearly 25 per cent. of that of the lode minerals of the whole of British Columbia.



ST. EUGENE.

Comparative Tables.

A comparison of production for the fiscal years ending June 30th, 1909, and June 30th, 1910, respectively, shows as under:

Quantities—	To June 30th, 1909.	To June 30th, 1910.
Gold	114,920 oz.	137,614 oz.
Silver	2,443,475 oz.	2,162,406 oz.
Lead	43,675,077 lb.	42,365,816 lb.
Copper	4,637,631 lb.	5,974,959 lb.

Value for Year.

To June 30th, 1910	$5,911,767
To June 30th, 1909	5,505,526
Increase	$ 406,241

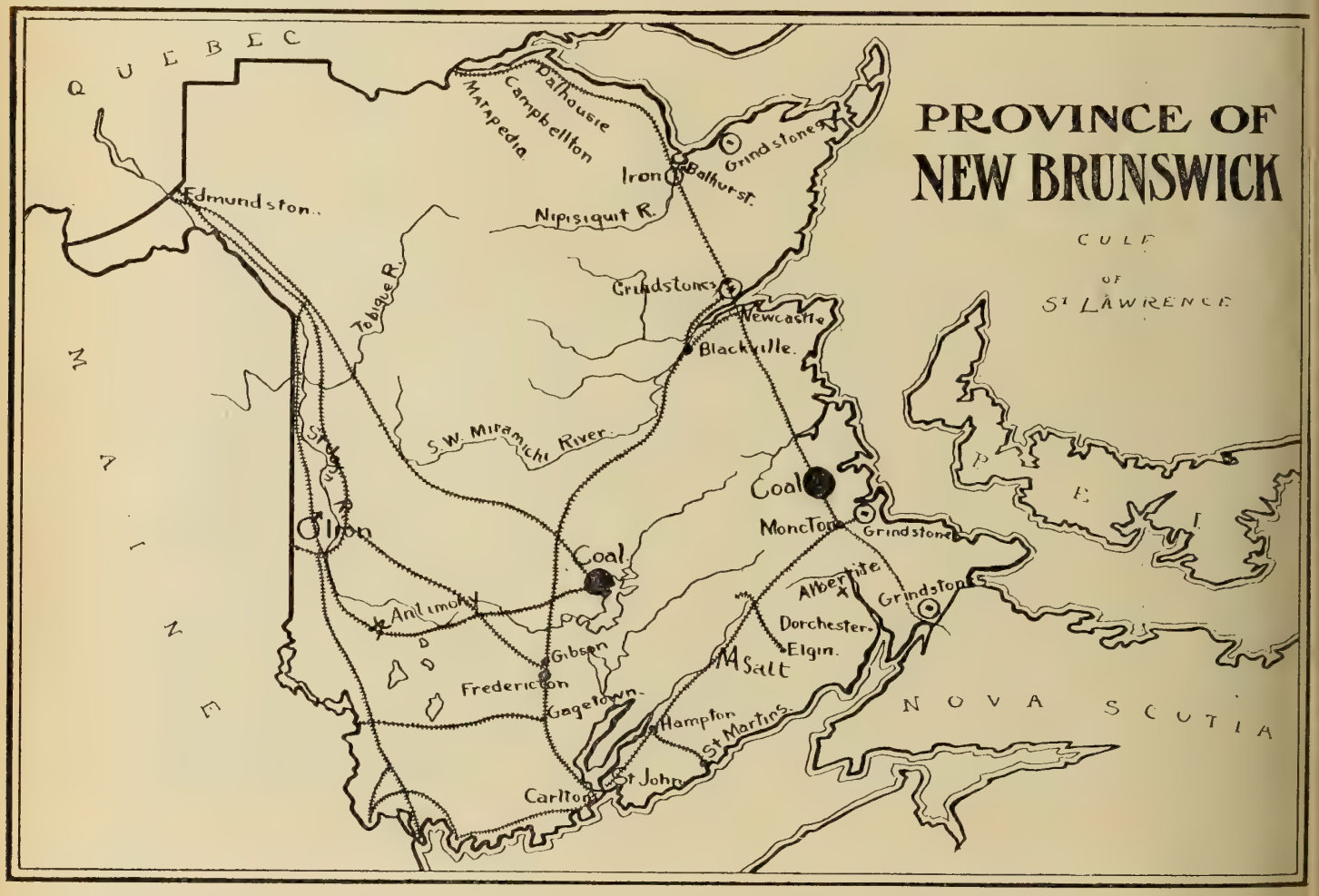
BATHURST DISTRICT, NEW BRUNSWICK.

By G. A. Young.

(Abstract from the Summary Report of the Geological Survey.)

General Character of District.

The district lies along the northeastern edge of the rugged country of central and northwestern New Brunswick, where this relatively elevated region is bordered by the comparatively low, almost flat, Carboniferous area of the eastern part of the province. Within the limits of the sheet, the north-flowing Nipisiguit River approximately marks the boundary between these two contrasting types of country. On the east, the nearly level, slightly rolling country, underlain by practically horizontal Carboniferous strata, gradually rises from the sea to a height of about 270 feet. West of Nipisiguit River, over the area occupied by highly folded and faulted pre-



Carboniferous strata and invading igneous bodies, the land rises more rapidly to a maximum height of slightly over 700 feet above the sea.

West of the Nipisiguit, the contours pursue generally, north and south courses, but swing far up the often gorge-like valleys of the easterly-flowing streams and rivers tributary to the Nipisiguit. In a number of instances these ravine-like waterways are particularly striking, as in the case of that of the Tetagauche River, the waters of which are confined to a narrow, trench-like depression seldom more than 20 feet wide, with steep, often almost vertical walls rising 75 to 200 feet above the river bed. But, except in the immediate neighbourhood of the larger waterways, the country is broadly rolling, with only an occasional outstanding hill. Save for the stream valleys, the surface of the country is a tilted plain rising from the Nipisiguit Valley, with a fairly even westerly gradient.

General Geology.

The two contrasting types of country east and west of the Nipisiguit are, geologically also, sharply differentiated. East of the Nipisiguit the country is underlain by almost undisturbed, reddish, fine conglomerates, sandstones, and shales of Carboniferous (Millstone Grit?) age. West of the river, the rocks are largely early Palæozoic (Ordovician?) sediments, chiefly black slates and grey sandstones and slates, closely folded and faulted, and in places, schistose. They are penetrated by dike-like bodies of igneous rocks, and to the south and west of Bathurst by a large body of granite that disappears eastward beneath the younger Carboniferous strata.

The country, as a whole, is very unfavourable to the study of geology. Save along the beds of a few of the larger streams, exposures are usually wanting. Over square miles of country no rock *in situ* appears, the underlying formations being largely hidden by morainic

and other material of glacial origin. Because of this general lack of exposures and the highly folded attitudes of the beds west of the Nipisiguit, it is not possible to offer an entirely satisfactory classification of the sedimentary rocks or to determine with certainty their ages. The following tabular list of formations is, therefore, but an imperfect one:

QUATERNARY.

Stratified clay, sand and gravel.
Glacial till, morainic deposits, etc.

PALAEOZOIC.

Carboniferous—
Bathurst formation.
Devonian?—
Bonaventure formation.
Nipisiguit granite.
Post-Ordovician—
Basic dikes.
Austin Brook quartz porphyry.
Ordovician—
Black Shales, sandstones, etc.

Ordovician, Black Shales, Sandstones, etc.—Along nearly the whole course of the Tetagauche River, and at intervals in the beds of Little and Middle Rivers, are numerous exposures of tilted and faulted, black, often highly graphitic slates, in many places accompanied by broken or torn bands of fine, dark sandstone. With the dark beds, also occur one or more zones of brick red, hardened, argillaceous or fine, arenaceous, slaty beds. Though rarely seen in the intervals between the main streams, these dark slates, etc., doubtless occupy nearly the whole of the country east of the Nipisiguit, excepting the portion underlain by the batholithic area of Nipisiguit granite. To the south, beyond the limits of the map-sheet and south of the granite body, the dark slates and associated beds reappear along the Nipisiguit, and are there intruded by the Austin Brook quartz porphyry, with which are associated the Nipisiguit iron deposits.

In places, the slates are schistose, apparently both along zones of shearing, etc., and in the neighbourhood of the granite batholith. The strata are closely folded, the strike, in general, being east and west, and the dip often nearly vertical. Quartz veins are common, and are very numerous in narrow zones. At many places, the rocks are impregnated with pyrite, often to a high degree.

Fossils were found in these beds at only one locality, on the Tetagauche, near the crossing of the Intercolonial Railway, where imperfectly preserved graptolites occur. A collection of these graptolites made by an earlier observer, was examined by H. M. Ami, who stated that the enclosing shales "appear to be . . . homotaxial with the shales of Norman Kiln, near Albany, N.Y. . . . ;* that is, with the lower Trenton."

On the several rivers already enumerated, appear comparatively narrow zones of fine tufaceous conglomerates, sandstones, and shales, all grey in colour, and closely enfolded with the dark slates. It is possible that these grey measures lie along synclinal axes of folding, since they closely resemble grey beds more widely exposed to the north, in the district examined in 1908, where they appear to underlie fossiliferous Silurian measures.

Post-Ordovician, Austin Brook Quartz Porphyry.—The Ordovician slates, sandstones, etc., occur for a number of miles along the shores of Nipisiguit River, south of the southern boundary of the granite batholith. About half a mile below the Great Falls of the Nipisiguit, at a point some seven miles south of the boundary of the area of the main map-sheet, the sediments are followed by quartz-porphyry and associated rocks, that extend along the river for over a mile to the mouth of Austin Brook and for an unknown distance beyond. The area of quartz-porphyry is important, since within it occur the iron deposits.

Normally, the quartz porphyry is a dark rock full of transparent, glassy grains of quartz often small in size, and usually accompanied by white crystals of feldspar lying in a dense matrix. At times the phenocrysts are large, and in some cases, those of feldspar are fully half an inch in length. Almost invariably, the rock has a schistose parting, and in certain zones or areas it has been changed to chloritic and sericitic schists.

The contact of the quartz porphyry and the sedimentary series was seen at one locality, where it appeared conformable to the bedding planes of the clastics. The quartz porphyry appeared to be intrusive, and, possibly, the intrusion took the form of an immense sill. The porphyry seems to have been involved in the main folding in the region, and in age, therefore, is probably pre-Devonian.

Post-Ordovician, Basic Dikes.—North of Tetagauche River, and to a less extent to the south, are exposures of dark, basic rocks called diabase in the field. They apparently belong to a series of dikes, some of which appear to be of considerable magnitude. Somewhat similar forms cut the Austin Brook quartz porphyry, but were nowhere observed cutting the Nipisiguit granite.

Devonian, Nipisiguit Granite.—Exposures of granite occur on the lower reaches of Little and Middle Rivers and on the Nipisiguit River from above Rough Waters to a point about five miles above Pabineau Falls, or over a distance, in all, of about eight miles. Though scarcely a single exposure of granite was found in the areas between the waterways, it is fairly evident that all the observed exposures belong to the western part of a single batholith whose major axis runs north and south with a length of about eleven miles. The eastern part of the granite body is covered by the younger, overlying Carboniferous sediments lying east of the Nipisiguit.

Typically, the granite is a grey, biotite granite, with a slightly pinkish tinge, due to the presence of numerous large crystals of feldspar. The larger feldspars lie in a fine, grey matrix of feldspar, quartz, and abundant biotite. Other varieties of granite are less abundantly present. Pink aplite dikes are common.

The granite undoubtedly penetrates the Ordovician slates and associated sediments, sending dikes into them and altering them in the neighbourhood of the contact. Along the course of the Nipisiguit, numerous exposures show the granite passing under the red, Carboniferous beds of the Bathurst formation, of which the lowest beds —for a few inches or more—are usually of the nature of a fine arkose, composed of material derived from the breaking down, apparently *in situ*, of the granite. At a number of points the contour of the plane of contact between granite and sediment is visible, and where this is so the old rotted surface of the granite may be seen to have rounded, mammillary outlines, while the rock itself presents parting planes concentric with the outline of its surface.

The Bathurst granite appears to have been intruded at a period intermediate between the folding that, farther north, involved Silurian measures, and the deposi-

* H. M. Ami, Summary Report for 1904, Geological Survey, Canada, pp. 289-290.

tion of the beds of the Bonaventure formation of late Devonian or early Carboniferous age. Therefore, the granite is regarded as being of Devonian age.

Devonian, Bonaventure Formation.—Within the area covered in 1909, only one exposure of the Bonaventure formation was seen. In the previous year, the formation was met with at intervals along the sea coast. The beds are usually dark red in colour, flecked with white from carbonate: they consist of coarse conglomerates, coarse and fine sandstones, shales, and less often, dolomitic beds.

These beds, as exposed along the shores of Nipisiguit Bay and westward along Chaleur Bay, have been correlated by a number of observers with the Bonaventure beds as exposed on the island of that name lying off the extremity of Gaspe Peninsula, Quebec. The Bonaventure formation has usually been classed with the early Carboniferous, but in recent years doubt has been expressed as to the propriety of so doing, and the opinion advanced that they should rather be regarded as of Devonian age.** In the previous Summary Report of 1908, the Bonaventure beds were assigned to the Carboniferous, on the supposition previously expressed, or implied by various geologists, that these beds conformably underlaid the Millstone Grit east of Nipisiguit River. This year's examination of the area, however, failed to confirm the supposed equivalency of the beds underlying the Millstone Grit and those of the Bonaventure formation lying along the coast, and, therefore, following Clarke, they are now considered to be late Devonian rather than early Carboniferous.

Carboniferous, Bathurst Formation.—The beds of the Bathurst formation are recoloured, fine conglomerates, sandstones, and shales, and are exposed at intervals along the banks of the Nipisiguit River almost from its mouth to a point several miles above Pabineau Falls. Sandstones and shales are the common varieties; conglomerates are comparatively rare. The measures lie almost horizontally, with only a very slight eastward dip. Cross bedding is common. The formation overlies the Nipisiguit granite, and a number of contacts are exposed on the Nipisiguit. Nowhere was a true basal conglomerate seen, the basal bed usually being an arkose several inches, to a foot or so, thick. The curious mammillary outlines of the planes of contact between granite and sediment, as well as the regular concentric parting planes in the plutonic rock, have already been mentioned.

The absence of basal conglomerates, the presence of an arkose apparently derived from the granite directly below, the mamillary outline of the contact plane and the concentric partings in the granite, so like exfoliation planes, all suggest an æolian origin for at least a part of the Bathurst formation. The presence of fine shales and the occasional beds of conglomerate seem to negative this supposition. As the district in question seems to lie about on the last shore-line of the advancing sea of Carboniferous time, possibly æolian and aqueous deposits may have irregularly alternated with one another prior to the more permanent submergence during the time of the formation of the Millstone Grit, beds of which outcrop not far to the east, and apparently conformably succeed the Bathurst beds.

Quaternary.—Stratified gravels, sands and clays, accompanied by distinct terraces, occur along the lower slopes up to heights of 250 feet to 300 feet. Boulder clay occurs, and in one section was observed to hold interstratified, cross-bedded layers of sand. Over considerable areas the country is completely mantled with boulders, often of large size. Certain hills are apparently composed of tumultuous aggregates of boulders of all sizes that seemingly have been glacially transported. Imperfectly preserved glacial striæ were observed at a few points within the area examined in 1908, but none were recorded during 1909. The transported material, so widely distributed over the whole country, is of rocks such as underlie the district or are believed to occur farther inland. The imperfect evidence collected apparently indicates that, at least in the last recorded stages of glacial times, the movement of the ice sheet was northward and outward from the interior of the province.

Economic Geology.

The main interest of the district, as far as economic geology is concerned, centres about the iron ore deposits of the Nipisiguit River. Within the area examined this year, manganese deposits also occur, on Tetagauche River near the falls above the last road bridge. The Nipisiguit granite has been quarried to a small extent, the stone having been used for bridge piers on the Intercolonial Railway, also for certain buildings in Bathurst, etc.

Iron.

The Nipisiguit iron deposits are found on both sides of Austin Brook where it empties into the Nipisiguit River at a point about sixteen miles south-southwest of Bathurst. The deposits are the property of the Canada Iron Corporation. This company is, at present, completing a railway running from the site of the ore bodies, along the west side of the Nipisiguit to a point of junction with the Intercolonial Railway, not far from where this railway crosses the river. When completed, the new line will have a length of about sixteen miles.

Up to the end of September—with the exception of the sinking of eight diamond drill holes, and a very slight amount of stripping—little development work had been done in connection with the ore bodies, the energy of the company being chiefly directed toward the completion of the branch railway.

Austin Brook, where it joins the Nipisiguit, flows about south-southeast, in a narrow valley with steep sides rising 60 feet to 80 feet above the floor. East of the brook, the country is comparatively level; west of the stream, the land rises in a broken ridge bounded on the west by a depression somewhat analogous in size and course to that occupied by Austin Brook. One ore body lies west of Austin Brook, running in a southerly direction between that stream and the Nipisiguit; the remaining ore bodies, in two groups, lie east of Austin Brook.

Nearly the whole of the surrounding country is heavily wooded, rock exposures are comparatively rare, and, altogether, there are only ten exposures or groups of exposures showing ore. The conditions, therefore, are very unfavourable to the study of the nature and forms of the deposits. The following statements are, in a measure, provisional only, pending a more detailed study of the evidence collected.

The ore bodies lie within the area of the Austin Brook quartz porphyry already described, and near a considerable body or a number of dikes of the so-called diabase. They have sharply defined walls, are largely of magnetite, and apparently have the forms of steeply-dipping, flattened lenses, the major axes of the outcrops trending nearly north and south. The character of the ore is indicated by the following figures derived from the results

** Clarke, J. M., New York State Museum, Memoir 9, pp. 92-96, 1908.

of nearly 70 analyses of samples taken at intervals of 10 feet from the cores of four diamond drill holes. The logs of the drill holes and accompanying analyses were very kindly placed at the disposal of the writer by Mr. Fulton, the local manager of the mining company:

Iron, average, between 47.0 per cent. and 51.0 per cent.; range, 39.6 per cent. to 58.7 per cent.

Sulphur, average, between 0.17 per cent. and 0.27 per cent.; range, 0.009 per cent. to 2.433 per cent.

Phosphorus, average, between 0.77 per cent. and 0.89 per cent.; range, 0.385 per cent. and 1.222 per cent.

The ore consists largely of magnetite, with sometimes a considerable proportion of hematite. Fine quartz, and probably various silicates, occur through it, giving the ore a finely-banded appearance. Quartz in small and large, often crenulated veins, is common; the mineral also forms comparatively large lenticular-like aggregates. Pyrite is somewhat abundant along narrow zones, and in some instances is very abundant in the foot-wall. At times the nearly pure sulphide forms lenticular aggregates nearly a foot in diameter. Within the ore body were observed narrow, discontinuous bands of nearly pure, fine silicates, perhaps representing altered country rock. In common with the country rock, the ore exhibits a prominent parting, or schistosity, striking about north and south or parallel to the direction of the main axis of outcrop. In the ore itself, this is accompanied by an apparent banding simulating bedding; the zones of quartz veins, of sulphide, and of intermixed or interbanded gangue, all follow the same direction, and all, at least roughly, dip parallel with the walls of the body.

Because of the lack of a sufficient number of natural or artificial exposures, an estimate of the size and general attitude of the ore bodies must largely depend on the evidence furnished by the diamond drill holes, and on the magnetometric survey of E. Lindeman of the Mines Branch. The outcrops are too few and too scattered to yield definite results.

According to the plan of the magnetometric survey, confirmed by the distribution of the natural exposures, the ore bodies lie in three main groups, the longer axes of which, at the surface, run, roughly speaking, north and south.

The body lying west of Austin Brook, and known as No. 1 deposit, is, at its northern end, exposed over its full width. At this point the outcrop had a width of about 150 feet, with sharply defined walls dipping westerly at an angle of about 45 degrees, giving a true thickness to the body of about 105 feet. A vertical drill hole sunk in the hanging-wall near this point, entered ore at a depth of about 40 feet and indicated a true thickness of about 90 feet. A second vertical drill hole bored at a point about 700 feet farther south, intersected ore at a depth of 50 feet, and yielded a calculated thickness of nearly 80 feet. A third drill hole, started at a place about 500 feet west of the last, and inclined toward the east at an angle of 20 degrees, cut ore at an equivalent vertical depth of 410 feet—where the ore body appeared to be about 65 feet thick. The results of the magnetometric survey indicate that the ore body extends at least 1,000 feet farther south, or, over a distance in all, of about 2,000 feet. As far as present knowledge goes, the walls apparently preserve a nearly uniform southerly strike and westerly dip, the angle of dip, in the northern half, being about 45 degrees.

A second body or group of ore bodies, known as No. 2, lies east of Austin Brook, the southern end commencing on the valley slope at a point about 1,000 feet east of the apparent end of No. 1. The course of the axis of the second body diverges about 23 degrees from that of the first. At the southern end a group of outcrops has a maximum width of a little over 40 feet, with nearly vertical walls. The southern extremity is well exposed, and the body is seen to end in a number of irregular fingers projecting into schistose country rock. Northward, ore outcrops at a few points for a distance of about 1,200 feet, and the indications are that the body remains at about a constant width, forming a comparatively narrow band. The magnetometric survey points to a horizon of practically the same length, but containing two ore bodies following one another along the strike.

A third ore body or group of ore bodies, known as No. 3, lies east of Austin Brook, and about in line with the prolongation of the axis of No. 1: commencing at a point about 1,800 feet north of it. Four diamond drill holes have been placed in this body, but the results of one only are at present available. The log of this drill hole, together with the position of surrounding exposures, indicates a body of ore about 100 feet thick, dipping west at an angle of about 75 degrees. In this instance, the drill passed through ore from a point about 20 feet below the surface to one 350 feet beneath it. Exposures of ore occur at the surface over a length of only 300 feet, but the magnetometric survey of E. Lindeman, supplemented by one carried out by Mr. Fulton of the Canada Iron Corporation, indicates an ore-bearing horizon of much greater length: perhaps totalling in the neighbourhood of two-thirds of a mile. It is possible that over this distance the ore may occur in more than one distinct body, and the magnetometric surveys also seem to indicate the existence—along a parallel line a few hundred feet west—of other bodies.

Besides the above main bodies, an outcrop of iron ore was seen in one of the cuttings on the line of the new railway not far above the falls on the Nipisiguit. The presence of other bodies of ore in the district is to be expected, but their discovery is practically possible only by making use of magnetometric methods.

All the information available seems to indicate that, the deposits have the form of beds varying in width from a maximum of 105 feet to a minimum of about 40 feet. In all cases the walls are sharply defined, and dip westerly at angles ranging from 45 to nearly 90 degrees. The three groups of ore bodies do not seem to represent one original one separated into three by faults, since, in the case of No. 2 body, what appears to be an original, natural end, is exposed.

The country rock of the three deposits is believed to be, in the main, quartz porphyry, or as is more commonly the case, a schistose derivative. In that rock the planes of schistosity in country rock and ore are, on the whole, parallel to one another, and to the bounding planes of the ore bodies and lines of banding in the ore. The ore bodies seem to have suffered from the forces producing the schistosity of the country rock, and, at the same time, to have been guided in assuming their positions by the greater degree of schistosity of the country rock along certain zones. The visible end of No. 2 body seems to indicate that the ore penetrates the country rock—not that the country rock was later than, and penetrated the ore.

The invariable presence of a rather high amount of phosphorus in the analyses indicates a considerable amount of apatite, a mineral whose presence in bulk usually indicates a direct or indirect igneous origin, and not a sedimentary origin nor one analogous to that of the more common types of veins. The very general presence of quartz veins in the ore and their absence or comparative uncommonness elsewhere, strengthens the above

deduction, and weakens the argument for a sedimentary origin of these bodies, which their bedded-like forms at first view suggest.

The present conclusion is, that the ore bodies are of pegmatitic types, and that their formation has been due to the action of forces accompanying or following igneous invasion or invasions the results of which are not otherwise apparent; they do not seem to have been directly associated in origin with the quartz porphyry. If this view of the origin of the ore bodies is the correct one, it seems highly probable that their true shapes are those of very flattened lenses; that the depths to which the individual lenses extend will prove to be, on the whole, not much greater than their maximum extension at the surface; and that the lenses will, as they approach their limits, thin out and end—as far as mining is concerned—rather rapidly.

(In the above considerations, the presence of the pyrite has been only briefly touched upon, since study has not sufficiently far advanced to determine, with any degree of certainty, the relative age of this mineral.)

Manganese.

A quartz vein carrying manganite, cuts red slates on the south bank of the Tetagauche above the last road bridge, and only a short distance below the falls on the river. The deposit was worked a number of years ago, but the tunnel leading in on the vein is now caved in, thus preventing any detailed examination. At its outcrop on the steep river bank, the vein is seen, in places, to be at least 13 feet wide, to be nearly vertical, and to be accompanied by roughly parallel, narrow veins. The quartz is coarse, and white in colour; it forms most of the vein, the manganite occurring in narrow seams and small patches or aggregates of plates, or in semi-detached, imperfect crystals or fine grains. The vein is irregular in outline, holds inclusions of country rock, and is much fractured. From information gained from nearby residents, it is believed that during mining operations solid or nearly solid ore was found to occur in pockets. Manganite, in small quantities, also occurs in the dump of several shallow trenches sunk a short distance back from the river, at a point several hundred yards farther down stream.

LOSSES BY FIRE AT BRITISH COLUMBIA MINES.

There was much destruction by fire of surface works at British Columbia mines during the month of July. The first accounts published in district papers and sent out in press despatches made it appear that leases had been large, but later accounts are to the effect that the position is not nearly so serious as was at first stated. However, there has been sufficient damage done to surface works of several producing mines to interfere with the output of ore to some extent, though, fortunately, the instances in which production must be suspended for a time are not numerous.

In the Slocan.

Parts of Slocan and Ainsworth mining divisions situated along the line of the two railways from Kootenay and Slocan Lakes, respectively, to Sandon appear to have been most damaged by fire. According to local accounts, the fire started along the Canadian Pacific branch railway, near Alamo, which is four or five miles on the Slocan Lake side of Sandon. Sweeping up the valley of the middle fork of Carpenter Creek, it reached McGuigan and spread thence over the divide to Bear Lake and on to Whitewater. The chief destruction reported occurred at the following named properties: The Idaho-Alamo, Queen Bess, Payne, Rambler-Cariboo, Lucky Jim, and Whitewater mines. Of the first three, the Idaho-Alamo is stated to have been the only one at which work has been done lately, and it was not on an important scale there. Unfortunately the situation in regard to the other three is quite different, for it had been confidently expected that each of these mines would make a comparatively large output during the second half of the current year; further, the position is much worse in this connection, for the reason that the Kaslo & Slocan Railway was also damaged to a considerable extent, having been rendered quite unfit for use for the six or seven miles of its length over which trains have been running to serve the three mines above mentioned as being detrimentally affected by the big fire.

As to the Kaslo & Slocan Railway—two or there years ago several big trestles along this line between McGuigan and Sandon were so much damaged, chiefly by snowslides, that the Great Northern Railway Company, which owns the line, did not regard the local traffic as sufficient to warrant the large outlay that would have been necessary to put that portion of the railway in good condition, so that trains could be again run to Sandon from Kaslo. So it has been, that for some time McGuigan has been the terminus of the operated part of the line. Now it is uncertain whether the company will replace the bridge and trestles recently destroyed along the length between Sproule's, which is 14 miles from Kaslo, and McGuigan.

Whitewater, situated at the junction of the creek of that name with Kaslo Creek, has practically disappeared, there being scarcely a building left on the site of the small settlement. Included among those burned were two large buildings, for office and residence purposes, erected years ago by the Whitewater Deep Company. The destruction of these, though, is of much less importance than the loss of the concentrating mill, which was situated nearly a mile up the creek, in close proximity to the portals of several adits driven into the mountain in which are the Whitewater and Whitewater Deep mines. This mill was re-started early in June, following suspension of operations consequent on shortness of water at the close of winter and in the early spring. The extent of the stoppage of ore-production will be best shown by mention of the fact that the output of the Whitewater group of mines in 1909 was between 28,000 and 29,000 tons of ore, from which the products shipped were 320 tons of crude silver-lead ore, 3,250 tons of silver-lead concentrate, and 4,360 tons of zinc-silver concentrate. It is probable exploration work will be continued in the mines, but this will necessarily depend upon the decision of those chiefly interested as to rebuilding the mill. Both the Whitewater properties are under lease, the owners being British companies.

Two or three miles beyond Whitewater, on the Sandon side of Bear Lake, which is the headwater of Kaslo Creek, flowing east to Kootenay Lake, and the middle fork of Carpenter Creek, which flows west to Slocan Lake, the Lucky Jim mine is on a mountain rising directly above the railway. (It was here that there was deplorable loss of life, for five men were suffocated by the thick smoke which filled the mine workings to which they had gone when the fire came over the mountain to the tunnel portals.) Some information descriptive

of this mine was published in the CANADIAN MINING JOURNAL of July 1 (pp.396-8), so it is hardly necessary to repeat the particulars thus recently printed. Briefly, it may be said that the lowest adit, driven during last winter and spring, had opened both large ore bodies, and that construction of an aerial tramway, with upper terminal at the portal of that adit and lower terminal with shipping bins alongside the railway, had just been completed. As yet it is not known to the writer what damage was done here by fire, early reports having indicated that a clean sweep had been made of mine buildings and tramways (two), while later statements published are to the effect that only old buildings, which it had been decided to replace by new ones, were destroyed. Further, a commencement has been made to repair the old wagon road from Three Forks to Bear Lake and thus provide a means of getting in building materials pending the rebuilding of railway bridges and trestles so that ore may again be shipped. A comparatively large tonnage of zinc ore of unusually good quality is now available for shipment, and, too, the erection of a concentrating mill at Kaslo for treatment of second class ore was being prepared for, so the railway company will doubtless take this into consideration when deciding its plans relative to the future of its line.

The position at the Rambler-Cariboo mine is especially to be regretted, for the reason that the company owning this property had been engaged for six years in carrying out an extensive plan of underground development and only lately had a stage been reached at which a resumption of production on a profit-earning basis became practicable. A description of this mine was printed in the CANADIAN MINING JOURNAL of July 15 (pp. 431-2), and to this readers are referred. It is sufficient now to add that the most important development work yet done in the Slocan district is that so far advanced in the Rambler-Cariboo, at which most of the mine buildings—modern and comparatively new—were burned. It is decidedly unfortunate that now, when ore bodies have been rendered accessible and preparations made for shipment of ore on a considerable scale, disaster has overtaken the company, and immediate large loss, besides a delay in production that will probably extend over several months, has resulted. It is thought the compressor plant may be made serviceable again; if so it will be practicable to proceed with further development work, which the company has announced its intention of doing as soon as the necessary arrangements can be made. In this the directors are displaying characteristic enterprise, and it is hoped this will result in eventual success, which is well deserved, for their persistence and pluck in developing their mine is worthy of all commendation.

Besides the larger Slocan mines above mentioned, there are several at which operations were on a smaller scale that have been disadvantageously affected by the fire. It is likely, though, that whatever damage has been done to these will be repaired and their operation continued.

Fires in Other Parts.

From East Kootenay, Nelson, and Boundary districts reports were also received of more or less destruction as a result of forest fires. At the St. Eugene lead mine, near Moyie, East Kootenay, the upper terminal of the aerial tramway connecting the upper levels of the mine with the concentrating mill was reported to have been burned, and other damage done. This tramway has served for conveying ore to the mill from the 400 adit and above. Ore from below the 400 down to the 1,800, together with that from all levels opened from the shaft below the 1,800 adit, passes over an electric tramway which, so far as known, was not reached by the fire. It is probable, therefore, there will be little, if any, interruption to operations at the St. Eugene mill.

Part of the pole line for the transmission of electric current to the 15-stamp mill recently completed at the Jewel mine, Long Lake camp, Boundary district, is stated to have been destroyed. This will delay for a time the starting of the mill, but it is not expected that anything more than a brief delay will be the result.

It may be that there were other losses than those narrated in the foregoing statement, but no very serious ones have come to the notice of the writer. It is hoped that with the coming autumn, danger from fire will be less; meanwhile the Provincial Government fire rangers are exercising much vigilance, and district Government agents are empowered to employ all assistance required to meet whatever emergencies shall arise.

THE BRISTOL MINE, PONTIAC COUNTY, QUEBEC.

A joint report, written by Messrs. E. Lindeman, M.E., and G. C. Mackenzie, B.Sc., dealing respectively with the Bristol iron ore deposits and with the magnetic concentration of those ores, has been issued by the Mines Branch, Ottawa.

The Bristol iron mine is situated on the north half of lot 21, range 2, in the Township of Bristol, County of Pontiac, Quebec, about 5 miles northwest of Chats Falls. A standard gauge railway, now in a state of decay, connects the mine with the Ottawa-Waltham branch of the C. P. R.

Operations were first commenced in the winter of 1872-73. A compressor and hoisting plant were installed, and necessary buildings erected. In 1894 the mine was closed, and it is now filled with water.

Geologically the area presents a series of Keewatin schists and gneisses, associated with crystalline limestone and intruded by granites. The magnetite deposits occur in irregular beds and pockets, interstratified with hornblende, calcareous mica, and chlorite schists. The schists are overlaid by highly siliceous mica schists, which are followed by gneiss. The strike of these stratified rocks varies from N. 70 degrees W. to N. 42 degrees W., with a dip towards the north varying from 89 degrees to 35 degrees. The ore bodies are frequently cut by basic granites often showing a strong pegmatitic structure.

Ore.

The ore consists of magnetite, containing in places a considerable amount of hematite. Associated with the ore are hornblendic, micaceous, and chloritic materials, which are distributed through the ore as well as interbanded with it. In places a complete gradation is observable between the magnetite and the gangue. Frequent small patches of iron pyrites are disseminated through the ore.

As the mine could not be sampled, the five largest ore piles were dealt with, five one-hundred pound representation lots being taken.

The metallic iron ranged from 53.75 per cent. to 58.18 per cent.; sulphur from 1.48 per cent. to 2.92 per cent.; and phosphorus less than 0.01 per cent. The average results were: Iron, 55.84 per cent.; phosphorus, 0.005 per cent.; and sulphur, 2.02 per cent. The percentage of titanium is negligible.

The extent of the ore bodies could be determined only by means of magnetometric survey. The following conclusions were reached: The magnetite occurs in parallel

beds and lenticular shaped bodies along the stratification. The association of the magnetite and the gangue materials seems to be very intimate. Numerous intrusions of granite cut the ore bodies into irregular masses and render uncertain their extent in depth. Systematic development by means of diamond drilling will be necessary.

Mr. MacKenzie's report deals with the magnetic concentration of the Bristol ores. General samples running 53.5 per cent. and 51.8 per cent. respectively were treated. The former gave excellent results, the total loss of iron by the dry process being only 3.54 per cent. of that contained in the original crude. Ninety per cent. of the total sulphur was eliminated by the wet process, the loss in iron being hardly 2 per cent.

The second sample gave poorer results owing to the large proportion of hematite contained in the ore.

In the wet test the concentrates were brought up to an iron content of 67.42 per cent., whilst the tailings ran as low as 5.03 per cent. iron.

Mr. MacKenzie believes that the concentrates would be amenable either to briquetting or nodulizing.

OUR EUROPEAN LETTER.

All mining shares very depressed in London. England and the Continent badly hit by collapse of American bull movement and mining shares sold as a consequence. The Stewart discoveries. British capital already forthcoming. Pause in oil. Success of the International Mining Congress. Some of the topics discussed. Steady rise in Rand working costs. The colour line in Transvaal mines.

Exclusive correspondence to Canadian Mining Journal

London, July 20th, 1910.

The eternal mystery as to why market quotations fall when the outlook of the industry represented by the shares is healthy is once more illustrated by the condition of affairs in the mining share markets here. Theoretically and apart from technical market conditions the outlook for South African mining shares is very much as could be desired. Yet day by day prices sag until they are down to extremely low levels. The latest outburst of activity of any kind in this department was the boomlet in Rhodesian shares in March last, and it has to be owned that that boomlet went to an extent not altogether justified by intrinsic values. The reaction appears to have carried along with it all other South African mining descriptions, but the true cause of the general severe dullness must be sought further afield. It is to be noted that the greatest weakness synchronizes with the news that heavy losses had been incurred by big Continental operators owing to the slump in Americans. Paris and Berlin have been ardent supporters of the bull movement engineered from Wall Street and long lists of failures show how heavily the blow fell. As these same Continental speculators have also been heavily interested in South Africans that market has necessarily been sympathetically affected. The reaction in rubber has no doubt also helped to breed a spirit of reluctance to trade. It must not be overlooked, however, that although leading South African shares are 20 to 50 per cent. below their best figures of this year they are very much above the lowest points touched during the extreme depression of the early part of 1909.

A little passing excitement was produced in the minds of mining speculators here when the news of the Stewart gold discoveries in Canada was cabled across, and in a very few days a company was registered here to acquire one of the first four gold mining claims staked out by the discoverers. Of a total capitalization covering one million shares at 50 cents apiece 400,000 were issued for subscription. Fair success appears to have attended this flotation.

General dullness is also shown by the oil section, where the only promotion of any importance recently, has been that of the Coalinga British Oil Company, formed for the purpose of acquiring freehold oil producing lands in California. The share capital is one and a quarter million dollars. In taking stock of the first half of the current year, however, many signs of a new activity are presented. Petroleum prospecting appears to have gone on to an extent never before undertaken, although no great strikes of oil of a spectacular nature have been made. At the moment not much is being heard of Maikop and its oil, and although experts hold that the oil is there in great quantities, the field as a commercial proposition is not yet out of the experimental stage. Geographically Maikop is well placed. It is within fifty miles of the coast of the Black Sea and thus in a position to ship its products to the European and near Eastern markets without fear of competition. Successful wells have been drilled and the fertile nature of the oil sands proved. Storage centres and adequate transport facilities are now required. English promoters are asserted to have obtained the best situated plots on the field and have paid less for them than have people in Baku. It is believed that the development of Maikop with English capital, may mean the establishment of a very large petroleum refining industry in England.

Taking advantage of the activity in oil, Walter R. Skinner of Clement's Lane, London, has issued the "Oil Petroleum and Bitumen Manual" at thirty-six cents. This book gives particulars of three hundred oil companies dealt in here involving a nominal capital of nearly $300,000,000.

The International Mining Congress at Dusseldorf was a huge success and it closed with a decision that the next convention should be held in London in 1915. Altogether eighteen hundred delegates attended and a great number of interesting papers on mining and metallurgical topics were read. The coal dust problems received special attention, and reports from various countries were represented showing what has been done in reference to the cause and prevention of dust explosions. One noteworthy paper appeared to prove that the coal dust danger might be regarded as non-existent whereever there was hydraulic impregnation of the coal face and hydraulic blasting by the Meissner process. With regard to a danger which is quite as serious as fire damp and coal dust, namely, sudden outbursts of carbon dioxide, the only remedy was to prohibit the mining of coal with the pick and to substitute shot-firing.

Interesting details were given by various speakers with regard to recent developments in shaft-sinking. The petrification process, the freezing method and the acceleration of shaft sinking by the use of compressed air-locks were described.

A German paper dealt with face conveyors and it mentioned how in England the scraper type of conveyor had been raised to a high degree of perfection, with outputs increased, and important economies in working effected. Machine coal cutting methods obtained attention and an English bar machine and a German undercutting and nicking machine were favoured. A report on British tests of mining ropes brought out the curious fact that in Great Britain no such tests are required by the regulations. All the same, despite the increasing depths of mine shafts, there had been only 38 fatal accidents in ten years rising from the failure of winding ropes. Severe tests are made by the makers and the steel used when drawn into wire has a breaking strength of from 120 to 160 pounds per square inch.

The need for the unification of mining statistics was emphasized by one delegate and the Congress agreed by resolution that a committee should be appointed in order to get rid of the lack of uniformity in the conception and methods employed in different countries. On the application of electricity to mining and metallurgical requirements many delegates gave information and expressed their views, and special attention was devoted to pumping plants, ventilators and large winding engines. For main shaft winding, from the standpoint of safe working, first cost, and running charges, one German engineer considered the Leonard system the best that had as yet been devised. Figures were also quoted showing the degree of efficiency obtained by Ilgner installations.

Aerial ropeways of great capacity were described in another paper and it was mentioned that the Aumetz Kneuttingen ropeway, which had a length of about seven miles had carried over two and a half million tons of iron ore during the last four years, at a cost of 0.64 cents per ton per mile. With the four-roller double-bogie truck it would be possible under favourable conditions to bring the cost down to 0.38 cents per ton per mile.

General problems of haulage were also raised. Compressed air locomotives for mine railways, it was pointed out, were first employed on a large scale in North America and it was not until quite recently that European mine owners had realized the advantage of compressed air haulage. Immunity from fire and explosion combined with simplicity of manipulation and trustworthy operation were mentioned as leading attractions. A Saarbrucken expert on underground haulage showed that economically working electric overhead cable locomotives designed for single phase, and in some places three phase, current had successfully been applied to work below ground. Extensive use had also been made of motor locomotives driven by liquid fuel, but this expert admitted the desirability of compressed air locomotives in fiery mines.

A number of interesting papers were also read upon metallurgy and applied mechanics. A geological section was also opened where twenty papers were read dealing with a great variety of subjects. These included the mineral resources of Canada, the gold deposits of Abyssinia, the iron supplies of the world, the utilization of water power and the origin of coal.

Supplementing the official figures of the Rand's gold output for June, a private cablegram from Johannesburg gives me statistics relating to the yield per ton, working costs, and profit. This table enables comparison with the corresponding figures for the preceding months of the current year:

	Yield per ton.	Costs per ton.	Profit per ton.	Total profit.
	s. d.	s. d.	s. d.	
January . . .	27 7	17 0	10 7	$4,621,375
February . . .	28 5	17 6	10 10	4,373,730
March	27 6	17 1	10 4	4,568,795
April	28 1	17 6	10 7	4,636,220
May	28 3	17 6	10 9	4,791,735
June.	28 1	17 9	10 5	4,605,680

It will be seen that the June ratio of working costs was the highest of the year, but the profit ratio was not quite the lowest.

I learn from an entirely trustworthy source that the recent Commission on mining regulations has drafted some very important proposals applying to all mines in the Transvaal, which will be recommended to the Government. One suggestion is that only white men shall in future receive blasting certificates and that only competent white men shall be allowed to be in charge of boilers, engines, and machinery. The existing rules draw no colour line and a number of coloured men now hold certificates.

Stringent regulations are proposed to safeguard the health of the men underground. All dusty rock must be damped, and no person suffering from tuberculosis or disease of the respiratory organs shall be permitted to work underground. Some suggestions made with the idea of preventing accidents lay down the principle that no incompetent or inexperienced man shall be allowed to take part in dangerous work. The hours of work underground are limited to eight a day, exclusive of the time occupied in reaching work and returning to the surface . If adopted, these regulations will have a most important effect upon the mines of the Rand from the standpoint of the white miners.

RHODESIAN GOLD OUTPUT.

The total output of gold from Rhodesia for the month of June is cabled as 51,016 ounces, valued at £214,709, as against 53,419 ounces, valued at £224,888, in the previous month. This is a decrease on the month of £10,-179. There were 195 gold producers last month. The output of other minerals for last month was: Silver, 19,-318 ounces; lead, 67 tons; coal, 15,191 tons; copper, 3 tons; chrome ore, 5,901 tons; asbestos, 70 tons.

The following table shows the monthly gold returns in sterling since 1908:

Month.	1908.	1909.	1910.
	£	£	£
January	199,380	204,666	227,511
February	191,636	192,497	203,888
March	200,615	202,157	228,385
April	212,935	222,700	228,213
May	223,867	225,032	224,888
June	224,920	217,600	214,709
July	228,151	225,234	.....
August	220,792	228,296	.....
September	204,262	213,249	.....
October	205,466	222,653	.....
November	196,668	236,307	.....
December	217,316	233,397	.....
Totals	2,526,007	2,623,788	1,327,594

The annual consumption of coal in Canada is approximately 20,000,000 tons. Of this quantity the United States supplies slightly more than 50 per cent.

KOPPERS' BY-PRODUCT COKE OVENS AND DIRECT AMMONIA RECOVERY PROCESS.

A high stage in the advance of coke oven construction has been attained by the Koppers' by-product ovens. That the industry appreciates its merits is fully evidenced by the increasing number of ovens built of this type. In the short period of seven years since this oven was introduced, there has been erected and under construction, by the various branch offices of H. Koppers, located at Joliet, Ill.; Sheffield, England; Paris, France; Vienna, Austria; and Essen, Germany; a total of over 5,600 Koppers' ovens. The greater part of this business has been in Germany, where the oven was introduced, and where it has easily displaced all other types; and the oven has proven so successful that it has also found favour generally throughout Europe and America, as well as in Australia and China. In the United States, the United States Steel Corporation decided in 1907 to build a by-product coke oven plant in connection with its blast furnaces at Joliet, Ill. Accordingly a committee was sent to Europe to investigate the relative merits of the different by-product coke ovens in use in Germany. Upon their recommendation, a plant of 280 Koppers' by-product ovens was built in Joliet. The results of this installation were so satisfactory that this Corporation in 1909 began the erection of a plant of 560 Koppers' by-product ovens at its new steel plant at Gary, Ind., and has just begun work on a third plant of 280 Koppers' ovens at Birmingham, Alabama. In addition to these orders from the United States Steel Corporation, the American branch of H. Koppers' has built 86 ovens in Mexico, and has under construction 110 ovens at Sault Ste. Marie, Ontario, for the Lake Superior Iron & Steel Corporation, and 60 ovens for the Woodward Iron Company, at Woodward, Ala., making a total of 1,376 ovens in America in the short period of three years.

To make such rapid strides, this oven must possess some peculiar and noteworthy advantages. One primary advantage must necessarily be the high quality of coke produced. In addition to this distinctive advantage the construction of this oven is such that it excels in economy of fuel consumption, thus yielding a larger percentage of surplus gas. These are the essential points of superiority of the Koppers' by-product regenerator coke oven.

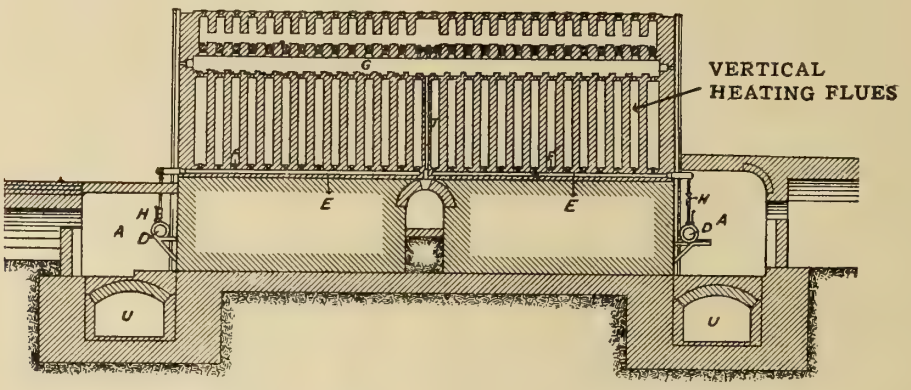


Fig. 1. Longitudinal Section of Koppers' Oven, showing Vertical Heating Flues.

Koppers' System of Heating Flues.

To make a good, homogeneous quality of coke, an oven must necessarily be uniformly heated; and the Koppers' oven design accomplishes this result to a nicety. The ovens are heated by the combustion of the gas in flues which are so arranged that the walls of the ovens are equally heated throughout their entire length. This is accomplished by a large number of gas burner nozzles, there being one burner for each vertical flue and thirty flues on each side of each oven. Therefore, each oven is heated by the combustion of the gas at sixty different points. Consequently the charge is subjected to exactly the same intensity of heat at all points, and the desired uniformity in the quality of the coke is secured. With so many burners, we might expect a complex design and

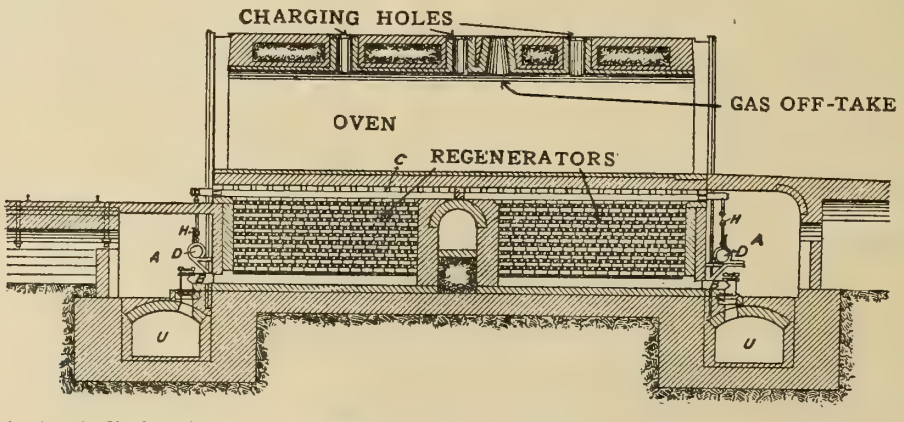


Fig. 2. Longitudinal Section of Koppers' Oven, showing Oven Chamber and Koppers' Patent Cross Regenerators.

difficulty in regulating the combustion at so many different points. But we find that the Koppers' oven is simple in design, and the combustion in the heating flues is most easily regulated. The burners are all readily accessible for inspection, or adjustment, by means of openings into the vertical heating flues, on top of the battery of ovens. An additional advantage gained by this uniform distribution of heat is the shortening of the coking time, thus increasing the efficiency of the ovens.

Fuel Economy.

In the by-product regenerator coke oven, the gases evolved from the coal are conducted to the condenser and saturator house, where the tar and ammonia are recovered. Some of the cleaned gas is then returned to heat the ovens. The balance of the gas, or surplus gas, is available for power purposes or for distribution to domestic consumers. It is in the percentage of surplus gas that the different types of ovens essentially differ from each other. The Koppers' oven, because of its improved system of heating flues and its efficient regenerator chambers, is remarkably low in its fuel consumption, and the yield of surplus gas is 50 to 60 per cent. of the total quantity evolved from the coal.

Koppers' Patent Cross Regenerator System.

In this type of oven, the Siemens regenerator system has been admirably adapted to coke oven construction. The usual form of regenerators consists of two long chambers running the whole length of the battery of ovens. In case of any repairs to the regenerators, this arrangement necessitates the whole battery of ovens being shut down. To obviate this disadvantage and also to enable the hot air to be still more satisfactorily distributed among the heating flues, the Koppers' new system of regenerators was introduced. In this system there is a separate pair of regenerators for each oven in the battery. During a period of 30 minutes air is admitted into the regenerator at one end of the oven and after being heated by contact with the hot checker brick in one-half of the regenerator, it enters the vertical heating flues, where it unites in combustion with the gas entering the flues throughout one-half of the oven length. The products of combustion pass up these heating flues and down the vertical flues throughout the other half of the oven length, then through the other half of the regenerator, and finally through a flue to the stack. In their passage through the regenerator the waste gases heat the checker brick, and after 30 minutes, the gas valves and air dampers are automatically reversed, and during the next 30 minute interval cold air and gas enter at the opposite end of the ovens, the brick in that half of the regenerator, and combustion takes place in the vertical flues, which during the previous period served for the passage of the waste gases to the regenerator. The principal advantages of the Koppers' cross regenerator over the long regenerator type is that it permits of a better regulation of the air supply of each oven, and this air is heated to a higher temperature, thus promoting fuel economy.

Strong Construction and Minimum Repairs.

The construction and working of the Koppers oven is exceedingly simple, and its design is such that it is stronger than any other system. The oven walls consist of a series of hollow columns reaching from the bottom to the top of the structure. Added to this, the uniformity and regularity of heating is conducive to a long life and a low repair account. With all of these points

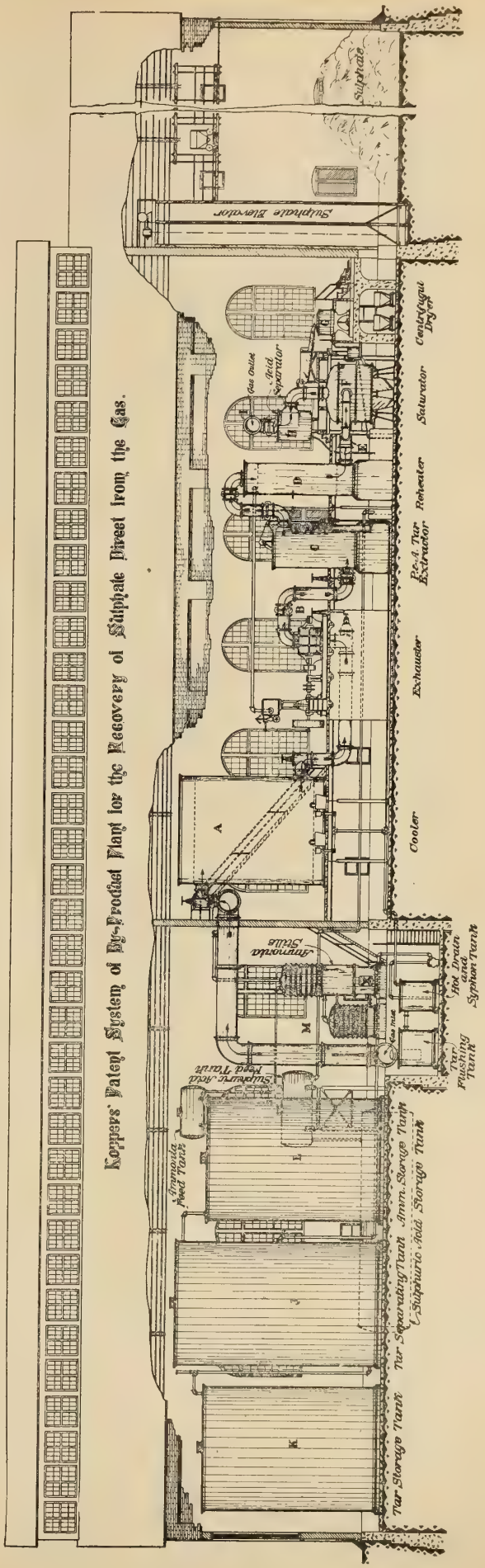


Fig. 3. Koppers' Patent System of By-Product Plant for the Recovery of Sulphate direct from the Gas.

of superiority we can readily understand why this type of oven is being built so extensively.

Koppers' Direct Process of Ammonia Recovery.

Passing from the ovens to the by-product plant, we find that here also there has been decided improvement in methods and results. The Koppers' patented direct process for the treatment of the gas and the recovery of ammonia has been installed in 28 plants, including 2,693 Koppers' by-product ovens. In the old system of gas treatment, the gas was first cooled in condensers to remove the tar and was then washed, or scrubbed with water, in a series of scrubbers, to remove the ammonia. The ammonia was collected as a solution of weak ammonia liquor. This weak liquor was then concentrated by treatment with steam in ammonia stills. The product from the stills was either in the form of concentrated liquor, containing 15 per cent. to 20 per cent. of $N H_3$, or the hot concentrator vapours were passed into sulphuric acid saturators to form ammonium sulphate salt.

In the Koppers' direct process, all of this is very much simplified, a larger yield of ammonia is recovered from the gas, and a superior quality of ammonium sulphate is produced.

In the Koppers' direct process, the tar is removed by condensation in a tubular condenser and by mechanical friction in a P. & A. tar extractor. The gas free from tar and at a temperature of 90 degrees to 100 degrees F., is then reheated by passing through a re-heater, the heat being supplied by the exhaust steam from the exhauster, which apparatus pumps the gas with a constant vacuum from the ovens and forces it through the by-product apparatus. In the re-heater, the temperature is raised to 155 degrees to 165 degrees F., at which temperature the gas passes directly into the sulphuric acid saturator. Here all of the ammonia in the gas unites with the sulphuric acid in the bath and is recovered directly as ammonium sulphate. The gas, free from tar and ammonia, next passes into the balancing holder, which forces some of it back to the oven burners to heat the ovens. The balance of the gas, amounting to from 50 to 60 per cent. of the total, is available for gas engine fuel or other purposes. If it is desired to market this surplus gas to domestic consumers, it is necessary to pass it first through iron oxide purifiers to remove the sulphur existing as hydrogen sulphide, and then into a storage holder supplying the distribution system.

Koppers' direct process has many advantages over the old system of gas treatment. Besides being a much simpler process, it is decidedly more economical in operation. In this process, the only ammonia liquor to be handled is that which condenses out of the gas in the foul gas main, coolers and tar extractors; while in the old system, the gas is scrubbed with water to dissolve out the ammonia, thus producing large volumes of ammonia liquor to be stored and concentrated, before the ammonia can be absorbed in the saturator. All this handling of ammonia liquor results in more or less loss of ammonia. Therefore, we can readily understand why the direct process gives a much higher yield of ammonia per ton of coal. Also, the expense of recovering ammonia by the old system is much greater than by the direct process, this being due to the large amount of ammonia liquor to be pumped and concentrated in the old system.

Our admiration for the simplicity and economy of operation of the Koppers' direct process, and for the efficiency of the Koppers' by-product regenerator coke ovens is so great that we feel that the industry must be congratulated on the progress made along these lines.

BITTER CREEK, B.C.

The Director of the Geological Survey has just received a report by Mr. R. G. McConnell on the recent discovery of gold on Bitter Creek, Stewart, B.C. Mr. McConnell, who is one of the best known members of the Geological Survey staff, has been in the Portland Canal district since the spring, making a geological survey of the district. He has just examined the new discovery at Bitter Creek, concerning which very exaggerated accounts have been circulated.

Mr. McConnell states that "the discovery was made on the precipitous sides of a mountain built of slates or shales with occasional graywacke bands, seamed horizontally with numerous granitic and dioritic dykes some of them 20 to 30 feet thick. The slates dip at an angle of 40 degrees and are fairly regular. The ore occurs in zones following generally the dip and strike of the slates but cutting them in places at a low angle. The principal zone has a thickness at the only place where it is accessible of about 15 feet and consists of silicified slate and quartz carrying more or less iron pyrites. In places layers of almost pure iron pyrites occur. A red zone at about the same elevation (600 feet above the glacier) can be seen at intervals running horizontally along the mountains for a distance of about 3,000 feet. It is interrupted by several rock slides, and for most of its course passes along inaccessible cliffs. The width of the zone ranges from 5 to about 20 feet.

"Assays made here from specimens brought in by prospectors are reported to run from $3 to $8 in gold per ton. Some rich assays were obtained from oxidized float, but these of course do not mean much.

"Besides the main zone several other similar silicified zones, none traceable for any great distance, outcrop at various points on the mountain slope. The principal mineral in all of these is iron pyrites, with occasionally a little chalcopyrite and at one point a small seam of galena.

"Vein matter in the mountains is abundant, but the contained values, so far as known, are low, so low that it is still doubtful if they could be extracted at a profit. The ore occurrences are, however, promising enough to justify some expenditure in exploration. The mountain has not been thoroughly prospected, in fact, most of it could only be prospected with the aid of a balloon. Good looking float is abundant in the slides, and there is a good chance of finding richer shoots than any yet discovered.

"The transportation question, if pay ore in quantity is discovered, has its difficulties, but these could be overcome if the deposits prove valuable. The valley is filled with a glacier from half a mile to a mile in width, which extends down for three miles below the discoveries. Farther down snow slides sweep both sides of the valley at a number of points. The grade on the three miles of glacier is 700 feet to the mile, and on the lower 6 or 7 miles to the Bear R. Forks 100 feet to the mile."

The above substantiates the opinion expressed by the Survey concerning the first exaggerated accounts, namely, that it would probably be found that the discovery, while affording encouragement to prospecting does not justify a wild rush into the camp. It is a rugged Alpine country, hence somewhat dangerous for tenderfeet unaccompanied by an experienced mountaineer.

THE CLAY AND SHALE DEPOSITS OF NOVA SCOTIA AND PORTIONS OF NEW BRUNSWICK AND PRINCE EDWARD ISLAND.

(Continued.)

Coal Measures.—These represent the most important clay and shale-bearing formations of Nova Scotia, and were carefully examined in the several areas in which they occur. The largest is the Sydney field, of Cape Breton, and extends from the Big Bras d'Or Channel to Cow Bay, with only one important interruption, at Cape Percy on the northeastern shore of Cow Bay, where the Millstone Grit cuts out the Coal Measures.

Owing to the almost uninterrupted line of cliffs which fringe the shore-line, a fine series of exposures was obtained. The Sydney coal field is cut into several parts by somewhat deep northeast-southwest bays; which has rendered it difficult for geologists to correlate the sections of the several subdivisions of the field. It can be said that the coal seams are interstratified with a series of shales and sandstones. These are bent into a number of gentle folds, forming the bottom of a broad trough which dips out under the sea. Throughout the field, therefore, low dips prevail. This gives the beds broad outcrops, but still the dip is sufficient to carry the bed rapidly under cover. Toward the northwestern and southeastern parts of the field the sandstone beds predominate, and the shales are of poorer quality, but in the central portion the shales are as abundant as the sandstones. The shales themselves range from smooth, fine-grained, plastic ones, of grey or red colour, to others which are quite siliceous in their character, and of doubtful value. One important deposit is found underlying a large portion of Cranberry head, near Sydney Mines. It is a smooth, greyish shale, and may prove of value for vitrified wares. In the final report it will probably be referred to as the Cranberry Heay type, as it appears at a number of points. A second type found at a number of localities in the Nova Scotia Coal Measures is a somewhat soft, reddish shale, well exposed along the shore just west of Cranberry Head type, as it appears at a number of points. siliceous in appearance and touch, and it would be unwise to express any definite opinion on them until the tests have been completed.

It seems curious that up to the present time these shales have been completely overlooked; and while it is true that they do not occur in deposits of great thickness, still they are easily accessible, and are capable of supplying a considerable quantity of raw material.

Numerous references to fireclays in the Sydney field have been published, but as far as we were able to ascertain, this region does not contain any high grade fire-clays, although some of them may prove to be low grade. Unfortunately most coal miners have formed the habit of calling any "under clay" a fire-clay.

Pictou Field.—In this field there are numerous shale beds associated with the coal seams, but they are best developed in the central portion of the area, and the most important known up to the present time are higher up in the section than the coal beds. Many of these shales when ground and mixed with water are of strong plasticity, but they unfortunately contain such a high percentage of carbonaceous matter as to require great care in burning, and some of the shale beds are too high in carbonaceous or petroliferous matter to be used at all; while others have to be avoided on account of the abundant siderite concretions; but in spite of these disadvantages, the field is an important holder of commercially valuable shale deposits. In some parts of the section, as along Coal Creek, south of the Allan shaft at Stellarton, the beds of shale are occasionally quite free from carbonaceous material. In only one instance is an under-clay worked, viz., at the Drummond Colliery at Westville, where a hard shale is mined for the manufacture of bricks. The most important utilization of the shales is near New Glasgow, where they are made into common and pressed brick, flue linings, sewer pipe and drain tile. Pleistocene drift clay is sometimes added to the pipe mixture.

Inverness Field.—This small field carries a number of shale beds associated with the coals, but few of them are of great thickness; indeed, none of them are equal in volume to those worked in the Pictou area. A good bed outcrops on the shore a few hundred feet south of the dock, and a plastic shale is said to underlie the 7-foot coal. Most important, however, is the bed of grey, plastic clay which overlies the 13-foot seam, and is found at several points where that seam is cut through by streams. It is, probably, a No. 2 fireclay, and varies in thickness from 18 inches to 3 feet. If the tests prove it to be of refractory character, it would be practicable to work it in connection with the coal.

Port Hood Field.—Here, too, there are scattered shale occurrences in both the Millstone Grit and Coal Measures; but the most important is along the shore a short distance north of Judique harbour, where a bluish-grey shale, with a vertical dip, and about 8 to 10 feet thick, outcrops for some distance along the shore.

Joggins Area.—This field contains a number of thin shale seams interstratified with sandstone in the Coal Measure rocks, but few of them are of any thickness. The most important, perhaps, is south of McIntyre Brook; while a second one, of possible value, underlies the coal seam at Joggins.

Pleistocene Clays.—These may be roughly divided into two classes: (1) glacial clays, usually of stony character ,but very plastic, tough, and red burning; and (2) marine clays, often strongly laminated, but also quite plastic and red burning. These two types of clay are rarely used for anything but drain tile and common brick. A few pressed bricks are made from them, and the smoother ones could be utilized for the manufacture of common ornamental terra cotta and cheap art pottery. The marine clays are best developed in the Annapolis and Shubenacadie Valleys, while the stony, glacial clays are worked mainly in the Cape Breton region.

A most remarkable clay, and one of undetermined age, is that found at Shubenacadie and in the Musquodoboit Valley. The material is a highly-plastic clay, of dark grey, white, or mottled red and white colour, lying beneath the glacial drift, and resting, possibly, on bedrock. Its thickness, as indicated by a series of borings made by Mr. Keele, ranges from 7 to probably 50 feet. Scattered lumps of lignite were found in the clay at Shubenacadie, and it is hoped that the age of these can be determined.

It is exceedingly difficult to determine the exact area underlain by this deposit, owing to the heavy mantle of glacial drift covering the region; but the fact that the material is found at several points extending over a dis-

tance of 7 miles, indicates its probable extent, unless some of the masses have been pushed along with the drift. Borings could, of course, only be made at those points where the drift cover was thin or absent.

The clay burns to a cream colour, and fairly dense body at a comparatively low temperature. It is at least semi-refractory in its character, and may prove to be a stoneware clay. Some test bricks were made from a carload lot of this clay, taken from a shaft sunk in the deposit at Shubenacadie.

It is safe to say that nothing like it has been found elsewhere in Nova Scotia, and its resemblance to some of the Cretaceous fireclays of New Jersey is striking.

New Brunswick.

As most of our time was required for the examination of the Nova Scotia clays, but little of the field season was left for New Brunswick. Several localities were examined, and the following is a condensed statement of the results.

In the vicinity of Albert Mines, in Albert County, there are some very promising beds of Devonian shales, which are probably of red burning character. In the event of the oil-shales at that locality being developed, these shales will be of importance for brick manufacture, but aside from this, they may prove to be of value for making pressed brick to be shipped to other markets. Nearby there are also red burning shales of lower Carboniferous age. Some of the latter are located along the line of the railway.

Many shale deposits, some of which may prove to be of refractory character, are associated with the coal deposits around Minto and Chapman, north-east of Grand Lake. Similar shales underlie and overlie the coal 12 miles south-east of Harcourt.

Marine clays are worked for common, and some pressed brick, at both St. John and Fredericton.

Prince Edward Island.

The only clay resources of Prince Edward Island are of Pleistocene age. Common brick clays are found at a number of points, but are worked to but a slight extent.

Clay Working Industry.

Up to the present time, the clay deposits of Nova Scotia have been but little developed. Common bricks are made at Annapolis, Middleton, and Avonport in the Annapolis Valley region, and at Shubenacadie, and Elmsdale in the Shubenacadie Valley. Other yards are in operation at Sylvester, New Glasgow, Pugwash, Eden Siding, and Mira River. In most cases these are operated to supply a rather local demand, although the Annapolis and Pugwash bricks are sometimes shipped some distance by water. Common pottery is made from the smoother sections of the surface clays south of Elmsdale. Most of the common brickyards re-press a few bricks. A hard brick, known in the trade as a firebrick, but not really such, is made from the Carboniferous shales at Westville. Sewer pipe, flue linings, and drain tile are made from the shales at New Glasgow; and some drain tile is manufactured in the Annapolis Valley by the same firms that produce brick.

It will be seen, therefore, that there is considerable room for expansion. If such development occurs, the markets will be mainly outside of the province; except for common brick. At present the buildings in that region are constructed mainly of wood; but as the supply of this becomes scarcer and more expensive, brick must be utilized as a substitute. For outside markets, the plants should be located as near to water as possib to avoid rail shipment.

It is hoped that the studies of the samples now bei carried on will demonstrate the value of the clay a shales for making pressed brick, vitrified brick, earthe ware, and perhaps stoneware, sewer pipe, etc.

THE FOLSOM DREDGE WORKING PLACE GROUND IN CALIFORNIA.

By Frank C. Perkins.

The accompanying illustrations show a moder dredge working placer ground in the Folsom distri in California, and it is stated that it has been mo successful in its operation, working with great econ my and rapidity. This gold dredge is said to have



Folsom Dredge.

capacity of 150,000 cubic yards per month, although i is maintained that this class of ground is exception ally hard to dredge. It is maintained that the machine could handle nearly 200,000 cubic yards per month in ground containing less cement.



Folsom Dredge.

It is of interest to note that the buckets of this gold dredge are of 8½ cubic feet capacity. The circular screen utilized in this work for sizing the gold-bearing particles is thirty-six feet long and measures over all about seven feet wide. This gold dredge was constructed at San Francisco, California, by the Western Engineering & Construction Company.

Mr. John Reddington has been appointed general manager of the Cobalt Provincial Mining Company. Mr. S. N. Graham, who was formerly in charge of the El Favor mine, Jalisco, Mexico, is superintendent.

CANADIAN MANUFACTURERS ASSOCIATION.

An Organization of Direct Service and Tangible Results

"The manufacturers must hang together lest they hang separately." In these terms—an adaptation of John Locke's famous definition of Government—a well-known Toronto professor tersely set forth the basic principle of the Canadian Manufacturers Association in addressing that body two years ago. A manufacturer battling single handed against an increase in freight rates or against legislation which threatens the ruin of his business is like a voice crying in the wilderness. His opponents strongly entrenched in their position, presenting a solid front and well backed by capital and influence, can easily dispose of their lone adversary. His arguments, sound as they may be and ably presented, fail to carry the day. But let our lone friend secure the co-operation of his fellow-manufacturers in the same town, or in the same trade and at once there is a difference. The railway company, let us say, is prepared to reconsider its position, friendly discussions take place, and ultimately a compromise is arranged that is mutually satisfactory.

History of the C. M. A.

Firmly imbued with the idea that union would bring strength, the manufacturers of Canada nearly forty years ago banded together to defend their interests. This was in the lean years of trade depression following the abrogation by United States of the Reciprocity treaty in 1866. United States had imposed quite a high tariff against Canadian goods, while Canada allowed United States products to come into Canada under a low revenue tariff. The policy of protection for home manufactures was decried on all sides, and the few manufacturers then established wielded but little influence. Conditions grew rapidly worse. With a view to devising some means of ameliorating them, meetings of the manufacturers were held as early as 1871. By 1873 the organization had taken definite shape under the name of the Ontario Manufacturers Association, with Mr. Joseph Simpson, of Toronto, as its first president. The next few years were devoted to educating the Canadian people to the importance of developing home industries under a policy of tariff protection. The triumph of the National Policy in the elections of 1878 affords convincing proof that the seed was well sown by these pioneer manufacturers and that it took good root. The eighties saw a tremendous development in the manufactures of the country. This development has continued with some temporary setbacks, down to the present day and seems likely to continue for many years. With prosperity abroad through the country the Manufacturers Association flourished. The Montreal captains of industry joined forces with those of Ontario about 1880. Under the aggressive secretaryship of Mr. Frederic Nicholls, now general manager of the Canadian General Electric Company, the association branched out in new directions, although protection was still the paramount issue.

Membership.

During the nineties the association fell away somewhat in membership and influence. In 1899, however, a reorganization was effected and under capable management it immediately took on new life, entering on its present broad sphere of usefulness. It became a national organization in the fullest sense of the word. With a membership extending from coast to coast, the "Made in Canada" policy was proclaimed throughout the land and advocated with a vigour never known before. The membership increased by leaps and bounds. From a scant 137 in 1899, located chiefly in Ontario and Montreal, it grew to 1,800 by 1905, while to-day it reaches the surprising total of 2,615, embracing all kinds of industries and scattered throughout every part of the Dominion.

Transportation Department.

The rapid growth in membership brought financial strength and greater influence. It paved the way for the establishment of special departments to handle difficulties common to all manufacturers. The transportation problem looms large in every industrial enterprise. It is surrounded with intricate regulations and tariffs which only a trained railway man can decipher. Very often the shipper does not know how he is affected by the alteration of a schedule until it is too late to protest. The adjustment of a simple claim for damages is fraught with uncertainty, because the shipper is ignorant of the terms and classification where the railway official is dealing with something he knows intimately. The transportation question was a live one in the association before the reorganization, and as soon as the sinews of war were available it was decided to retain a railway expert to assist members, individually and collectively, in their fight for better shipping conditions. The creation of the Dominion Railway Commission about this time made it absolutely necessary for the manufacturers to appoint a qualified railway expert to look after their interests in this field. When the railways propose a change in rates, invariably calculated to bring them an increased revenue, their case is well prepared, and ably presented by men who are thoroughly familiar with every detail of the transportation question. To protect their interests, therefore, it became essential that the manufacturers should have the same expert assistance. For years the Canadian Manufacturers Association was the only force in Canada in a position to battle effectively against the railways. Imitation is the sincerest form of flattery. Its success through retaining a railway expert prompted the Winnipeg Board of Trade a few years back, and the Montreal Board of Trade last year to follow suit, while it is expected that the Toronto Board of Trade will also fall in line shortly. With the creation of the transportation department, the association was in a position to render direct tangible services to its members. In addition to giving information and advice on transportation problems generally, the transportation expert, in the last resort, will adjust claims for members, many of whom can testify to the effectiveness of his work in this respect.

Fire Insurance Department.

Fire insurance is another subject which interests all manufacturers. In this field, too, the association places at the disposal of its members expert knowledge and assistance in the fight for better rates. Risks are inspected and rated, and if the insurer wishes, his entire insurance is arranged by the association's expert with a minimum of expense and trouble. Remarkable savings have been effected by many members who have entrusted their insurance to the association's adviser.

No other business organization in Canada retains an expert to offer its members absolutely disinterested advice on the insurance problem. Out of the work of this department has developed two strong mutual companies. They are pioneers in factory mutual insuraance in Canada. Organized and operated along the lines laid down by the famous "New England Mutuals" their success now seems assured. In them the manufacturer secures insurance absolutely at cost. The insurance department has just concluded a long and successful fight against those clauses in the insurance bill which aimed at prohibiting unregistered mutual companies, such as the New England Mutuals, from accepting risks in Canada. The successful culmination of this fight means a saving of thousands of dollars yearly to factory insurers in Canada.

Tariff Department.

Two years ago the association further added to its facilities for direct service to the members by establishing a tariff department. It was fortunate in securing for this work a member of the Civil Service, whose twenty years' experience in the customs department at Ottawa gave him a knowledge of the Canadian tariff equalled by few. All enquiries regarding the tariff are answered fully and correctly. Members who have tariff difficulties of any kind refer them to the tariff expert and are assured that they will be capably handled. This service is absolutely unique in Canada, but its effectiveness has been demonstrated on many occasions. Tariff statistics and tariff information for all the civilized countries of the world are also available for members who require it.

Legal Department.

Only a few months ago the association branched out in another field. A solicitor was retained to act as legal adviser to the Parliamentary Committee. For many years the association's legislative work has been more or less hampered by the lack of adequate information about the laws of the various provinces and of the Dominion. With a lawyer on its staff the association is now in a position to investigate from the legal side every measure introduced in the parliaments of the country. The effectiveness of its work will, as a result, be materially increased. While the legal expert has been retained primarily to advise the Parliamentary Committee, information along certain lines will be furnished to members, but litigation will not, of course, be entered into.

Legislative Work.

The association, alone in Canada, maintains a service to watch legislation throughout the country. Every bill introduced in any legislature or at Ottawa is carefully checked over and if action is considered advisable to oppose or advance it in the interest of the members it is taken immediately and with the greatest possible effectiveness. A perusal of the newspapers when our legislative bodies are in session indicates the necessity of work of this kind. The association is, of course, not always successful, but at the close of each year it can point to many results which have benefitted its members. As far as organized labour is concerned, the association opposes it freely in the legislative field, but is not a strike-breaking organization in the same sense as the Employers Association. The great majority of its members are firm believers in the "open shop," but this is not a condition of membership, and several firms running under "closed shop" conditions are members.

Other Direct Services.

Firms interested in export trade can always secure general commercial information, lists of prospective buyers, agents, etc., through the association. Special reports are prepared on the market for Canadian commodities in any foreign country desired, and facilities are provided whereby members can obtain reliable credit reports on foreign customers at nominal cost. Quite a number of members have secured profitable foreign accounts through connections formed through the association. A free translation bureau is also maintained for the benefit of members. In fact the association acts as a general commercial information bureau and its services in respect to information concerning manufacturers are at the disposal of the general public.

Organization.

The association's official governing body is known as the executive council and is elected at the annual convention. Its members are chosen from representative industries and representative localities. The council meets once a month and is assisted in its work by various standing committees which guide the different departments in their work. Branch organizations flourish in the principal cities, numbering eight all told. These deal finally with matters of purely local interest and report their views to the council on questions of general interest. In addition there are about thirty trade sections organized to deal with questions that concern their respective trades. Some idea of the rapid growth and present size of the organization may be formed from the fact that the permanent staff has grown from a secretary and one stenographer in 1899 to an even thirty to-day, all of whom are devoting their whole time to the work. The association publishes an official organ known as "Industrial Canada."

In sketching the history of the association, it was made clear that its foundation was based on the tariff question. It was maintained and directed for many years solely for the purpose of building up a strong protectionist sentiment in Canada, and notwithstanding the recent statements of certain journals with free trade leanings the tariff question is still a vital issue in the association. It is the only body in the country fighting in behalf of the industries of Canada and without its restraining hand many of them would lose the tariff protection that now enables them to exist. Of course the increased attention the association has given to the transportation problem and the other problems manufacturers are confronted with of late years, has detracted to some extent from the tariff issue. In the old days protection was the sole issue in the association. To-day it is an important question, it is true ,but not the only question manufacturers are interested in. With reciprocity negotiations pending, it will become more prominent in the association in the next few months.

With many of its policies condemned by a section of the press, the free trade west, and very often by organized labour, the Canadian Manufacturers Association has no bed of roses to lie in. Much of the opposition is due to ignorance. The association is by many dismissed in a word, "High Tariff." Its critics do not stop to consider what it has done, and is doing to secure better freight rates and shipping conditions, better insurance rates, and fairer laws for the transaction of business throughout the various provinces. Its direct services to its members and to the country are overlooked. From these unfriendly and prejudiced critics it asks only fair examination.

It is the manufacturers' own organization. They recognize in it a wise investment yielding large dividends. It has flourished now for over a generation, and these is no reason to believe that it will not continue to flourish in the years to come. To-day it is Canada's strongest and most representative national organization.

H. D. Scully,
Assistant Secretary,
Canadian Manufacturers' Association.

August 8th, 1910.

UNITED STATES NAVY TO TEST PACIFIC COAST FUEL.

While there is nothing to indicate whether or not British Columbia coals will be included among those to be tested, the possibility of their being so may cause interest to be taken by British Columbia Coast coal mine owners in an announcement contained in correspondence from Washington, D.C., relative to intended fuel tests to be made by vessels of the United States navy, published in the New York "Engineering and Mining Journal" of July 23rd. The correspondent of the "Journal" says: "The United States Navy Department has determined upon an experiment to test the steaming power of representative Pacific coast coals and will direct the making of the tests on board of one of the larger cruisers on the Pacific coast early next autumn. The test will be intended to show the comparative value of the northwestern coal as fue land should it prove satisfactory, it may result in a change of policy leading to the bandonment of the recent plan of shipping to the coast the Pocahontas and other coals heretofore in vogue. The action of oCngress in setting aside 10,000 acres of Alaska coal land for the use of the navy was taken in pursuance of recommendations based upon the desire of the department to supply itself more largely with Pacific coast fuel for the future."

PERSONAL AND GENERAL.

Mr. J. J. Harpell sailed for Toronto from England on August 6th.

Mr. J. C. Murray has been in Nova Scotia for the past two weeks.

Mr. J. B. Tyrrell is just leaving for a short visit to London, England.

Mr. Julius Lewisohn spent some time in Cobalt recently examining the Kerr Lake property.

Mr. Robert R. Hedley left Vancouver, B.C., recently on a trip to the Skeena River and Portland Canal districts.

Mr. Gordon Pharo has been appointed manager for the British and American Asbestos Company at Robertson, Quebec.

Mr. Alexander Dick, general sales agent of the Dominion Coal Company, will have his headquarters at Montreal.

Mr. O. N. Scott has returned to Toronto. Mr. Scott is still connected with the Cobalt Provincial Mining Company.

Mr. Harold Parker, of Thetford Mines, Que., has accepted the position of superintendent of an asbestos mine in Wyoming.

Mr. S .S. Fowler, general manager of the Canadian Metal Company, has returned to Riondel, B.C., from a business visit to Europe.

Mons. J. de Perpigna recently arrived at Kaslo, B.C., from France to supervise the installation of plant and machinery at the Joker group mine, at the head of the south fork of Kaslo Creek.

Mr. Neil McL. Curran's resignation as manager of the North Star mine, owing to ill-health, caused by lead poisoning, has lately been announced by the directors of the North Star Mining Company.

Messrs. J. B. Tyrrell, H. E. T. Haultain, F. D. Adams, J. B. Porter, W. H. Aldridge and W. H. Trewartha-James have been re-elected Corresponding Members of the Council of the Institution of Mining and Metallurgy for the current year.

Mr. Peter Christianson, until recently one of the district mine superintendents of the Dominion Coal Company, N.S., has been appointed general superintendent fo rthe Pacific Pass Coal & Coke Company, to direct prospecting on its coal areas in the Little Pembina River region, Alberta. Mr. Alexander McDonald, for years manager of Dominion No. 4 (Caledonia) colliery, has succeeded Mr. Christianson as superintendent of No. 3 district.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Technical Education Commission.

The Technical Education Commission spent the 1st, 2nd and 3rd of August in Sydney, Glace Bay and Sydney Mines respectively. The proceedings were necessarily very much hurried, considering the many things they wished to see and the short time at their disposal. The chairman explained that the work of the Commission would have to be carried out with great economy of time to enable their labours to be completed within a reasonable period, but, granting this, it was generally felt that three days was a very small proportion to devote to so populous and extensive an industrial centre as that surrounding Sydney. Nevertheless, the Commission made good use of their limited opportunities, and the sitting which was held in Glace Bay elicited much interesting and useful information.

All the officials of the Coal Company who testified before the Commission stated that the most useful part of their technical education had been obtained through the medium of evening classes and correspondence courses. It was stated that, almost without exception, the official staff of the Coal Company, from the grade of overman to that of superintendent, was indebted to the night mining schools, carried on by the Provincial Government, for the instruction which had enabled them to obtain the certificates of competency required by the law, and, incidentally, the International Correspondence Schools of Scranton obtained a striking advertisement. The impression gathered from the evidence given was that the Provincial mining schools had fulfilled a decided want and had paved the way for still better things, and the general concensus of opinion was voiced by the chairman, who stated that the evident desire for the enlargement and improvement of the technical education in mining now afforded by the night mining schools implied no criticism or belittlement of these schools, which had most evidently been pioneers in mining instruction. The testimony of the superintendents of the Dominion Coal Company elicited the fact that every one of them had achieved his present position by dint of

persevering study, and their evidence was in striking contrast with some evidence given before the Commission at a sitting in Sydney on the previous evening, where several workmen volunteered the information that evening classes involved "hardship" and "exhaustion of vitality." One man went so far as to intimate that what he chiefly desired was a "soft job." It is to be hoped that in their progress through Canada the time of the Commission will not be wasted by the giving of evidence of this kind.

The Commission visited Dominion No. 2 Colliery and were shown through the surface works. But judging by the time which was occupied in their progress, the impressions they obtained must have been kaleidoscopic and fleeting. The small acquaintance of the members of the Commission with mining operations was apparent, and there could be no doubt that even the excellent personnel of the Commission would have been much better balanced had it contained a representative of the mining profession. Considering the great importance of the products of the mine to this Dominion, the omission is a noticeable one, particularly in Cape Breton.

Dominion Coal Company's Output.

The output by collieries for the month of July has been as follows:

	Tons.
No. 1	49,464
No. 2	66,166
No. 3	27,749
No. 4	40,589
No. 5	32,238
No. 6	24,833
No. 7	21,863
No. 8	15,971
No. 9	37,583
No. 10	14,672
No. 12	18,254
No. 14	4,094
No. 15	1,018
	454,494

These individual outputs show several records. The monthly production from No. 9 Colliery has only been exceeded on one previous occasion, and the outputs from Nos. 6 and 7 and the Lingan collieries constitute records for one month. The aggregate output of the Lingan district amounted to over 23,000 tons. Considering the unusually small number of working days in the month, the output was a very satisfactory one. The aggregate outputs for the 7 months ending July 31st for the past three years compare as follows:

	Tons.
1908	2,299,724
1909	1,764,897
1910	1,909,494

This month marks the anniversary of the beginning of the U. M. W. strike at the mines of the Dominion Coal Company, probably one of the most useless and futile struggles in the history of Canadian trades unionism. During the first month of the strike the output was 136,697 tons, and before the strike collapsed the production reached 243,000 tons per month. It is, therefore, no matter for wonder that Mr. Edwin Perry, International Secretary of the U. M. W., should have found it difficult to understand why the strike was ever called. In a letter written by this gentleman to the U. M. W. Journal, after his visit to Glace Bay in June, he states: "I am not advised fully why the strike was called in the mines controlled by the Dominion Coal Company. Considering the fact that there were at least 8,000 or 9,000 men at work in Nova Scotia compared with approximately 3,000 idle, it seems to me that it would have very little effect on the production, but, of course, those familiar with the conditions were confident of victory." Before the strike the leaders of the U. M. W. in Glace Bay claimed to control 5,000 employees of the Dominion Coal Company, and it is decidedly refreshing to meet a true statement in the U. M. W. Journal. As a matter of fact, 3,000 men was about the number of adherents the U. M. W. cause had in Nova Scotia in the spring of 1909, including Glace Bay, Inverness County and Cumberland County. It will be a more difficult matter for the responsible officials of the U. M .W. to explain why—with a following of only one-third of the miners of Nova Scotia—they introduced a period of lawlessness and intimidation without parellel in the history of this province, carrying in its train permanent injury to the coal trade of Nova Scotia and leaving behind a legacy of bitterness and unpleasant reminiscences which it will take a good many years to efface. Mr. Perry further remarks that: "Invariably a body of men not familiar with the fundamental principles of unionism believe that the first thing to do is to revolutionize conditions of employment, wages, etc., with the result that a strike is precipitated, not taking into consideration the consequences or cost."

Your correspondent has before expressed the opinion that the United Mine Workers' strike at Glace Bay was called with a wanton and light-hearted disregard of the consequences, and it would be difficult to adduce more substantial corroboration of this view than is given by Mr. Perry himself.

ONTARIO.

Cobalt.—The Cobalt Townsite, which is now under the management of Mr. Charles Watson, recently shipped another car of high grade ore. This property was shut down for a considerable period but work was finally resumed by English capitalists and since that time the prospects of the property have been steadily improving.

Two new veins have been discovered on the Trethewey in the vicinity of the No. 4 shaft. They were opened up by a cross-cut, which is being run to connect that working with the No. 2 shaft. Although narrow, they are both high grade and carry a considerable quantity of milling rock. The concentrator is working steadily putting through on an average about one hundred tons a day, and a very good extraction is being obtained.

The winze below the bottom level of the Little Nipissing has opened up a considerable quantity of ore and materially augmented the reserves. The management now believe that they will be in a position to ship approximately one car of medium grade ore per month.

There has lately been a good deal of activity in the neighbourhood of Smooth Water Lake, in the Gowganda district, and a number of good veins of silver have been found in the last few months. When this section was first called to the attention of the prospectors a large number of claims were staked, but owing to the superficial manner in which the prospecting was carried out the results obtained were very meagre. Since that time a large proportion of the claims were allowed to lapse, but these are rapidly being restaked, as development has proven the existence of native silver.

The Silvers Limited, which company is operating the Armstrong Fraction in Gowganda, has run short of funds, and it has been decided to cease operations. A meeting of the directors was called recently to see whether or not they would raise any more money to carry on the work, but the reports were not sufficiently encouraging to warrant them putting any more money into the enterprise. When the property was first staked a very rich surface vein was discovered, but the values were found to carry for only a very short depth.

An important find was made a short time ago on the two hundred foot level of the Crown Reserve. A long cross-cut is being run down the lake to open up veins which were cut by the diamond drill. At a distance of about nine hundred feet from the shaft the new vein was encountered. It is about eight inches wide of high grade ore. The management believes that this is not one of the veins cut down by the diamond drill but is an entirely new one.

The Cobalt Hydraulic Company has recently experienced considerable difficulty in keeping down the consumption of their air and as a consequence there was for a time quite a serious drop in pressure, necessitating some of the mines starting up their compressors. While only a few drills have been added to the original load, the consumption has increased from about two thousand cubic feet per minute to almost double that amount. This is due to the fact that the air is being wasted at the mines. The company has so far been unable to place meters and reducing valves on its lines, which would keep the consumption down to the amount contracted for. They are now, however, installing the meters and valves, and it is expected that the pressure will shortly again be normal.

Since the Gould Consolidated Company at Cart Lake has stopped underground operations a diamond drill has been started. This is being run in an endeavour to locate some veins which are supposed to come over from the Nipissing.

Good progress is being made on the Bailey property, and it is expected that the tunnel which is being run toward the old workings will cut the Bailey vein in a short distance. A considerable quantity of high grade ore was taken from this vein when the Bailey was under lease to the Cobalt Central. The main shaft is also being sunk and it is probable that the Huronian slates which underlie the diabase will be cut shortly. In the adjoining property this formation was found to be the most productive and when it is reached on the Bailey, a cross-cut will be run to cut several veins which were worked on the upper levels.

Work has been started on the Airgoid property, which is now being operated by the Cyril Lake Mining Company. Considerable trenching is being done, and it is expected that a new shaft will be started shortly.

The report of the Buffalo mill for the month of June shows that 2,918 tons of rock having an average assay of 26.2 ounces were treated; the mill ran 465 hours at a total cost of $5,452.37. Several changes have recently been made in the concentrator and also in the cyanide plant, by which it is expected to materially increase the extraction. Heretofore the cyanide plant has been making an extraction of about sixty per cent. on thirteen ounce slimes, but this was not considered satisfactory.

It was expected that the strike of the conductors and trainsmen of the G.T.R. would tie up traffic on the T. & N. O., but the trouble was not as great as was anticipated. Passenger traffic was interfered with to some extent, but on account of the C. P. R. trains running through from outside points, little difficulty was experienced. The biggest tie-up was, of course, with the freight, but the mines suffered no inconvenience from this, as practically all the ore was shipped out over the C. P. R.

A new ore shoot has been opened up in the drift at the sixty-eight foot level of the Bellellen property in South Lorrain. The vein is about ten inches wide and carries very high values in silver.

The Government reports for the first six months of the present year show that about two-thirds of the ore shipped from Cobalt has been treated in the States. The distribution is as follows:

	Tons.	Per Cent.
United States	9.816.7	66.13
Canada	4,782.63	33.22
England	153.65	1.00
Germany	90.10	.65

Although the larger per cent. of ore was treated in the States, practically 75 per cent. of the total silver was produced by Canadian smelters. This is due to the fact that the Canadian smelters take only the highest grade ores, and as their rates are much better than can be obtained on the other side of the line, they consequently have all the ore they can handle. There are no smelters in Canada that will treat low grade ore, with the exception of the Trail smelter in British Columbia, but freight rates to this point are so high that they do not get any ore. The total production for the six months was 14,843.08 tons. The largest tonnage for any one month, 2,917 tons, was shipped in June, while January had the smallest showing, 2,025 tons.

Another dividend of 300 per cent., payable July 29th, has been declared by the Temiskaming & Hudson Bay, thus making a total of 12,000 per cent. so far this year, or $93,112. This high percentage is due to the low capitalization, which consists of only 7,761 shares having a par value of $1.00 each. A new vein carrying extremely high grade ore has been discovered on the second level about twenty feet from the No. 1 vein. Good progress is being made with the erection of the concentrator, and the cement work will be started in a few days.

The development of the third level of the Coniagas has been very satisfactory. Three of the principal veins have now been opened up at the depth of 225 feet, and it is expected that others will be cut in the near future. On this level the veins are, if anything, wider than on the upper levels, and show no diminution of values.

In the case of the Lucky Godfrey, at Elk Lake, against some of their employees for high grading, no evidence was adduced to show that the men took the ore and the case was dismissed. The company is entirely at a loss to understand how the ore disappeared. They valued their car at approximately $40,000, but when it reached the smelter it was found to be worth only $5,200. It is understood that one of the men is suing the company for wrongful arrest.

The Off Shoot vein of the Chambers-Ferland has been picked up in a cross-cut on the third level. It varies in width from one to two inches, but is very high grade and assays about 4,000 ounces to the ton.

In the future the Right of Way expects to ship about three cars of ore per month; one of high grade and two of low grade. The company is now working three veins carrying high grade ore. The ground to the south of No. 3 shaft is being prospected by a cross-cut from the old shaft of the Little Nipissing. So far nothing of importance has been found there.

A new surface vein has been found on the Silver Alliance at Elk Lake. It is about three inches in width and in places shows almost pure native silver. It has already been traced for a distance of over one hundred feet and a shaft has been started.

A diamond drill is being operated on the Provincial property to prospect the ground under the swamp at the head of Cart Lake. The shaft near the Savage line has been sunk to the 170-foot level and a station has been cut. Two high grade veins will be developed from this point.

During the month of July the ore shipped from Cobalt totalled 3,015 tons, as against 2,325 tons for the corresponding period last year. This increase is largely due to the much heavier shipments from the Kerr Lake section of the camp .

Porcupine.—One of the most important deals in the Porcupine country was recently consummated when Mr. Lorne McGibbon, president of the La Rose Consolidated, and his associates, took over seventeen claims known as the Dobie properties. These claims were among the first staked in the district, and several fine showings of free gold have been reported. It is understood that they will be opened up as soon as possible. The entrance of Mr. McGibbon into the new gold fields will doubtless have an important bearing on the attitude in which the country will be regarded by many other investors.

It is stated that gold has been found on the Cartwright claims, which are located near the shore of Gillies Lake in Tisdale Township. The main vein is about fifteen feet in width and has already been opened up for a considerable distance.

On account of the low water in the rivers and lakes, transportation of supplies has become an exceedingly difficult matter. The low water was caused by the action of Father Paradis in blowing out the falls on the river, which lowered the water about eight feet. To overcome this difficulty and raise the level of the water sufficiently to allow the running of gasoline launches, it was decided to build a dam. Considerable work had already

been done when orders to cease operations were received from the Dominion Government. Engineers are now in the district examining into the conditions, and it is believed that permission to resume the work will be given shortly.

It is reported that the four Hollinger claims, upon which the Timmins have been concentrating their energies ,will be organized into a company known as the Alpha Gold Mines, with a capital of $3,000,000, about $1,000,000 of which will be offered to the public. A great deal of work has already been accomplished on these claims, and the results so far have been extremely encouraging. The main shaft is down about one hundred feet, and at this depth the vein is ten feet wide and carries extremely high values in gold. A small prospectors' stamp mill has been erected and is treating about fifteen tons a day. Plans are being prepared for a new mill to have a capacity of about one hundred tons a day.

A half interest in the McIntyre claims has been purchased by local men. These claims have some of the best showings in the district, but, so far, have not been developed. As soon as supplies can be obtained a force of men will start to work.

Operations on the Foley-O'Brien have been suspended owing to the shortage of supplies and high freight rates. Work will be resumed as soon as supplies can be brought in at a reasonable cost.

Development work on the Dome property is progressing very satisfactorily. A few days ago the diamond drill cut the vein at a depth of one hundred feet and the core showed spectacular values in free gold. Another large payment on this property was made on the first of August.

The Dome Extension, which adjoins the Wilson Dome, has been forced to stop work until the road from Matheson has been cut through.

A complete plant has been ordered for the Foster property and will be brought in as soon as the road is in shape. A large amount of surface work has been done in stripping the big vein for a distance of about eight hundred feet. The shaft on the Scottish Ontario has reached a depth of eighty feet. It will be continued to the one hundred foot level, from which point a cross-cut will be run to open up the vein.

Survey parties have already been sent in to lay out the route for the new electric railroad. The line will be approximately thirty-five miles long and will start from some point near Matheson. No difficulty will be experienced with grades, as the country is practically level. Although this line will eventually be operated by electricity, it will be impossible to have that power ready by the time the road is completed. The charter states that the work must be finished in five months, so that it will be necessary to operate by steam until such time as the electric plant is in commission. The Mines Power Company of Cobalt has taken a lease on a splendid water power a few miles from Porcupine, and as soon as the winter roads are in shape will start the erection of its plant. It is expected to have a capacity of about six thousand horse-power.

BRITISH COLUMBIA.

The amendment to the "Coal Mines Regulation Act," made at the last session of the British Columbia Provincial Legislature, which requires that oxygen helmets or other mine-rescue appliances shall be provided and mine-rescue stations established at every colliery in the province to which the Act applies, is to come into force on November 1st of the current year, the Lieutenant-Governor in Council having had gazetted a proclamation which will then bring into effect the section of the amended Act in this connection.

The prospects for the early establishment of an operating steel-making industry in British Columbia do not appear to be encouraging at present. It has been the custom of two or three interested parties during the last year or more to give publicity to statements purporting to show that Mr. J. A. Moore, of Seattle, Washington, and his associates in a proposed iron and steel manufacturing enterprise for British Columbia, would ere long launch such an undertaking. Incidentally, much importance was attached to the stated occurrence on Vancouver and other British Columbia islands of immense quantities of ore suitable for the manufacture of pig iron, and it was implied, if not asserted, that when Mr. Moore' company should commence to manufacture iron and steel at Irondale, Puget Sound, Washington, much British Columbia iron ore would be used in the furnaces there. It has lately transpired that the greater part of the material for such manufactures is to come from China, at least for the time, and shipments of pig iron from that country have already reached Irondale. Further, when asked quite lately in Victoria, so the "Colonist" states, "as to the intention of his company in regard to making steel in this province, Mr. Moore said the first thing was to get cheap coke, and this they expected to make on Graham Island," which is one of the Queen Charlotte group, by the way. As the commercial mining of coal has not yet been commenced on Graham Island, it would seem that the manufacture of cheap coke is not an early possibility, and consequently Mr. Moore does not seriously contemplate activity in the direction of making steel in British Columbia in the near future.

East Kootenay.—Lead mining at the St. Eugene and Sullivan mines, constitutes the chief metalliferous mining in this district this summer. Two small lead-silver properties situated within a mile or two of the St. Eugene are also having attention. Placer mining is in progress on Perry, Wild Horse, and other streams on which gold-bearing gravels occur.

Coal mining in the southeast part of this big district is being steadily increased in extent of operations and quantity of coal produced. The producing collieries are those of the Crow's Nest Pass Coal Company at Coal Creek and Michel, and of the Hosmer and Corbin collieries, respectively, in other parts of the Pass district. The Fernie "Free Press" states that Mr. Frank T. Hoover is developing coal measures which are a continuation of those being worked by the Corbin Coal & Coke Company. This company last year opened a deposit of coal 200 feet in thickness, of nearly all clean coal, but this unusual thickness is said to probably be due to folding. The coal met with in the preliminary workings on the main seam, however, was at least 40 feet in thickness. There are also large deposits of coal of excellent quality being prospected in the upper Elk River region, but this district is at present without transportation facilities, being 50 miles or more from the C. P. R. Company's Crow's Nest Railway.

Slocan.—Announcement has already been made that the Rambler-Cariboo Mines, Limited, will without delay resume work in its mine in McGuigan Basin. To do this supplies for the miners will probably have to be taken in by pack train. Work is to be continued at the Lucky Jim also, so that the set-back resulting from recent fire losses may not be felt for long. In the Slocan Lake section, the erection of a concentrating mill for the Van Roi Mining Company is to be proceeded with. Grading at the site of the new mill was completed some time ago, but the erection of the superstructure and equipment of the mill was postponed until after matters had been fully considered by the directors in London. Meanwhile the company has been concentrating its ore at the Wakefield mill, to which an aerial tramway was constructed from the Van Roi mine about two years ago.

Ainsworth.—The Blue Bell mine, on Kootenay Lake, opposite Ainsworth, is to be operated again, the stated intention being to resume work this autumn, but it is probable production will be deferred for several months. Meanwhile the capacity of the concentrating mill is to be increased. One of the objects the general manager of the Canadian Metal Company had in view when he went to Paris early last summer was to discuss with the larger shareholders the question of supplying hoisting and pumping equipment for the mine, in which occur large bodies of ore below the level it has been practicable to work with existing

equipment. It is understood that present difficulties are to be overcome by additions to plant and ore-handling facilities.

Nelson.—In Nelson mining division, lode gold mining is having increased attention. The Granite-Poorman mine, situated within half a dozen miles of the city of Nelson, continues to supply ore for its 20-stamp mill, which last year crushed 10,500 tons of ore and produced about 4,600 ounces of gold and 1,500 ounces of silver. At Ymir several mines are being worked, and others in the Salmo and Erie districts, respectively. Sheep Creek is especially active, with the Queen and Nugget mines producing gold and a number of more or less developed prospects being worked as well. The Queen has a 20-stamp and the Nugget a 4-stamp mill. Reports of discoveries of gold ore giving high assay returns are frequent. The Bayonne district, east of Sheek Creek, is being prospected, too, and reports from this part are also favourable. The Emerald lead mine, Salmo, has shipped more than 1,000 tons of ore this year. The only copper mine in the division at present producing is the Queen Victoria, which has sent about 2,000 tons to the Trail smeltery.

Boundary.—Diamond drilling is in progress in the Granby mines at Phoenix, with the object of prospecting for new ore bodies at greater depths than those now being worked. The "Pioneer" states that ore bodies additional to those included in Dr. Sussmann's estimate of available ore are now known to occur, consequently the position is considered that much better than the report of the expert indicated. The 15-stamp mill for the Jewel mine at Long Lake is about completed and a preliminary run will shortly be made. In the Jewel mine there is much gold-quartz ore opened by development work 10 to 12 years ago, and since then more ore has been found in the course of exploration work. With much ore in sight and a modern plant to treat it, good results are expected.

Similkameen.—The Hedley "Gazette" reports gratifying improvement in results obtained at the Hedley Gold Mining Company's 40-stamp mill, both in regard to quantity of ore crushed and extraction of value. The tonnage for the month of June is stated to have been 4,574 tons, as compared with 3,829 tons in June of 1909. This record is 745 tons better than that for the corresponding month of last year and 1,170 tons higher than the average June record since 1905. Loss of gold in tailings is now less, it is claimed, than formerly. The Princeton Coal & Land Company, Limited, organized chiefly for the purpose of operating the coal mines near Princeton opened by the Vermilion Forks Mining & Development Company, is arranging to put in a screening plant and other coal-cleaning apparatus, so that a more marketable coal product may be shipped in the future.

Kamloops.—A Vancouver syndicate has arranged to acquire a group of mineral claims situated on Tranquille Creek. The ore occurrence is described as a large dyke of gold-bearing porphyry, samples of which have given good assay returns. Boring for coal is to be commenced shortly by a British Columbia com-

Coast.—The Great Granite Development Company has placed a 7-drill compressor on its Lucky Jim mine, on Valdez Island, where good value is reported from gold-copper ore. The managing director, on his return to Vancouver stated that there is 9 feet of chalcopyrite on the 100-foot level. Shipment of ore to the Tyee Copper Company's smeltery at Ladysmith, Vancouver Island, is to be commenced next month. Prospecting work with the diamond drill at the Ikeda Bay mine has been stopped pending completion of arrangements for purchase by the Vancouver syndicate that has the property under option. Mr. John McLellan has obtained good returns from two months' run of a small stamp mill at his Early Bird claim, Gold Harbour, Moresby Island. The Portland Canal Mining Company is pushing on with the work of completing equipment of its concentrating mill on Glacier Creek. The delay in completion has been unavoidable, transportation difficulties having hindered progress. It is expected, however, to have the mill in operation in September. Development work is being done on the claims of the Stewart, Red Cliff, and other companies. Undue importance continues to be placed upon specimen assays, though. It is hoped the Portland Canal Mining Company's operations will determine, before the close of this year, what value its ore will yield from treatment in bulk.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—Gold mining is going on at Montague. Several old mines and prospects are being worked and two stamp mills are operated. At Oxford, Manager Partington is getting things into good shape.

Moose River.—Manager A. A. Hayward is sinking and crosscutting in several places on the numerous scheelite veins. The scheelite property is controlled by a Canadian syndicate.

QUEBEC.

Montreal, August 2nd.—Announcement was made yesterday by President Harris, of the Nova Scotia Steel & Coal Company, that Mr. James Reid Wilson and Mr. K. W. Blackwell had been elected to the board of directors. Mr. Wilson is a prominent business man and a director of the Dominion Steel Corporation, and Mr. Blackwell is president of the Montreal Steel Works. The election followed the transfer yesterday of the large block of stock held by the Forget interests to the purchasing syndicate, headed by Mr. R. E. Harris, president of the company, for which Mr. Rodolphe Forget and his associates were handed a cheque for close to two million dollars.

ONTARIO.

Ottawa, July 28th.—The Canadian Peat Society was formed here yesterday afternoon. All the Canadians present at the annual meeting of the American Peat Society joined the new organization, and from now on a vigorous campaign will be carried on to interest Canadians in the peat industry and to join the new society.

Dr. McWilliams, of London, is the president, William B. Lincoln, of Montreal, vice-president, and Mr. A. J. Forward, of Ottawa, secretary-treasurer. The headquarters of the new organization will be at Ottawa, and its annual meetings will be held here. It will remain affiliated with the American society and will work along very similar lines to that society, but will not do much experimenting. It will approach the railways with regard to securing rates when necessary and be advisory to the government.

Ottawa, July 29th.—An official report to the Geological Survey by Dominion Geologist McConnell on the Bitter Creek gold discovery at Stewart, B.C., indicates that the first stories of the district were exaggerated. Assays run from $3 to $8 per ton. There is plenty of vein matter in the mountains, but

the values are low, making it doubtful if they could be extracted at a profit. The district is inaccessible in places, and a gold rush is not warranted by discoveries so far, though they are sufficient to warrant further prospecting.

Toronto, July 28th.—A meeting of the directors of the Boyd-Gordon property showed a complete change of officers and directors with one exception, and the company decided to put the lot under new management and begin active mining operations at once in Gowganda.

The new officers and directors are: Messrs. E. L. Duncan, Buffalo, president; Samuel Jardine, Toronto, vice-president; Dr. W. A. Rushworth, Toronto, secretary-treasurer; Major R. K. Barker, Toronto, and E. E. Groves, Buffalo. With the exception of Dr. Rushworth, this is an entirely new board. As the Johnson brothers are known to have held a seven-eighths interest between them and their names do not appear on the new list of directors, it would seem that a sale of some sort had been effected.

Toronto.—Application has been made for charter by Messrs. Arthur Ferland, W. C. Chambers, Charles Richardson, R. W. Gordon and A. E. Burdett to build a steam or electric railway from a point on the Temiskaming & Northern Ontario Railway, between Matheson and Mile Post 229, to the Mattagami River, a distance of 42 miles. This railroad would pass through the Porcupine gold fields and connect the Temiskaming & Northern Ontario Railway with the Mattagami River. Upon favourable action on the application it is said that work will start at once, under the direction of W. C. Chambers.

Cobalt.—Cobalt mine owners are pleased over the advance in the price of silver, which with the reduced working costs brought about by the cheaper power gives the industry a much stronger position. Estimating the output for the current year at 26,000,00 ounces of silver, an increase of 4 cents in the returns from smelters means $1,040,000 more available for dividends. While the added price for silver may not amount to 4 cents per ounce averaged over the whole year, the gain to the treasurers of shipping mines will be fully $750,000. There is greater inducement now for larger shipments, and it may be that the Cobalt industry will exceed the 26,000,000-ounce mark.

BRITISH COLUMBIA.

Phoenix.—Exploratory operations of importance have been begun on the property of the Granby Consolidated Mining, Smelting & Power Company. A diamond drill has been started on the 900-foot level, and will drive a series of holes to a depth of 1,000 feet. It has been generally believed that ore bodies of low-grade copper propositions in the Boundary district do not run down, though there has never been any satisfactory demonstration that there is not ore at depth. Up to the present time ore bodies have been found to be so large that it has never become necessary to develop at great depth, that it, below 600 or 700 feet. The starting of deep holes from the lower level of the Granby Mine, which is practically 800 feet below the surface, begins a new era of deep mining in the Boundary mining district. Gratifying results have followed recent diamond drilling on the southern part of the Knob Hill claim of the Granby group, hitherto undeveloped. Although no official information could be gained from the mine superintendent, O. B. Smith, it is learned that the drill has gone through 100 feet of good average ore, and the extent of the body has not yet been determined, though development work with this object in view has been commenced.

Lillooet, July 26th.—Messrs. Reinbold & Mellon have arrived from Lytton with a crew of miners. These gentlemen who represent the International Mining & Milling Company, of Everett, Wash., have secured leases of three miles of ground on Cayoose Creek some three and a half miles from Lillooet, where they purpose hydraulicking for gold. This ground was thoroughly tested by Mr. W. S. Reinbold this spring, and results justified an immediate start. Mr. Reinbold, who is a mining engineer of some repute, graduated at a German mining university and has mined in many countries and several states of the Union. He expresses much confidence in the richness of his leases and states that his company will spend some $25,000 this season alone, and if results are as good as expected, will extend their operations further.

Vancouver, B.C.—Manager Roy, of the Vancouver Industrial Exhibition, has announced that the directors have decided to grant a handsome cup for competition among mining exhibits which Nelson Board of Trade has decided to send to Vancouver's first fair. Hope is entertained in Vancouver that the exhibit can be retained here as a permanent exhibition.

Prince Rupert.—The "Prince Rupert Optimist," the bright daily newspaper of the new town, resents editorially the false reports concerning finds of gold at Stewart, and points out the evils that will ensue. It condemns heartily the authors of the grossly exaggerated reports that appeared in the London, England, papers.

Stewart.—Not only is the Canadian Northern Railroad going to continue its railway from Stewart to link with the trunk railroad at Edmonton, but also is projecting another line from Stewart to tap the mining districts at the head of the Salmon River and Fish Creek. This new line is to pass from Stewart through Portland City and through Alaska to the mines located in British Columbia at the headwaters of the Salmon, carrying ore through Alaska to Stewart.

Atlin, B.C., July 27.—Capt. Alexander arrived yesterday from the Engineer mine with the first gold bar produced on the property. The weight of the bar is twenty pounds eight ounces, the product of eight hundred pounds of rock, four hours' run of the two-stamp mill. This is considered the record run of the world. It is estimated that the bar represents only sixty per cent. of the value of the rock.

The mine has been working since January, and about two hundred tons of rock have been taken out, which will average $150 per ton. Three tons of selected rock will go six to ten thousand dollars per ton. These are conservative estimates. Numerous leads have been opened up, all showing values.

The owners intend to erect a hundred-stamp mill at an early date, for which purpose Capt. Alexander expects to leave shortly for England. Particulars of the mine have not heretofore been made public owing to possible litigation, all likelihood of which is now at an end.

YUKON TERRITORY.

Dawson, July 19.—Stewart Menzies, master mechanic of the Yukon Gold Company, was killed yesterday when a three-ton dredge fell on him while being swung into place by a crane. Menzies was a widely-known Klondiker.

Dawson.—Advices are to the effect that the season's output of the large placer operations is estimated at $5,000,000. This, it is said, is important in view of the fact that a very large part of it will come from ground that has already been mined once and abandoned. This yield, according to the despatches, is therefore practically from a waste product.

The principal operator in the old Klondike district is the Yukon Gold Company, which purchased a large number of abandoned claims on Bonanza and neighbouring creeks and which has spent several millions of dollars in experiment, and last year began working over the tailings and bench ground that could not be worked by the crude methods employed by the original owners.

MINING NEWS OF THE WORLD.

UNITED STATES.

Miami, Ariz.—The Miami Copper Company has resumed Sunday work on all construction operations. Superintendent Gottsberger plans to have the big concentrator in operation by January 1st, 1911. There is not an idle mechanic or carpenter in Miami and work on the mill is progressing rapidly. The mammoth smokestack is completed and is receiving the outside coat of plaster. The stack is 200 feet high. The concentrator is rapidly assuming shape and an army of painters and carpenters is closely following the iron workers as they place in position the massive pillars and girders of the structure.

Los Angeles, Cal., July 28.—Apparently vexed by the reports that it was diminishing its flow and about to sink to the rank of an ordinary, peaceable member of the oil fraternity, the great Lakeview gusher has again speeded up and is producing 35,000 to 40,000 barrels per day. This mammoth producer has been in operation since the middle of March, and has produced over 5,000,000 barrels of oil to date. Late tests show no water in the oil, and it is now believed that the presence of the fluid was owing to a leaking water pipe, running about 10 feet from the well. It is evident that the great oil geyser is slowly subsiding, but its sudden spurts of activity are still keeping its owners guessing. It is understood that the company has taken over the ten 55,000-barrel steel tanks of the Union Oil Company along the route of the Producers Transportation Company's pipe line, and is arranging to have reservoirs constructed at Coast points.

Leadville, Colo., July 29.—With a Starret compressed air pump, connected up with electric power from the Central Colorado Power Company, the Hellena mine, in Empire gulch, is being unwatered by a process novel in Colorado, but successfully tried out on the Pacific coast, notably at several points in Utah and at the Ward mine on the Comstock lode.

The Hellena shaft is 900 feet deep, and the water filled it within 80 feet of the collar. Already the water has been lowered 360 feet and two levels are now dry.

Boston, Mass.—The directors of the Calumet & Hecla Mining Company have sent to the shareholders a comprehensive report covering the operations for the year ending April 30th, 1910. The important facts brought out are: A refined copper production amounting to 72,108,577 pounds, or 10,707,653 pounds less than for the preceding year; the stamping of 2,865,900 tons of rock as compared with 2,699,919 tons in the year ending April 30th, 1909; a yield of 27.44 pounds of copper to the ton, as against 30.06 pounds in the previous year, and an addition to the surplus of $845,530, making the total surplus at the close of the year $7,667,298. The price of copper during the year varied from 14 1-8 cents to 13 cents per pound, and on April 30th—the closing day of the year—it was 13 cents per pound. Dividends aggregating $30 per share were paid during the year. In accordance with its usual custom, the management fails to give any definite facts regarding the producing costs and average selling price beyond the general information noted above.

Silver City, N.M.—The largest mining deal consummated in this section for the past two years has just been made, according to advices received here. Some months ago, representatives of the Rio Tinto Copper Company, of Cleveland, Ohio, visited the properties of the Savanna Copper Company, which include practically all the mines of the Pinos Altos mining district, situated nine miles north of this city.

New York, July 28.—The quarterly statement of the United States Steel Corporation for the three months ending June 30, shows total earnings of $40,170,960, an amount far in excess of unofficial estimates, and greater than the earnings of the first quarter by $3,554,084. The net earnings for the quarter were $33,880,755, or $2,377,561 greater than the first quarter's returns. Both gross and net earnings are vastly larger than those of the corresponding quarter last year, which were $29,340,421 and $23,323,395 respectively.

Tonopah, Nev.—The periodical reports of the Tonopah Belmont management are borne out by the statement of production during June. The report shows that 1,236 tons of dry ore went to the smelter and 6,157 tons to the mill. The total value of the output is placed at $276,434.54, and the net profit at $151,765.82. The statement shows that the general grade of the ore is the richest being mined in the Tonopah district, and places the Belmont at the head of the list as a producer of rich ore. Added to this is the fact that the vein producing this grade of ore is the strongest in the district, having been proven up for nearly 700 feet on its strike and 400 feet on its dip, showing an average width of 15 feet. While a little stoping has been done, by far the greater portion of the ore has come from development work.

NORWAY.

Advice has been received from the Sulitelma Company's mines in Norway that for the month of June 750 tons of concentrates, containing 6.88 per cent. copper were produced by the Elmore process.

GERMANY.

Berlin.—The "Lokalanzeiger" states that an Anglo-Dutch financial group is about to acquire control of a number of Rumanian petroleum undertakings in which German capital is largely interested. According to the journal, this means that German capitalists have decided to abandon the predominant position hitherto held by them in the Rumanian petroleum industry. German interests in the industry are chiefly represented by the Deutscho Bank and other leading banks which have 140,000,000 francs invested in Rumanian oil concerns.

AUSTRALIA.

Sydney.—The value of the mineral exports for the half-year ending June was: Silver, £75,252; silver-lead concentrates, £717,518; lead in matte, £118,403; copper, £469,096; tin, £165,025, and coal, £948,472. The total increase as compared with the corresponding period of 1909 amounted to £203,472.

SOUTH AFRICA.

A cablegram from Johannesburg states that during June the mines of the Witwatersrand (that is, excluding outside mines) crushed 1,761,034 tons. The average yield per ton was 28s 1d, the working costs per ton were 17s 9d, while the profit per ton was 10s 5d, and the aggregate profit £921,136.

Johannesburg.—The June output was a record of daily production, while the daily profit was the highest obtained this year, with the exception of February. The amalgamation of the Cloverfield and Welgedacht properties, under Mr. Abe Bailey's auspices, has been agreed to in principle. There is a possibility that the Lace Proprietary Company's Droogefontein farm and the Geygerle will be included.

The Van Dyk quarterly report shows that out of 875 samples assayed, 210 gave 7½ dwts. over 30 ins.; 665 gave below 5 dwts.

Johannesburg, July 21.—A gassing disaster, due to the ignition of a case of gelatine, occurred to-day at the Simmer East Deep mine. Thirteen whites were taken to hospital suffering from the effects of the gas, while fifteen natives lost their lives and 76 were conveyed to hospital in a more or less serious condition.

COMPANY NOTES.

CROW'S NEST DIVIDEND.

Crow's Nest Coal directors have declared a dividend of 1 per cent., payable August 10th to shareholders of record August 5th. The declaration is not a period dividend, but is merely a distribution, though the company's position is said to be steadily improving, and regular dividends may be settled on in the near future. The Crow's Nest Pass Coal Company ceased paying dividends two years ago, such policy being decided on to meet losses through the Fernie fire, and also to furnish funds for development work and improvements.

Another dividend of 300 per cent. has been declared by Temiskaming & Hudson Bay mine, payable July 29th. They have already paid 900 per cent., so far this year, which amounted to $69,849. This dividend will make a total of 1,200 per cent. for the year, or $93,122. The Liskeard company easily lead the list of dividend paying mines in percentage. In the year 1909 they declared a total of 2,400 per cent.; in 1908, 3,500 per cent.; in 1907, 300 per cent.; in 1906, 9,000 per cent., making a total of 16,300 per cent., valued at $1,285,946. This remarkable record can scarcely be equalled anywhere in the world.

An extra dividend of 3 per cent., or $30,000, has been declared by the Buffalo Mines, payable on all outstanding stock on August 15th, 1910.

Already this year the Buffalo has paid 19 per cent., or $160,000, in dividends, so that their yearly total now reads 19 per cent., or $190,000. The total to date since the organization of the company is 84 per cent., or $777,000.

STATISTICS AND RETURNS

Granby, during the week ended July 30th, sent out 20,721 tons, making 713,823 tons for the year to date.

The output of pig iron in the United States during July was heavily curtailed, preliminary returns indicating a reduction of about 140,000 tons, or a total of 2,125,000 tons during the month, which is at the rate of 25,500,000 tons annually of anthracite and coke iron. Estimating charcoal output at 400,000 tons, they are now producing pig iron of all kinds at the rate of about 25,900,000 tons, while during June the output was at the rate of 27,300,000 tons annually, including charcoal iron.

COBALT ORE SHIPMENTS.

The following are the shipments from the Cobalt camp for the week ending July 29th, and those from January 1st, 1910, to date:

	August 5. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	180,617
Buffalo	59,000	1,304,468
City of Cobalt	.....	422,735
Chambers-Ferland	.....	1,024,600
Cobalt Central	.....	293,286
Cobalt Lake	.....	260,900
Cobalt Townsite	.....	116,860
Colonial	.....	148,900
Coniagas	72,990	999,046
Crown Reserve	211,232	4,132,020
Drummond	.....	664,200
Hargraves	60,000	281,170
Hudson Bay	.....	297,835
Kerr Lake	60,129	5,984,587
King Edward	.....	221,296
La Rose	309,600	7,561,441
McKinley-Darragh	103,990	2,094,429
Nipissing	129,360	6,792,777
O'Brien	.....	758,086
Peterson Lake	.....	432,420
Provincial	.....	65,000
Right-of-Way	122,570	1,080,217
Silver Cliff	52,780	212,770
Temiskaming	53,000	1,248,050
Trethewey	41,300	682,410
Waldman	.....	63,992
Wyandoh	.....	48,300
Standard Cobalt	63,992	147,992
Rochester	60,750	60,750

Ore shipments for the week ending August 5th were 1,401,593 lbs., or 700 tons.

Total shipments from January 1st to August 5th were 37,582,154 lbs., or 18,791 tons.

Following are the shipments from the Cobalt camp for the week ending July 29th, and those from January 1st to date:

	July 29th. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	180,617
Buffalo	61,790	1,245,468
City of Cobalt	.....	422,735
Chambers-Ferland	64,000	1,024,600
Cobalt Central	.....	293,286
Cobalt Lake	.....	260,900
Cobalt Townsite	.....	116,860
Colonial	.....	148,900
Coniagas	.....	926,056
Crown Reserve	126,330	3,920,888
Drummond	.....	664,200
Hargraves	.....	221,170
Hudson Bay	.....	297,835
Kerr Lake	44,500	3,924,458
King Edward	.....	221,296
La Rose	325,900	7,251,841
McKinley-Darragh	119,750	1,990,439
Nipissing	184,550	6,663,417
O'Brien	.....	758,086
Peterson Lake	.....	432,420
Provincial	.....	65,000
Right-of-Way	.....	957,647
Silver Cliff	.....	159,990
Temiskaming	192,480	1,195,050
Trethewey	.....	641,110
Waldman	.....	63,992
Wyandoh	.....	48,300
Standard Cobalt	84,000	84,000

Ore shipments for the week ending July 29th were 1,203,300 lbs., or 601 tons.

Total shipments from January 1st to July 29th were 36,180,561 lbs., or 18,090 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The mining returns for the week ending July 30th are unusually interesting from the fact that the Boundary passes the 1,000,000 mark in tonnage produced the current year, and from the fact that the British Columbia Copper Company has treated at its Greenwood smelter to date 200,000 tons of ore.

The returns of the ore production and movement for the week and for the year, are as follows:

Boundary Shipments.		
Granby	20,721	712,703
Mother Lode	6,800	189,905
Snowshoe	2,438	96,807
Oro Denoro	289	7,645
Jack Pot	697	4,002
Other mines		608
Total	30,945	1,011,670
Rossland Shipments.		
Centre Star	3,131	113,922
Le Roi No. 2	634	19,273
Le Roi No. 2, milled	300	9,000
Le Roi	506	9,381
Velvet	31	286
Other mines		177
Total	4,602	152,039
Slocan-Kootenay Shipments.		
St. Eugene, milled	2,775	83,250
Van Roi, milled	800	24,000
Whitewater, milled	250	6,250
Queen, milled	420	12,600
Granite-Poorman, milled	250	7,500
Nugget, milled	110	3,300
Richmond-Eureka	31	2,539
Emerald	29	1,126
Yankee Girl	129	3,250
Eastmont	35	485
Sullivan	288	7,640
Queen Victoria	138	2,046
Other mines		27,319
Total	5,255	181,305

The total shipments for the week, including the estimated milling, were 40,802 tons, and for the year to date, 1,345,014 tons.

B. C. Copper Company's Receipts.
Greenwood, B.C.

Mother Lode	6,800	189,905
Oro Denoro	289	7,645
Jack Pot	697	4,002
Total	7,786	201,552

Granby Smelter Receipts.
Grand Forks, B.C.

Granby	20,721	712,703
Other mines		120
Total	20,721	712,823

Consolidated Company's Receipts.
Trail, B.C.

St. Eugene, concentrates	191	9,790
Le Roi No. 2, part concentrates	634	19,273
Queen, concentrates	39	383
Centre Star	3,131	113,922
Le Roi	506	9,381
Snowshoe	2,438	96,807
Richmond-Eureka	31	2,539
Emerald	29	1,126
Yankee Girl	129	3,250
Eastmont	35	485
Velvet	31	286
Sullivan	288	7,640
Queen Victoria	138	2,046
Other mines		15,823
Total	7,620	282,751

The total receipts at the smelters for the week, including concentrates, were 36,127 tons, and for the year to date, 1,197,126 tons.

B. C. ORE SHIPMENTS.

The following are the returns of the ore production and movement for the week ending August 5, and for the year to date:

	Week.	Year.
Boundary Shipments.		
Granby	21,118	733,821
Mother Lode	7,500	197,405
Snowshoe	2,079	98,886
Oro Denoro	322	7,967
Jack Pot	632	4,634
Other mines		608
Total	31,651	1,043,321
Rossland Shipments.		
Centre Star	3,365	117,287
Le Roi No. 2	414	19,687
Le Roi No. 2, milled	300	9,300
Le Roi	418	9,799
Velvet	41	327
Other mines		117
Total	4,538	156,577
Slocan-Kootenay Shipments.		
St. Eugene, milled	2,775	86,025
Van Roi, milled	800	24,800
Queen, milled	420	13,020
Granite-Poorman, milled	250	7,750
Nugget, milled	110	3,410
Richmond-Eureka	54	2,593
Standard	65	841
Emerald	31	1,157
Rambler-Cariboo	43	677
Yankee Girl	83	3,333
Sullivan	747	8,387
Monarch	40	289
Queen Victoria	439	2,485
Other mines		32,395
Total	5,857	187,162

The total shipments for the week, including the estimated milling, were 42,046 tons, and for the year to date, 1,387,060 tons.

B. C. Copper Company's Receipts, Greenwood, B.C.

Mother Lode	7,500	197,405
Oro Denoro	322	7,967
Jack Pot	632	4,634
Total	8,454	210,006

Granby Smelter Receipts, Grand Forks, B.C.

Granby	21,118	733,821
Other mines		120
Total	21,118	733,941

Consolidated Company's Receipts, Trail, B.C.

St. Eugene, concentrates	502	10,292
Van Roi, concentrates	124	882
Le Roi No. 2, part concentrates	414	19,687
Whitewater, concentrates	20	755
Centre Star	3,365	117,287
Le Roi	418	9,799
Snowshoe	2,079	98,886
Richmond-Eureka	54	2,593
Standard	65	841
Emerald	31	1,157
Rambler-Cariboo	43	677
Yankee Girl	83	3,333
Velvet	41	327
Sullivan	747	8,387

Monarch	40	289
Queen Victoria	439	2,485
Other mines	.....	13,539
Total	8,465	291,216

The total receipts at the smelters, including concentrates, were for the week 38,037 tons, and for the year to date, 1,235,163 tons.

TORONTO MARKETS.

Aug. 8.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 35 cents per lb.
Copper, casting, 13.10 cents per lb.
Electrolytic, 13.10 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

Aug. 8.—Pig Iron—(Quotations from Drummond McCall Co., Toronto).
Summerlee No. 1, $23.50 to $24.00 (f.o.b. Toronto).
Summerlee No. 2, $23.00 (f.o.b. Toronto).
Midland No. 1, off the market.
Hamilton No. 1, $20.50 (f.o.b. Hamilton).
Hamilton No. 2, $20.00 (f.o.b. Hamilton).
Clark's, $20.25 (f.o.b. Toronto).
Cleveland, $20.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Aug. 5.—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.65 to $1.70 per ton.
Foundry coke, prompt, $2.10 to $2.25 per ton.

Aug. 5.—Tin (Straits), 33.40 cents.
Copper, Prime Lake, 12.70 to 12.80 cents.
Electrolytic copper, 12.50 to 12.60 cents.
Copper wire, 14.00 cents.
Lead, 4.47½ cents.
Spelter, 5.25 cents.
Sheet Zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.15 cents.
Aluminium, 22.50 to 23.00 cents.
Nickel, 40.00 to 47.00 cents.
Platinum, ordinary, $34.00 per ounce.
Platinum, hard, $36.00 per ounce.
Bismuth, $2.00 per lb.
Quicksilver, $47.00 per 75 lb. flask.

SILVER PRICES.

	New York cents.	London pence.
July 23	54⅜	25⅛
" 25	54⅛	25
" 26	53¾	24⅞
" 27	53⅝	24 13/16
" 28	53¼	25⅝
" 29	53¼	25½
" 30	53¼	24⅝
Aug. 1	53¼	Holiday
" 2	53⅛	24 9/16
" 3	53	24½
" 4	52¾	24⅜
" 5	52¾	24⅜
" 6	52⅞	24 7/16
" 8	53	24½

SHARE MARKET.

(Courtesy of Warren Gzowski & Co.)

Miscellaneous—August 8th, 1910.

	Bid.	Ask.
Amalgamated Asbestos	14	16
Dominion Coal Company	..	..
Dominion Steel Company	..	..
Nova Scotia Steel	83⅞	84
Granby	31	32
Consolidated Smelting	60	65
Crow's Nest Pass	No quotations.	
Dominion Steel and Coal Corp	58½	..

Cobalt Stocks.—August 8th, 1910.

Amalgamated	.02	.04
Bailey	.07	.07½
Beaver Consolidated	.20½	.20¾
Big Six	.01½	.03
Buffalo	1.50	2.30
Chambers-Ferland	.16¼	.17½
City of Cobalt	.21½	.22
Cobalt Central	.10½	.11½
Cobalt Lake	.12½	.13⅛
Coniagas	4.50	5.00
Crown Reserve	2.68	2.75
Foster	.09	.14
Gifford	.03½	.05
Great Northern	.06¾	.07½
Great Meehan	.01	.01¾
Hargraves	.17½	.18
Hudson Bay	93.00	...
John Black	.02¾	.04
Kerr Lake	6.40	6.70
La Rose	3,90	3.98
Little Nipissing	.16½	.16½
McKinley	.95	.98
Nancy Helen	.03¾	.05
Nipissing	10.25	10.75
Nova Scotia	.29¼	.31
Ophir	.15	.25
Otisse	.02¼	.02¾
Peterson Lake	.16¾	.17¼
Right of Way	.22	.25
Rochester	.14⅝	.15¼
Silver Leaf	.05½	.06
Silver Bar	.04	.04⅜
Silver Queen	.02	.08
Temiskaming	.63	.63½
Trethewey	1.29½	1.30
Watts	.01	.09
Wettlaufer	.55	.70

New York Curb.—August 8th, 1910.

Boston Copper	15¼	15¾
British Col. Copper	4¾	5
Butte Coalition	18¾	19
Canadian Mines	None.	
Chino Copper	12½	12⅝
Davis-Daly Copper	15⅛	15¾
Ely Consolidated	.20	.25
Gila Copper	None.	
Giroux Mining	6⅝	6¾
Goldfields Consolidated	8⅜	8 7/16
Greene-Canadian	7⅛	7⅜
Harcuvar Copper	None.	
Inspiration Copper	7	7⅛
Miami Copper	21¾	22
New Baltic Copper	5¼	5½
Nevada Consolidated Copper	20½	20¾
Ohio Copper	1 9/16	1⅝
Rawhide Coalition	.15	.16
Ray Central	2⅜	2 7/16
Ray Consolidated	17½	18
Union Mines	1	1 1/16
Yukon Gold	3 15/16	4

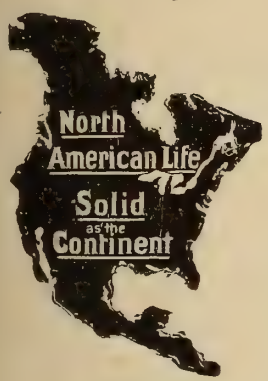
Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

MEN OF WEALTH



Are almost invariably the greatest believers in Life Insurance because they recognize the value of a "Cash" estate absolutely secured, and therefore they aim to maintain a considerable portion of their estate in the form of Life Insurance.

The North American Life Assurance Company appeals to business men because of its long record of success and its able and progressive management.

Assets, over $10,500,000. Net Surplus, over $1,000,000. Good Agency openings for energetic men.

HOME OFFICE, TORONTO ONTARIO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent
Board of Trade Bldg.
Montreal

J. S. CARTER, Gen. Agent,
217 McDermott Ave.
Winnipeg, Man.

I. E. SUCKLING, Gen. Agent,
S. E. Corner King & Yonge Sts.,
Toronto, Ont.

A Revelation

THE CFCo LTD

We firmly believe that the Economy effected in Steam Consumption and the Steady, Reliable Service given by Fairbanks-Morse Steam Pumps will prove a revelation to most engineers.

The design is fundamentally correct, as the pump relieves itself without setting up internal strains. There is an entire absence of short stroking, straining, or blowing out of valves so noticeable in some pumps when working under heavy load.

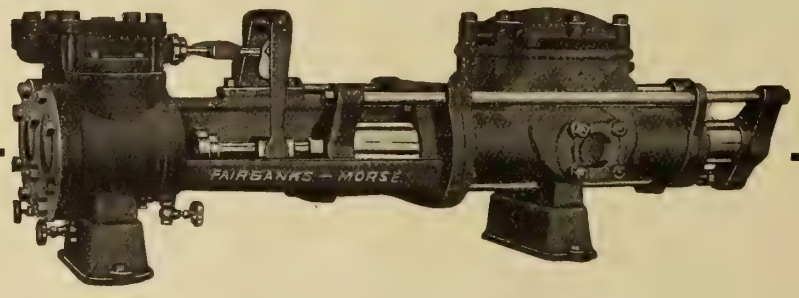
We build Fairbanks-Morse Pumps for Steam, Electric or Belt Power. Also Underwriters' Pumps.

FAIRBANKS-MORSE PUMPS—All sizes for any pressure

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

MONTREAL
ST. JOHN, N.B.
TORONTO



WINNIPEG
CALGARY
VANCOUVER

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,
Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

CARTER, W. E. H., B.A , Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

WILLMOTT, A. B., M. A., B. SC.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

RALPH A. MEYERS, E.M., B. SC.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

GROCH & GROCH
Consulting Engineers and Metallurgists
COBALT, ONT.
Mills designed and erected. Specialists in cyaniding and concentration.

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

ASSAYERS, CHEMISTS AND ORE TESTERS.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office; McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

S. F. KAVANAGH
Assayer
Minning Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors. Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Goristine Bldg., Montreal.
Phone M-7515

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

LONGYEAR & HODGE
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

FLAHERTY, R. H.
Examines and reports on Iron Lands. Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

G. W. DIXON
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, ROOM 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building, Montreal

SUTCLIFFE & NEELANDS,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1075. Report on the Gowganda Mining Division 1908, accompanied by a map, by W. H. Collins.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

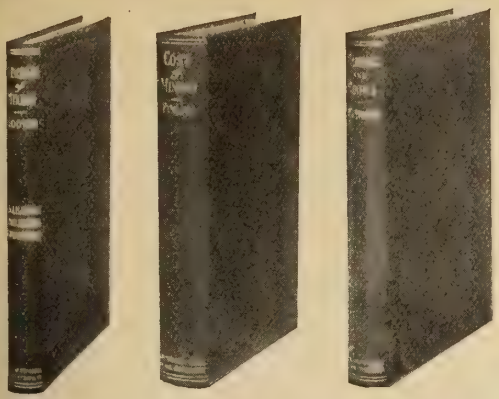
1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology* as *applied to practical mining.* It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mir es. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.

Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00 Foreign Countries in Postal Union $5.00

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

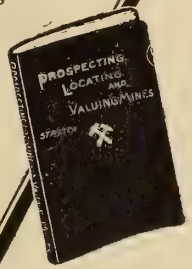


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT

CANADIAN MINING JOURNAL

CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co. ..vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd,, Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. v
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,03 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land ha been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in th Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discovers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed b Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

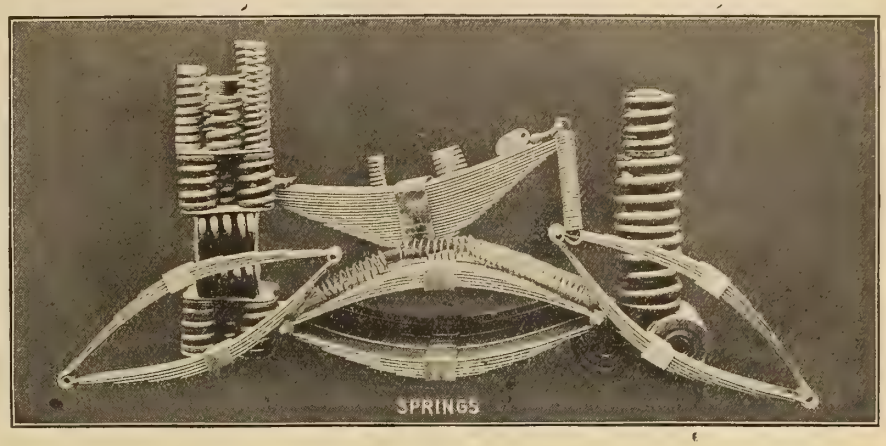
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

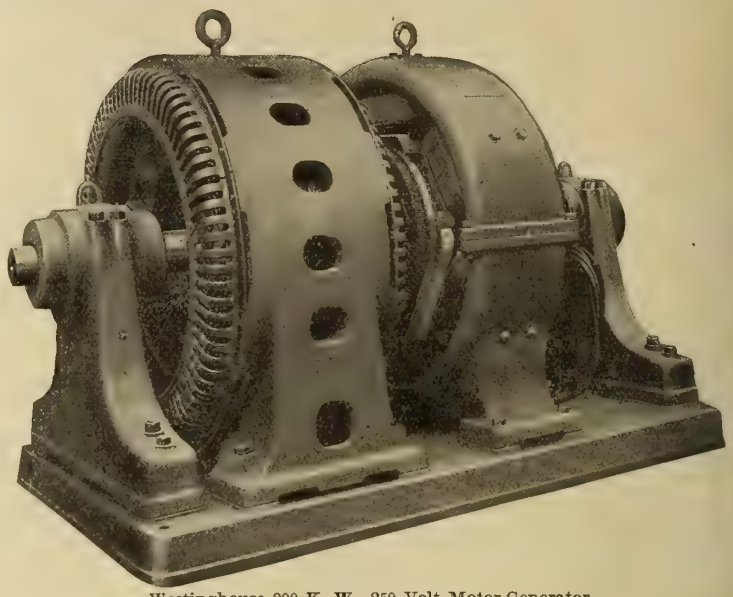
General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse Motor-Generators

Westinghouse Standard Motor-Generators are built for both 25 cycle and 60 cycle circuits, in sizes up to and including 2,000 kilowatts, utilizing either synchronous or induction motors. Synchronous motor-generators are arranged for self-starting from the alternating-current end, and all sets may be started from the direct-current end.

In general, Westinghouse Motor-Generators may be used without step-down transformers on alternating-current voltages up to 6,600 volts. Direct-current voltages are 250 and 600 volts.



Westinghouse 200 K. W., 250 Volt Motor-Generator.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

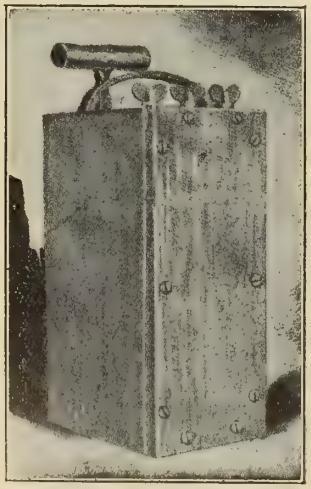
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appear ance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

A Ten-by-twelve Tent for $9.90

Made of 8-Ounce Duck



THIS is a photographic illustration of a special tent we have had made on a quantity-order basis. In no other way could we supply a tent of this size and quality of canvas for $9.90.

Made of 8 ounce duck, with double sewn seams and re-inforced strain points.

Used either with an outside ridge pole, or a ridge rope stretched between trees. An ideal prospector's tent with plenty of wall.

Dimensions—Height, 7 feet; Length, 12 feet;
Width, 10 feet; Height of walls, 3 feet.

Complete with guy ropes,..... **$9.90**

Poles and pegs if desired, **95c** extra

A "Black-Fly"-Proof Netting

A SPECIAL FLY NETTING with *smaller mesh* than the ordinary mosquito netting, so that it is proof against Black Flies, and all other insect pests. This netting we have had made to meet a special demand from the north country; per yard—9 cents, or piece of 24 yards for..... **$2.00**

36 INCHES WIDE, WHITE OR GREEN.

THE ROBERT SIMPSON COMPANY LIMITED

TORONTO

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

---

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

31 TORONTO No. 17

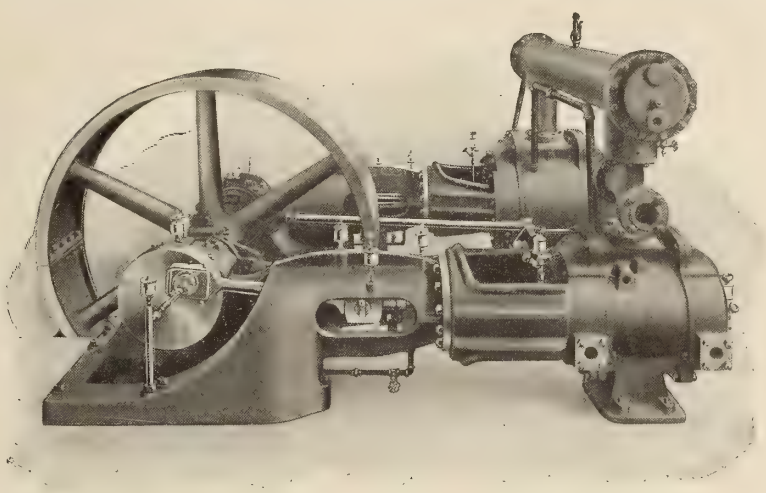
We are now the Sole Canadian Agents for

The Laidlaw-Dunn-Gordon Company

AND

The Clayton Air Compressor Works.

Manufacturing Air Compressing Machinery of all kinds



BELT DRIVEN TWO STAGE COMPRESSOR WITH CORLISS AIR VALVES.

Write for Bulletin No. L 521

MUSSENS LIMITED

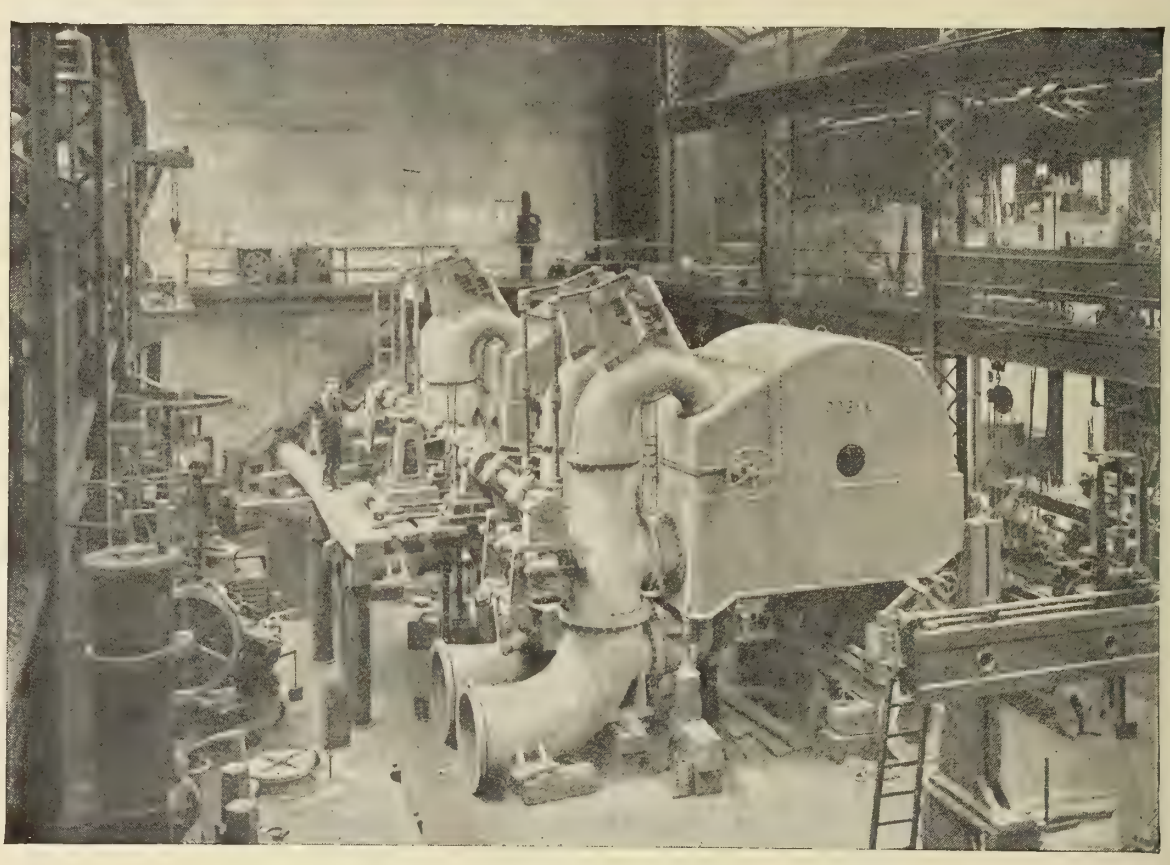
MONTREAL,	TORONTO,	COBALT,	WINNIPEG,	CALGARY,	VANCOUVER.
318 St. James St.	73 Victoria St.	opp. Right of Way Mine	259-261 Stanley St.	Crown Bldg.	Mercantile Bldg.

DOBLE WATER WHEELS

In successful operation under heads from 25 ft. up to 2,200 ft. and in capacities up to 9,000 H. P. from a single jet and runner. With patented regulating needle nozzles and ellipsoidal buckets embodying the following notable advantages:—

HIGHEST EFFICIENCY
CLOSEST REGULATION
STRICTEST ECONOMY

We illustrated in the last issue Doble Wheels ranging from 100 H. P. to 237 H. P. under heads varying from 110 ft. to 620 ft. We illustrate to-day a



10,500 H. P. DOBLE WHEEL

Under construction in our shops, Montreal, for the B. C. Electric Railway. It was designed to deliver 10,500 H. P. at 200 R. P. M. under a head of 380 ft. There are four sets of buckets, all on the same shaft, two on each side of a 5,000 K. V. A. alternating current generator.

Send for Descriptive Literature

The John McDougall Caledonian Iron Works Co.

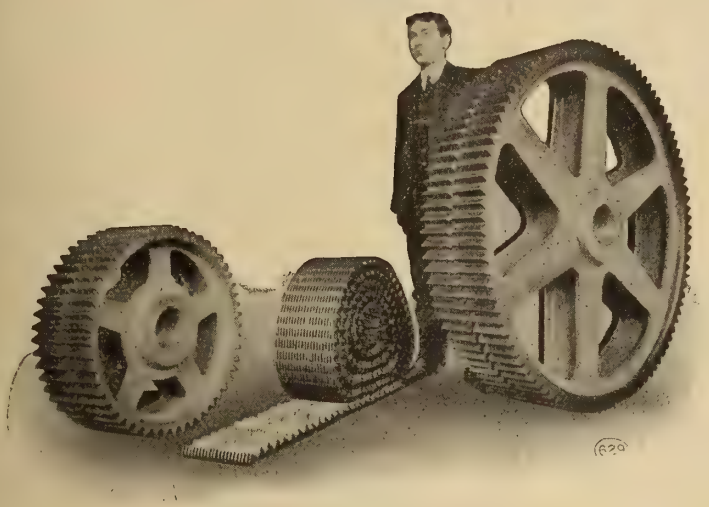
LIMITED

Works: 512 William Street, Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

Renold Silent Chains

Transmit at a

High Speed-any Power



150 H. P. Drive to Lineshaft.

and do it as **smoothly** and **quietly** as belts with the certainty of gears.

We have installed a number of these heavy drives in Canada with the greatest of satisfaction.

JONES & GLASSCO

Sole Canadian Agents **MONTREAL**

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we know, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs per year than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

Smith Premier Typewriter

Model No. 10

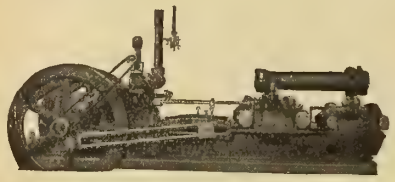
A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



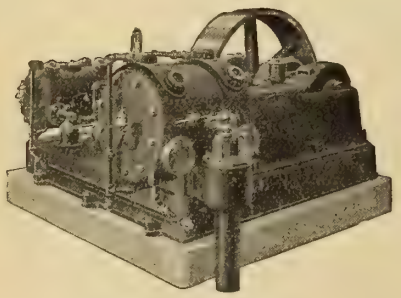
DO YOU NEED AIR?



Two-Stage, Straight Line.



Corliss Tandem.

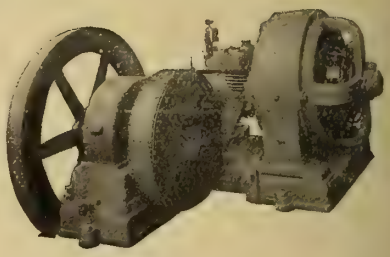


Two-Stage, Belt Driven.

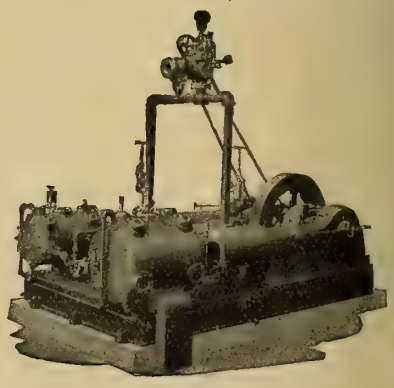
THERE is a Sullivan Compressor of just the type and size to meet **your** working conditions most efficiently and economically. Sullivan Compressors unite the most approved features of modern design, with a conservatism in ratings, an honesty in materials, and a thoroughness in details of construction which enables users to place full confidence in them for every-day service or for emergencies.

Ask for Catalogue 658.

Coal Cutters
Rock Drills
Diamond Drills



Electric Driven.



Two-Stage Duplex.

150 Michigan Ave., CHICAGO **SULLIVAN MACHINERY COMPANY** **CLAREMONT, N. H.**

BIRMINGHAM BUTTE COBALT, ONT. DENVER EL PASO JOPLIN KNOXVILLE NELSON, B.C.
NEW YORK PITTSBURG PARIS FRANCE SALT LAKE SAN FRANCISCO SEATTLE SPOKANE ST. LOUIS SYDNEY, AUS.

BAGS!

JUTE COTTON

DUCK

FOR

ASBESTOS COAL ORE

CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

Amatite ROOFING

NEEDS NO PAINTING

MOST ready roofings require special painting and coating, and unless this is done regularly, you are sure to have leaks and trouble right along.

If you use Amatite, nothing of the sort is required. You will have real roof protection *without painting* of any kind.

Amatite is made to stay waterproof and give protection year after year, without any thought or care on your part.

First—Because it is waterproofed with Coal Tar Pitch.



Second—Because it has a real Mineral Surface.

Amatite, owing to these features, is the most economical roofing made. Its first cost is low, and you are *saved* all future expense for repairs or paint because it will need neither.

If you haven't seen Amatite, write for a sample to-day. From it you will very quickly understand why it doesn't require painting; why it does not leak; and why it saves you money.

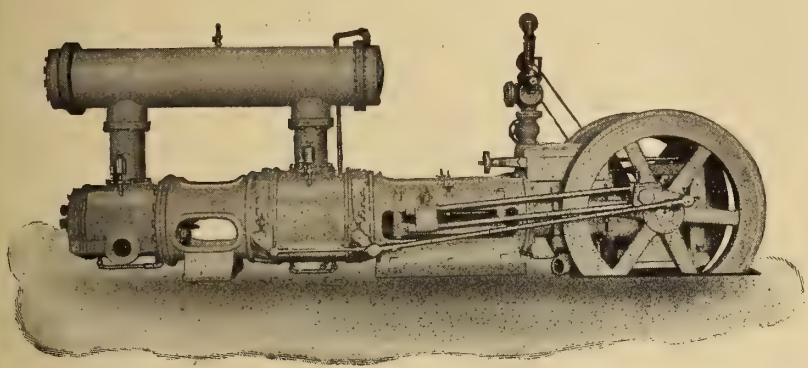
Address nearest office to-day.

THE PATERSON MANUFACTURING COMPANY, LTD.
Toronto, Montreal, Winnipeg, Vancouver, St. John, N. B. Halifax, N. S.

Rand Class "C-2" Straight Line, Steam Driven Compound Air Compressors

High *efficiency, simplicity* and ease of accessibility are distinct characteristics of the Class C-2 Compressor.

Corliss Inlet Valves on Low Pressure Air Cylinder, giving exceptionally large direct intake areas, practically unlimited life, quiet operation at all speeds and sustained high volumetric efficiency.



A simple direct Corliss Valve motion in which all complications have been eliminated and best efficiency obtained.

Sole Agency for B.C. Drill Steel in Cobalt Territory.

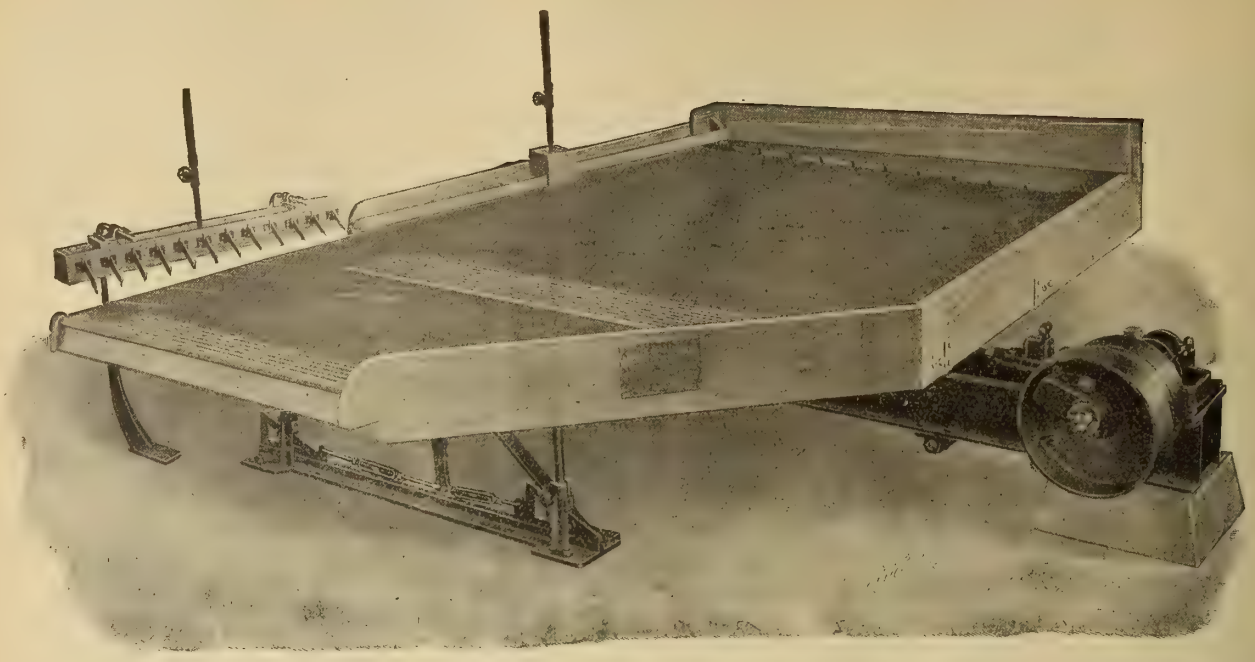
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

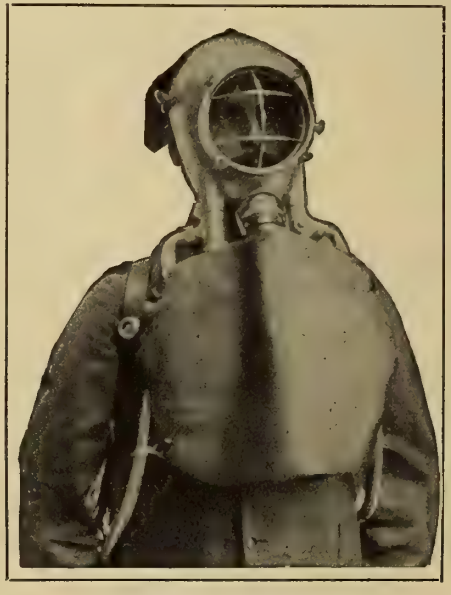
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING FULL PARTICULARS ON APPLICATION

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON

70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

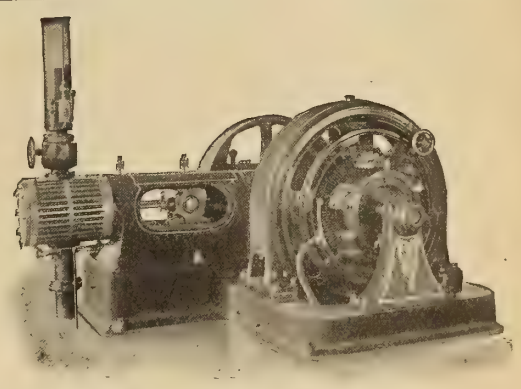
Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.

Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

An Engine that is built for Mine Haulage Work.



THE McEWEN

The simplicity, accessibility, close regulation and general reliability of these engines make them ideal for Mine work.

They are smooth running, require little attention and are quick and sensitive in regulation under full load or when running light.

A heavy rigid bed. Cross head guides, main bearings, and face for cylinder attachment machined at one operation. All parts are in perfect line and will stay so. Piston type valve, double ported, frictionless. Balancing pressure plate slotted to correspond with valve seat. A quicker more powerful stroke by providing double admission and exhaust edges. Automatic Begthrup Inertia Governor.

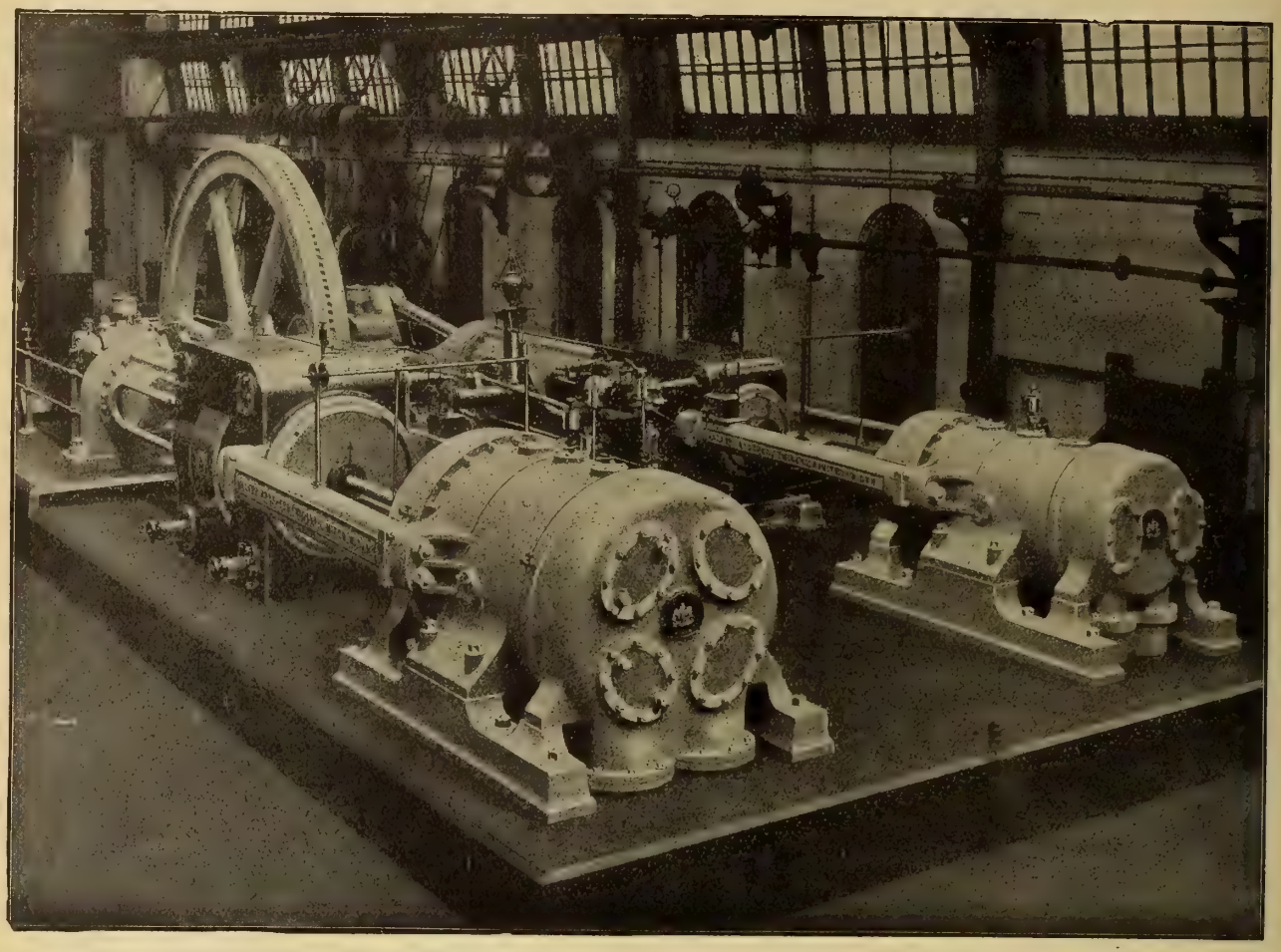
Built in simple or compound units of from 10 to 700 H. P.

Get our McEwen Engine Catalogue.

The Waterous Engine Works Co., Ltd. **Brantford Canada**

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

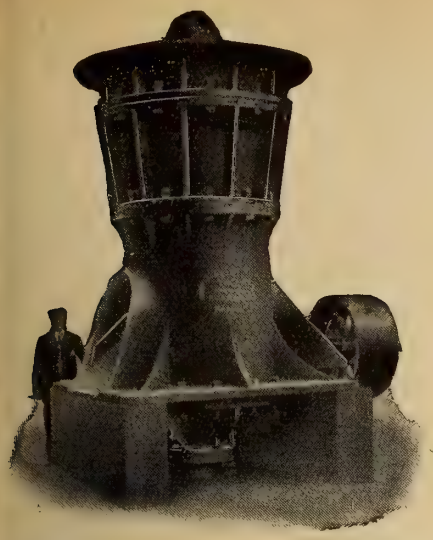
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jacks Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF
AND ALL KINDS OF
BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President

C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

CORRESPONDENCE SOLICITED

THE BROWN MACHINE COMPANY, LIMITED

NEW GLASGOW ENGINEERS NOVA SCOTIA

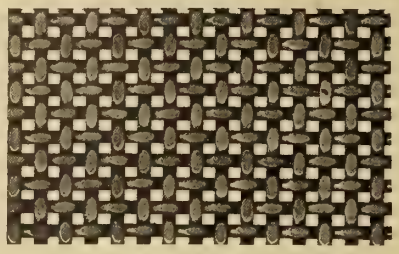
ROLLED WIRE SCREEN

Rolled Steel Wire Cloth

A flattened Steel Wire Cloth has the same smooth surface as perforated metal, with the added advantage of doubling the screening area.

Your enquiries are solicited.

"A SUBSTITUTE FOR



Rolled Steel Mining Cloth

Owing to the increase in the demand for the above materials, we have recently installed a very heavy Rolling Plant and now have facilities for rolling any desired size and weight.

Prices and details on application.

PERFORATED PLATES."

Hamilton, Ont. **THE B. GREENING WIRE COMPANY, LIMITED** Montreal, Que.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

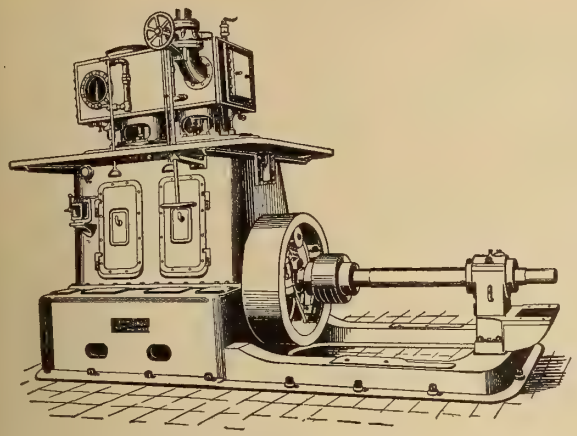
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Cost Nothing For Repairs



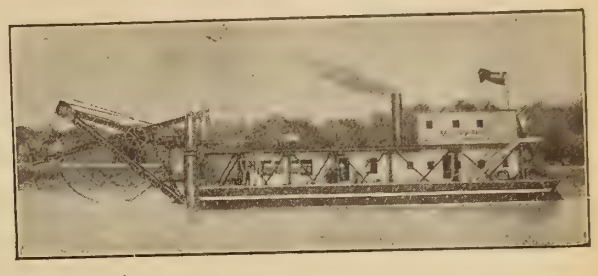
A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que. R. W. Robb, Manager
Traders Bank Building, Toronto, " Wm. McKay, "
Union Bank Building, Winnipeg, " W. F. Porter, "
609 Grain Exchange Building, Calgary, Alta. J. F. Porter "

M. Beatty & Sons
Limited
Welland, Ontario
MANUFACTURERS OF



Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S
Field Instruments
FOR
Civil, Mining Engineers & Surveyors

2½ INCH NEEDLE.



WEIGHT 15 OUNCES.

THE VERSCHOYLE POCKET TRANSIT
combines the useful features of the Abney Level, Prismatic Compass and Clinometer

For preliminary surveys of every description

Catalogue On Request

Eugene Dietzgen Co.
LIMITED,
TORONTO, - 10 SHUTER STREET

THE
Bennett Fuse
Crown  Brand

MANUFACTURED BY
William Bennett, Sons & Co.
CAMBORNE, CORNWALL, Limited
ENGLAND

CANADIAN OFFICE:

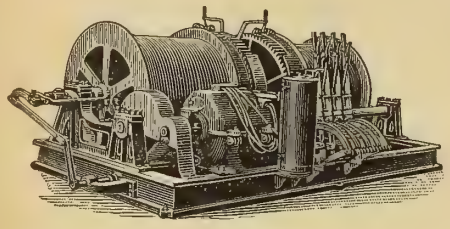
The Giant Powder Company, Con.
VICTORIA, B.C.
AND AGENCIES THROUGHOUT THE DOMINION.

Flory Hoisting Engines

STEAM AND ELECTRIC

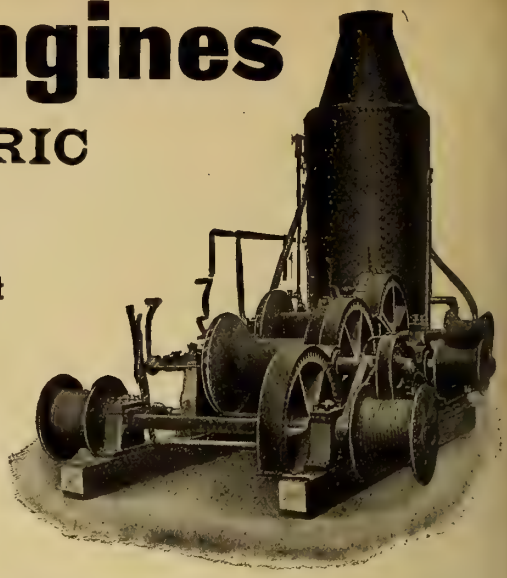
Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO., New Glasgow, Nova Scotia.
MUSSENS LIMITED, Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

50 SWITZERLANDS IN ONE



Write for copy of "Challenge of the Mountains."

The Canadian Rocky Mountain National Park

The Largest Park in the World. 5,732 miles in extent.

Pre-eminent Natural Grandeur. Splendid Hotel Accommodation. Luxurious Train Service. Most delightful place in the world for a vacation. A paradise for Mountaineers, Naturalists, Geologists and Mineralogists.

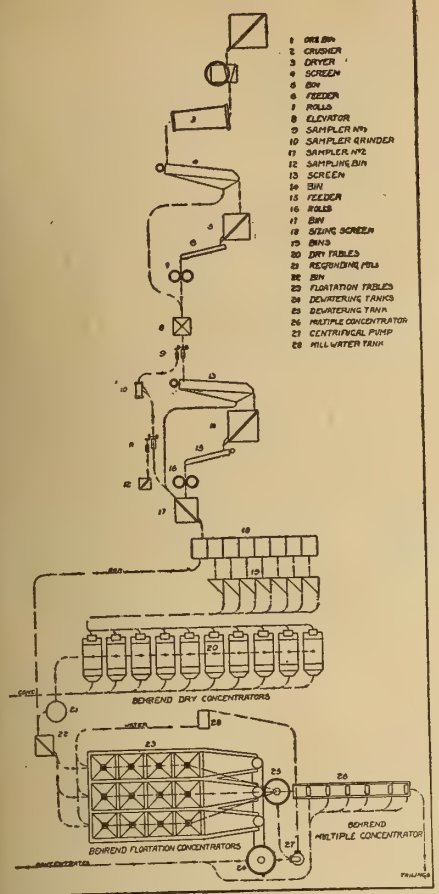
Reached by the

Canadian Pacific Railway

ROBERT KERR, Passenger Traffic Manager, MONTREAL.

OR

R. L. THOMPSON, Dist. Pas. Agent
TORONTO, - CANADA



FLOW SHEET

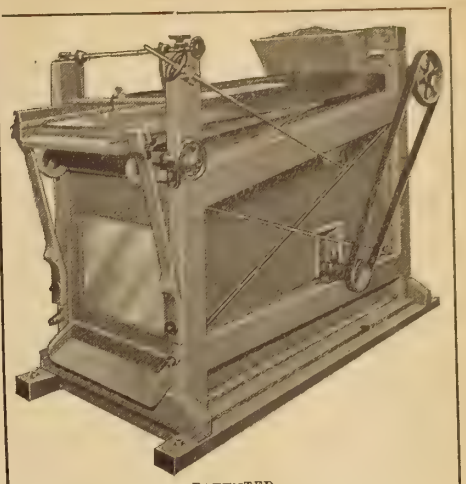
OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM

OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED

32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

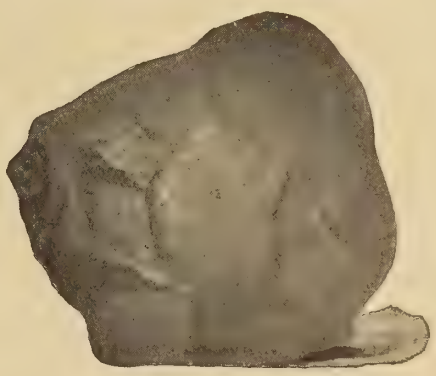
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

TO BE SEEN AND OBTAINED AT THE OFFICES OF THIS PAPER.

NOW READY

Published February 9th. ***Twenty-fourth Year.***

Containing all the latest information up to within a few days of publication.

THE

MINING MANUAL

1910

BY WALTER R. SKINNER.

The Standard Reference Work on Mines.

Price 17/- net Post Free (Abroad).

1,600 pages. In demy 8vo, handsomely bound in RED cloth.
A record of information concerning

MINING COMPANIES
(Gold, Diamond, Silver, Copper, Tin, Iron, and other Mines, Collieries, Land, Exploration and Mining Investment Concerns, &c.)

Arranged in three sections—

Australasian, African, Miscellaneous,

Preceded by Tables of Crushings and followed by lists of Mining

DIRECTORS, SECRETARIES, MINING and CONSULTING ENGINEERS and MINE MANAGERS.

Their Names, Addresses, and Descriptions, and Names of the Companies with which they are connected, and a

DICTIONARY OF MINING AND OTHER TERMS.

THE MINING MANUAL for 1910 contains particulars of over 3,600 Companies arranged in three sections, 430 Companies being AUSTRALASIAN (including Western Australia, Queensland, Broken Hill, Deep Leads, New Zealand and Tasmania); 1,030 AFRICAN (including Transvaal, Rhodesia ,West Africa, Cape Colony, Natal, Egypt); and 2,140 MISCELLANEOUS (including Siberia, Mexico, India, British Columbia, America, &c., and the Coal, Iron, Tin and other Mining concerns of the United Kingdom). The particulars given of each Company include the Directors and other officials; date of establishment; seat of operations; description of the property, with the purchase consideration; plant erected or in course of erection; present working results; ore reverses; details of capital; calls; dividends paid; and the financial position as disclosed by the accounts. Highest and lowest prices of the shares for the last four years, also latest price. The three sections extend over 1,100 pages,

Crushing tables and Gold Outputs from the principal mines are given at the commencement of the volume, showing tons treated monthly, results obtained, and yield per ton; also annual yields.

The Lists of Directors (8,000), Secretaries (1,900, Mining and Consulting Engineers and Mine Managers (1,400) include their addresses and descriptions and names of the Companies with which they are connected.

A complete Alphabetical Index, containing the names of 5,300 Companies and including many useful items of reference, occupies 42 pages.

Full particulars of all Re-constructions, Re-organisations and Amalgamations durlng 1909 are given in a simple and concise form.

LONDON:
WALTER R. SKINNER, 11-12, Clements Lane, Lombard St. E.C.
Nat. Tel.: 1323 Avenue. Tel. Address: Capitalist, London.

COAL WASHERIES



"Link-Belt" Washery for small size bituminous coal.
Central Coal and Coke Company, Girard, Kansas.
View shows duplicate plant under construction.
Capacity of both plants, 3000 tons in ten hours.

We Design and Construct:

Retarding Conveyors
All kinds of Chain Conveyors
Belt Conveyors
Bucket Carriers
Screw Conveyors
Car Hauls, Picking Bands
Tipples, Washeries
Coal Pockets
Coaling Stations
Power House Fueling Equipments
Industrial Cars and Tracks
Ball-Bearing Turntables
Steam and Electric Locomotive-Cranes
Lumber and Log Hauls
Car Loaders and Unloaders
Steel Casings, Chutes
Hoppers, Feeders
Weigh Boxes, Crushers
Rotary, Stationary and Shaking Screens
Elevator Boots, Buckets
Bearings, Takeups
Friction Clutches, Jaw Clutches Etc.
Conveying and Power Transmission Chains
Sprocket Wheels, Small Rollers, and Truck Wheels for Conveyors, Carriers and Cars

WRITE FOR NEW GENERAL CATALOG No. 90

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

299 Broadway, NEW YORK
1501-2 Park Building, PITTSBURGH
Central Nat'l Bank Building, ST. LOUIS
439-440 N.Y. Block, SEATTLE
Lindrooth, Shubart & Co., DENVER
Wilmot Machinery Co., NEW ORLEANS
SAN FRANCISCO, Eby Machinery Co.

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Safest and Best Quality.

Catalogue of Braun's Laboratory Appliances is interesting reading to the Assayer and Chemist, and is yours for the asking.

What is Your Address?

LYMANS, Limited,
MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Casartelli's Patent Mining Dial



SIGHT limb moves on axes cast on the compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indices attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Telescope attachment if desired.

The Simplest Mining Dial made—the most efficient—most durable—quite the **best.** Proof of this in Catalogue F—free on request.

Sizes 5 inches and 6 inches.

JOSEPH CASARTELLI & SON
Scientific Instrument Makers
43 Market Street, Manchester, Eng

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co , Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd- Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS
MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire-threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

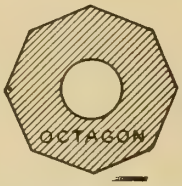
ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.
And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.
Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

Specify Distinctly  Allen's Stag Brand

"STAG" BRAND.



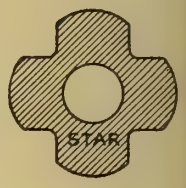


SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock





SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL

A New, Complete and Authoritative Treatise.

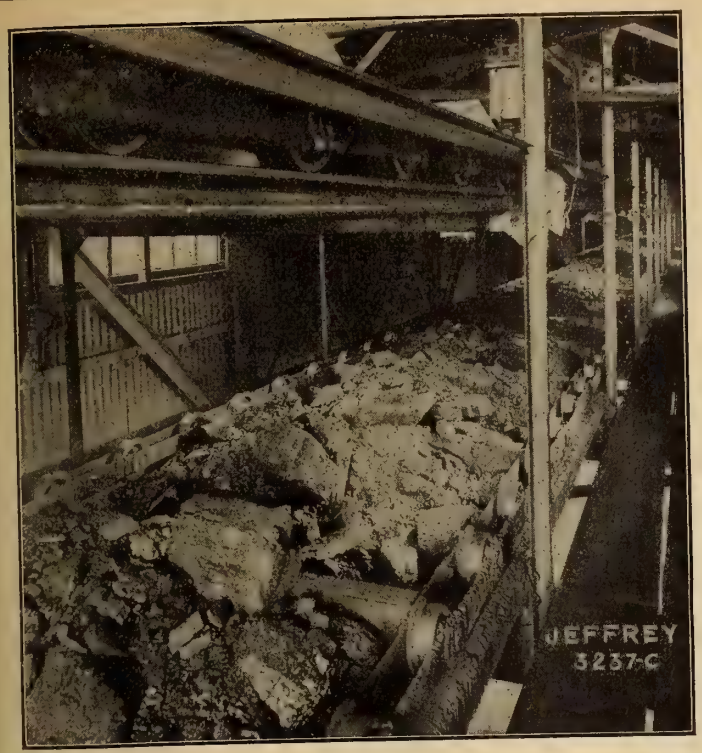
CYANIDE HANDBOOK BY J. E. Clennell

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL



Handling Coal Economically

Jeffrey Conveyers are constructed throughout to withstand hard service. They are moderate in first cost and require less for up-keep than any other conveyers built.

Our 33 years experience in the design and manufacture of conveying machinery enables us to produce the most economical and dependable equipments for handling any materials.

Let our expert engineers study your coal handling problem and suggest the best system for your requirements.

Catalogue X 81, describing various styles of Jeffrey Conveyers, is yours for the asking.

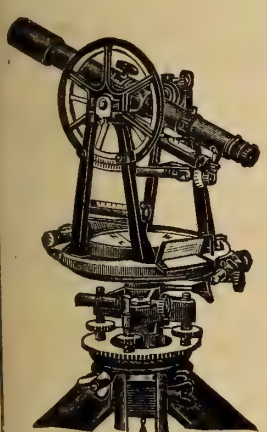
The Jeffrey Manufacturing Co.

Toronto Office: 174 King St. East.

Jeffrey Branch Offices in the Leading Commercial Centres all over the World.

Canadian Office and Works: Cote and Lagauchetiere Streets, Montreal.

Main Office and Works: Columbus, Ohio.



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

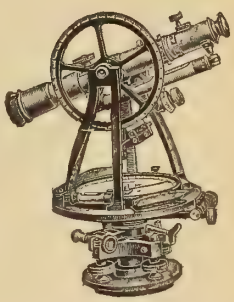
Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196

REPAIRS To Surveying Instruments



WE have established in MONTREAL a **Repair Department,** fully equipped to repair surveying instruments, drawing instruments, measuring tapes, etc., in the most careful and workmanlike manner.

We employ in this department mechanics trained at our works, experienced in the repair of a wide variety of instruments of every make, and we can assure our customers that any repair work entrusted to our care will be promptly and satisfactorily executed.

KEUFFEL & ESSER CO.

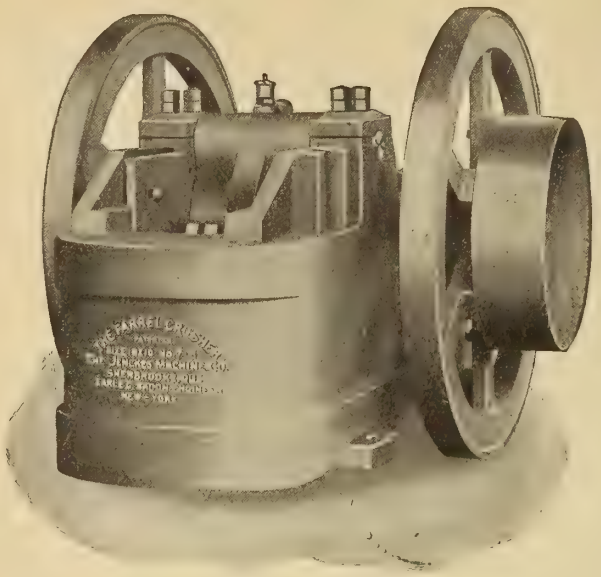
MONTREAL, 252 Notre Dame St. W.

General Office and Factories, HOBOKEN, N.J.

New York, Chicago, St. Louis, San Francisco

Mathematical and Surveying Instruments

Drawing Materials **Measuring Tapes**



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

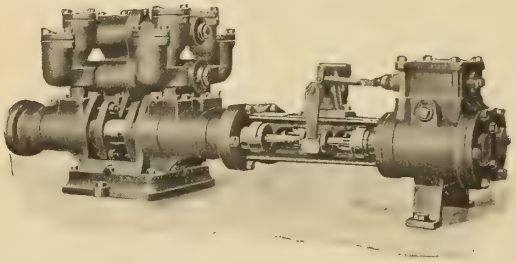
Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices:

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver

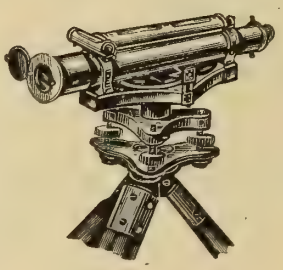
Power & Steam Pumps, Condensers, Travelling Cranes, Etc.

Write for Catalogue



THE SMART-TURNER MACHINE COMPANY, Limited

HAMILTON, CANADA



DAVIS DERBY.

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 BEAVER HALL HILL, - MONTREAL

Write for pamphlet No. 42 M.

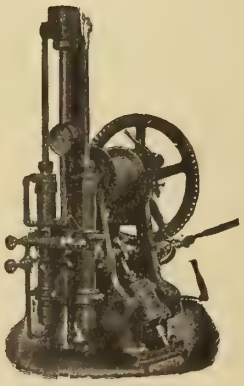
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins,
ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY,

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, Sept. 1, 1910 No. 17

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials	513
(a) Peat	513
(b) Engineers as Citizens	514
(c) Mining Operations in Quebec During 1909	515
(d) Porcupine	515
(e) Mine Cost Data	515
(f) A Good Report	516
(g) Editorial Notes	516
The Prospector	516
Report of Mining Operations in the Province of Quebec During the Year 1909	517
Abstract of Report of Mr. James Ashworth	522
Mining and Metallurgical Opportunities in Canada, by A. B. Willmott	527
The Engineer Group, Atlin Mining Division, British Columbia, by E. Jacobs	528
The Electric Operation of the Indiana Steel Plant, by F. C. Perkins	529
Are British Columbia Ores Improving?, by E. Jacobs	531
Correspondence	532
Industrial Section	533
Personal and General	534
Special Correspondence, etc.	534

PEAT.

Self-appreciation is a virtue which we attempt to encourage in ourselves. Yet we feel that it can be overdone in others.

For more than two years the CANADIAN MINING JOURNAL pressed upon the attention of the Federal Mines Branch several pertinent matters. Chief amongst these were the investigation and control of explosives, the encouragement of mine rescue work, and investigation of mine accidents. Within the last few months the Mines Branch has diverted its energies to these subjects. It has made a fair beginning in that it has stimulated public interest. But, quite naturally, any efforts it can put forth must but feebly compare with the requirements of the case until such time as an effective addition be made to its present staff. In thus alluding to matters already worn threadbare, one object is to correct what we consider a very serious mistake in the policy of the Mines Branch. The organization has got on the right track in the matters mentioned above. Life saving, whether indirectly by the prevention of accidents or directly by salvage appliances, eclipses all else in importance. It is, then, with pain that we observe that part of the staff and much of the appropriation of the Mines Branch are being used for the solution of the peat problem. Both staff and appropriation are limited, very limited indeed. This disposition of its energies may be compared to the case of the man who insisted upon finishing weeding his garden, the while his house was burning.

Further to illustrate our point let us consider the present position of Canada in regard to mining accidents. Great Britain, the leading European nations, and the United States have adopted enlightened preventive measures. We have alluded so recently to these that iteration is not necessary. The Canadian government, despite the representations of many employers and our own humble but pointed remarks, has rested upon its oars until the pressure was so great that it could not be resisted. Meanwhile many lives have been lost, and, as alluded to before, the United States authorities had to be called upon for assistance in the most distressing Extension colliery catastrophe.

Now, whilst we thoroughly approve the beginning already made, we do not hesitate to state that the Mines Branch has but two courses to pursue. Either it must secure large additions to its staff, or else it must drop its interesting, but not invaluable, work in peat and such things. Peat can wait. Human lives must not be wasted.

Lest any of our readers question the fairness of our reference to peat let us here and now survey the facts, denuded of their garb of shimmering fancy.

The use of peat for fuel is older than history. In the coalless provinces of Canada, peat, like everything else that can be burned, is of importance. The Mines Branch at Ottawa has set up a Swedish peat-making plant on a bog at Alfred, Ontario. If press despatches are to be trusted, the results obtained at Alfred go far to imperil the supremacy of Pennsylvanian coal. Indeed, Dr. Haanel is reported as saying that peat, ready to be used as fuel, can be produced at the Alfred works at a cost of $1.70 per ton. He is also credited with the statement that as much heat can be produced from a ton of peat as from a ton of coal. Both statements are fantastically inaccurate, and we shall not believe without further evidence that Dr. Haanel is responsible for them.

Much effort and a vast amount of ingenuity have been expended in the past in the attempts to make use of the extensive peat deposits of Ontario and Quebec. According to the Hon. Mr. Sifton, the failure of these endeavours has been due largely to the unscientific methods and uneconomic processes employed.

Calm consideration indicates that it is scarcely likely that all previous workers in peat have been lacking in scientific knowledge, or in their grasp of the commercial aspects of the question. Nor is it probable that the installation at Alfred of a Swedish plant of a well-known type will dispel all the difficulties that hitherto have beset the manufacture of peat fuel.

The crux of peat fuel manufacture is the removal of the moisture, of which peat is singularly tenacious. The sun and the wind are the cheapest agents, but obviously a nation's supply cannot with safety be permitted to depend upon the weather. On the other hand, if artificial heat be resorted to for driving off the water, experience has shown that the cost is increased to a point at which peat cannot command a market where coal or wood is obtainable.

It may be possible, though we doubt it, that the bare manufacture of air-dried peat can be carried on at a cost of $1.70 per ton; but it is safe to say that no peat fuel will ever be put on the market in a commercial way at any such figure. Manufacturers' profits, freight charges, cost of distribution, and middlemen's commission would bring the price up to two and a half or three times the original cost. Nor is peat a substance that bears transportation well. It crumbles and breaks, and there would be an appreciable loss on arrival at distant markets. Its fuel value, also, as compared with coal is overstated. Air-dried peat contains 12 to 15 per cent. of water at least, and its calorific power is little more than one-half that of anthracite coal. Peat fuel delivered to the consumer at, say, $4.50 per ton, would be much dearer than anthracite at $6.50 or $7.00 per ton. As long as hard coal can be obtained at present prices, there is little hope of its being displaced by peat, for the consumption of which special stoves, fireplaces and furnaces are required.

Nevertheless, the carbon that nature has stored in the peat bogs of Canada, aggregating thousands of square miles in extent, may some day be required to warm the bodies and cook the victuals of Canadians. Any real advances in the preparation of peat for fuel will be welcomed. There is nothing to lead us to believe that the Mines Branch has thrown light upon the question. Meanwhile our major point is the fact that other work has an immediate and imperious call upon the Mines Branch.

ENGINEERS AS CITIZENS.

Not long ago we were asked why the mining engineer is so indifferent to his duties and privileges as a citizen. We found that the assumption and the answer demanded a deal of excogitation.

Mining engineers, like their civil brothers, are nomadic. They live on the fringe of civilization. They work. Their work demands continuous attention. They do not touch politics. Rarely do they court the muses. When they gather in convention they talk mining. In all their spare moments they talk mining. To them the rest of life is shadowy and unsubstantial.

How many mining engineers are in the House of Commons, or in our provincial legislatures? How many are prominent in the business world, or in letters, or in sports, or in anything but mining? How often do we see the mining engineer rising to high administrative positions?

We can see two handicaps under which the mining engineer labours. The more definite of these is his ignorance of office methods and of business training. For example, an operator informed us recently that he had employed a second-year student of mining as timekeeper. Here we cannot quote our informant verbatim. He was not quotable. But it appears that the second-year student was incapable alike of making his extensions correctly, and of adding up his totals. It took thirty-six hours of hard labour to correct that young man's mistakes. Yet in all probability the youth was possessed of ordinary ability. Who is to blame?

The second handicap is less definite, but none the less serious. The mental development of the mere specialist is not symmetrical. His mind is like a hammer with a broken handle. It works, but its range is sadly limited. The mining engineer, who is merely the mining engineer, is far from reaching the full development of his mentality. His vision is narrow, and, in matters not pertaining to his profession, blurred and oblique. The very nature of his work demands that he cultivate the humanities.

Of all enlightening influences good books are the best. Good books are not hard to get. They take a man out of himself. They quicken and broaden and refresh the reader. They are not luxuries, they are absolute necessaries . . . .

Later we hope to have more to say on this topic. Our immediate object is to point out that the lack of roundness in the mining engineer's education is the main cause of his obscure position as a citizen. Mining en-

gineers as a class are the salt of the earth. As public citizens they are almost negligible.

MINING OPERATIONS IN QUEBEC DURING 1909.

We have looked forward with keen expectation to the first Quebec annual report issued under the supervision of Mr. Denis. Our first feeling on receiving an execrably printed 32-page pamphlet was one of disappointment. We had hoped that the new regime in Quebec would have been signalized by a report as ample and as dignified as are those issued by other provinces. No doubt the new Superintendent of Mines has had his hands more than full. He has occupied the office for but a few months. In many directions he has re-vivified the Department of Mines and, certainly, he has inspired the provincial government to better things. These considerations induce us to overlook the slimness of the report. But the cheapness of the paper, the wretchedness of the printing, and the unutterableness of the half-tones cause us to cry aloud and spare not. The province and the Department should be thoroughly ashamed of themselves.

It is encouraging to note that the mineral production during 1909 was the highest so far recorded. The figures for 1909 are $5,552,062, whilst for the year before they were $5,458,998, an increase of $93,064. Owing to changes made in the method of gathering statistics it is probable that the increase was still larger.

The principal gains during the year were in the outputs of copper ore, cement, marble and limestone; while the chief items of loss were in bog iron ore, chrome iron ore, asbestos, mica, granite and tiles.

Since 1900 the yearly mineral production has more than doubled itself. Although the figures are still far too small, yet there appear to be healthy symptoms of growth. One strong factor in that growth is the honest endeavour of the Quebec Government to re-model the mining laws. The recent changes have been fully noticed in these columns. We need only note here the fact that Quebec has eschewed that bugbear of the prospector, "discovery."

Mr. Denis briefly reviews the status during the year of each mineral industry. An abstract of his report appears on another page. Mr. J. H. Valiquette, Assistant Inspector of Mines, contributes an analytical review of all mining accidents occurring throughout the year. To this he appends timely warnings as to the use and storage of explosives.

In the main, Quebec has every cause to look forward with confidence. Her time is coming, and coming rapidly. It will come even more rapidly when the Department is able to publish a report compatible in all respects with the dignity of the province and with the requirements of the industry.

PORCUPINE.

Three errors against which it is constantly necessary to guard are over-estimation of a prospect, assuming the presence of unproved ore, and dogmatizing upon a mine's future with insufficient data. All of us are prone to sin in any or all of these ways. And, on the other hand, we are equally prone to swing to the other extreme and to assume a guardedly nescient position.

We have watched Porcupine with hope, and fear, and trembling. The latter two sensations have now practically disappeared. We have abundant evidence to believe that in certain spots bonanzas, such as we have never known in quartz mining before, have been encountered. At one young mine, for instance, spectacularly and uniformly rich ore has been sunk in continuously to a depth of 120 feet. Within a short distance, and presumably in the same body of ore, two other shafts, slightly less deep, are in similarly rich ore. Fine gold is disseminated throughout the ore from shaft-collar to sump. Drifts are being run and still the ore maintains its character. In fact, considering the amount of work done we doubt if there has ever been any such showing on the continent. Mill returns, which, naturally, are neither full nor exact, indicate that much of the ore runs well over $100 per ton. Some of it greatly exceeds this figure. The ore body ranges from six to twelve feet in width. Its horizontal extent can not be determined for some time yet.

Some other prospects are almost equally encouraging. It is inevitable that the great majority of claims staked will prove worthless. But all securable evidence points to the fact that the clouds that for so long have hung over Ontario gold mining are at last to be dispelled.

We cannot close without adding a word of congratulation. Porcupine has suffered no plague of boomsters. The "four-flusher" is there, as he is always everywhere. But he is by no means the controlling element. The men who are making Porcupine are content to mind their own business. Neither they nor we wish to see a boom in Porcupine. For once let us witness the blessed sight of a mining camp developed on its own merits.

MINE COST DATA.

It has been well remarked that the only indication obtainable by many mine operators as to costs is the condition of their bank balance. Itemized cost statements are usually made out so late that they are of little assistance. Hence arise confusion, waste and direct loss.

The Joplin Ore Producers' Association proposes to evolve a cure for this disease. A series of daily report forms has been prepared. Forty-eight mine operators are to be requested to fill out these forms daily and send them to headquarters. Here a competent staff will transfer and systematize the data. The costs will be properly distributed and analyzed. Each company will thus have the benefit of comparison with forty-seven other operating concerns. Moreover the facts thus ascertained will prove invaluable in discussing tariff problems.

The identity of no mine will be revealed in the state-

ment. Each will be numbered, and all information is to be considered confidential.

Canadian operators, especially in our large mining districts, might well follow this example. Apart from the economies that would follow, the arrangement would induce solidarity and uniformity.

A GOOD REPORT.

A word of praise is due the Government of British Columbia and Mr. W. Fleet Robertson, the head of the British Columbia Bureau of Mines, for the high character of the Annual Report. In respect of statistical tabulations, in typography, in illustrations, in descriptive matter, the Annual Report leads all Canada.

The full special reports upon the Extension explosion are of vital interest. The Government is no longer indifferent to the unnecessary loss of life in coal mines. It has been resolved that the situation will be met at once. Other provinces are rousing themselves. The honour of leading will rest with British Columbia.

EDITORIAL NOTES.

God save the King! Mr. Julian Hawthorne has turned loose his turbid tide of titillation on poor old England. Except as inspiration for Hawthorne's pellucid prose, shares in Hawthorne silver and iron mines, are worth about as much as Confederate paper money.

We hope that the Canadian Mining Institute will make arrangements to reprint Mr. H. Mortimer-Lamb's exceedingly careful paper on the mineral industries of Canada. Mr. Lamb's paper was read in Germany before the International Mining Congress. It is a difficult matter to treat so vast a subject without becoming either too diffuse or congestingly succinct. Mr. Mortimer-Lamb's paper shows that he has evaporated off the non-essentials without volatilizing anything of value. In plain speech, he has written a good, readable, and accurate paper.

The recently issued map of the Porcupine gold area, districts of Sudbury and Nipissing, Ontario, is a careful and instructive compilation. Messrs. A. G. Burrows and W. R. Rogers, respectively geologist and topographer, are to be congratulated. The conditions under which they worked were difficult. The marginal notes from Dr. W. G. Miller's pen are instructive. With his usual discrimination Dr. Miller steers a safe course. He writes no phrase that can be warped by the "boomster." There may be, however, superfluous canniness in one sentence. "Of course," writes Dr. Miller, "experienced gold mining men will not lay too much stress on surface values." In itself this statement is perfectly true; but taken with the context it may easily suggest to the hyper-sensitive Porcupinian that Dr. Miller does not look favourably upon the gold deposits in question. However, we can always count upon fault-finding.

Northern Ontario is manifesting its intention of taking care of itself. This is evident particularly in the case of Cochrane where a bright and independent weekly newspaper, "The Northland," is now being published. "The Northland" speaks with decision and clearness on public questions. It deserves the support of the community.

Amongst the reports in the Annual Summary of the Mines Branch, Ottawa, are some notes by Dr. Alfred, W. G. Wilson. In reviewing the pulpwood situation, Dr. Wilson remarks that if a portion of the copper-sulphur ores of Quebec can be utilized at the point of production for the manufacture of pulp, the mine owners will not be the only persons benefitted.

THE PROSPECTOR.

The accompanying photogravure represents a plaster cast designed by Mr. P. Norman Nissen. The engraving by no means does justice to the figure. However, our readers will notice with appreciation the poise of the prospector. On his face, marred indeed by the photograph, is a look of whimsical endurance. He has struck his stride. He carries a heavy pack. Evidently his tump-line has gone the way of all flesh and he has resorted to a piece of rope. In detail the figure may be open to criticism; in general effect it is strong and full of meaning and life.



The prospector is not always an heroic figure. The short, wiry, tough bushman is not frequently a thing of beauty. Mr. Nissen has got nearer the truth than most artists can.

It is fair to mention that Mr. Nissen dabbles in art only on rare occasions. He is, as many Canadians know already, a mining man himself and is not without painful experience in prospecting.

REPORT OF MINING OPERATIONS IN THE PROVINCE OF QUEBEC DURING THE YEAR 1909.

Abstract of Report of Supt. of Mines, Theo. C. Denis.

The mineral production in the Province of Quebec during the year ending December 31st, 1909, amounted to $5,552,062. This is a slight increase over the figures for the previous year which were $5,458,998. Thus in 1909 we had the highest mineral production recorded so far.

It should, however, be noted that the aggregate amount for the two years cannot be fully compared with one another owing to the changes made in the method of gathering statistics of certain non-metallic substances such as building stone, lime, bricks, etc. It is very difficult to obtain complete data regarding the production of these materials and, in previous years, the Bureau of Mines had adopted the rule of taking the figures given by the Census Bureau. These figures are given only at long intervals and meanwhile the same figures were repeated from year to year.

We attempted to get the figures for 1909 by applying directly to quarry workers, lime-burners and owners of brick-yards.

This entailed considerable extra work because it was necessary to correspond with an additional number of several hundred operators. Our efforts have been successful and the results most encouraging. In the case of nearly every kind of building material the figures collected have been higher than those given for last year. It is true that they are still far from complete, but they have the advantage of being based upon direct reports.

The following table gives the mining statistics of the Province of Quebec for the year 1909. For purposes of comparison, we have added a column showing the value of the various mineral substances produced in 1908.

Products.	Wages paid to workmen	Number of work men	Quantities	Value	Value in 1908
	$		tons	$	$
Bog iron ore ...	3,082	50	3,300	4,688	30,957
Ochres	16,388	65	3,940	28,093	19,940
Chrome iron ...	20,000	60	2,470	26,604	83,740
Copper ore	69,984	175	35,100	215,580	159,588
Asbestos)			63,965	2,296,584	
)	1,349,864	3,008			2,551,596
Asbestic)			24,801	20,468	
Mica	35.884	176	.....	27,034	95,311
Phosphate	.....	.....	525	4,800	1,610
Graphite	11,866	39	.....	10,339	165
			Galls.		
Mineral waters .	1,260	5	32,537	17,246	.....
			Sq.		
Slate	10,828	30	4,000	24,000	20,056
			barrels		
Cement	125,000	30	1,011,194	1,314,551	1,127,335
			tons		
Magnesite	954	6	330	2,508	520
Marble	70,000	125	.....	130,000	
Flag stones ...	2,225	10	.....	8,500	3,600
Granite	122,780	268	.....	149,064	250,000
Lime	42,504	99	.....	105,489	96,000
Limestone	241,269	699	.....	457,143	223,580
Bricks	205,764	853	M.93,891	584,371	525,000
Tiles, drain tiles, pottery, etc. . (partly estimated)	.....	.....	.....	125,000	270,000
				$5,552,062	$5,458,998

We give below a table showing the value of the yearly mineral production of the Province of Quebec since 1900. It will be seen that in ten years the figures have more than doubled and it may be presumed that this increase will continue in the future.

Year.	Value.
1900....	$2,546,076
1901....	2,997,731
1902....	2,985,463
1903....	2,772,762
1904....	3,023,568
1905....	3,750,300
1906....	5,019,932
1907....	5,391,368
1908....	5,458,998
1909....	5,552,062

Mining Law.

During the session of 1909, the Legislative Assembly of the Province of Quebec enacted some amendments to the Quebec mining law. The changes are important and we deem it advisable to give a summary of the principles. As to details regarding the steps to be followed in order to conform to them, they are given in the text of the Mining Law of the Province of Quebec and in a small pamphlet entitled: "The Miner's Guide," which may be obtained on application to the Bureau of Mines, Quebec.

Under the new provisions, a miner's certificate must be taken out which is valid from the date of its issue to the 1st January following. The price of the certificate is $10.00.

Any holder of a miner's certificate may prospect on public lands, whether surveyed or not, or on private lands where the mines are reserved to the Crown.

Nevertheless, if such holder of a miner's certificate wishes to prospect on private lands, he must first give good and sufficient security, subject to the Minister's approval, for any damage he may cause the surface owner through his prospecting.

Every holder of a certificate has the right to mark out himself, on the ground in unsurveyed territories, one or more claims, but not exceeding five, of rectangular shape, the sides running north and south and east and west, each claim measuring at least forty acres in area and not exceeding two hundred acres in all.

In surveyed territories the holder of a miner's certificate may stake out only one or two claims, each of one hundred acres, or of the dimensions of one lot.

The holder of a miner's certificate, who has established a claim by proceeding as above, must without delay notify the same to the Department of Colonization, Mines and Fisheries or the official at the office nearest to the place of discovery.

Within a delay of four months from the date marked on the stakes planted on the claim, he must, on pain of forfeiture of all his rights, obtain a mining license valid for one year and renewable. Such license is granted on payment of a fee of ten dollars and a yearly rental of one dollar per acre.

Or, if the holder of the certificate prefers to purchase the claim, he may do so by paying ten dollars per acre for superior metals when the lands are more than twenty miles from a railway and twenty dollars when such distance is under twenty miles. But letters-patent, giving full possession of such mining lands, are not issued

until the purchaser has exhibited specimens of the ore taken from it, accompanied by affidavits by competent and trustworthy persons establishing that the specimens exhibited come from such lands and that he has spent, within maximum delay of two years, the sum of five hundred dollars in mining operations.

The steps to be taken to conform to the Mining Law are set forth in a pamphlet entitled: "The Miner's Guide," copies of which can be obtained free of charge by applying to the Department of Colonization, Mines and Fisheries, Quebec.

Iron.

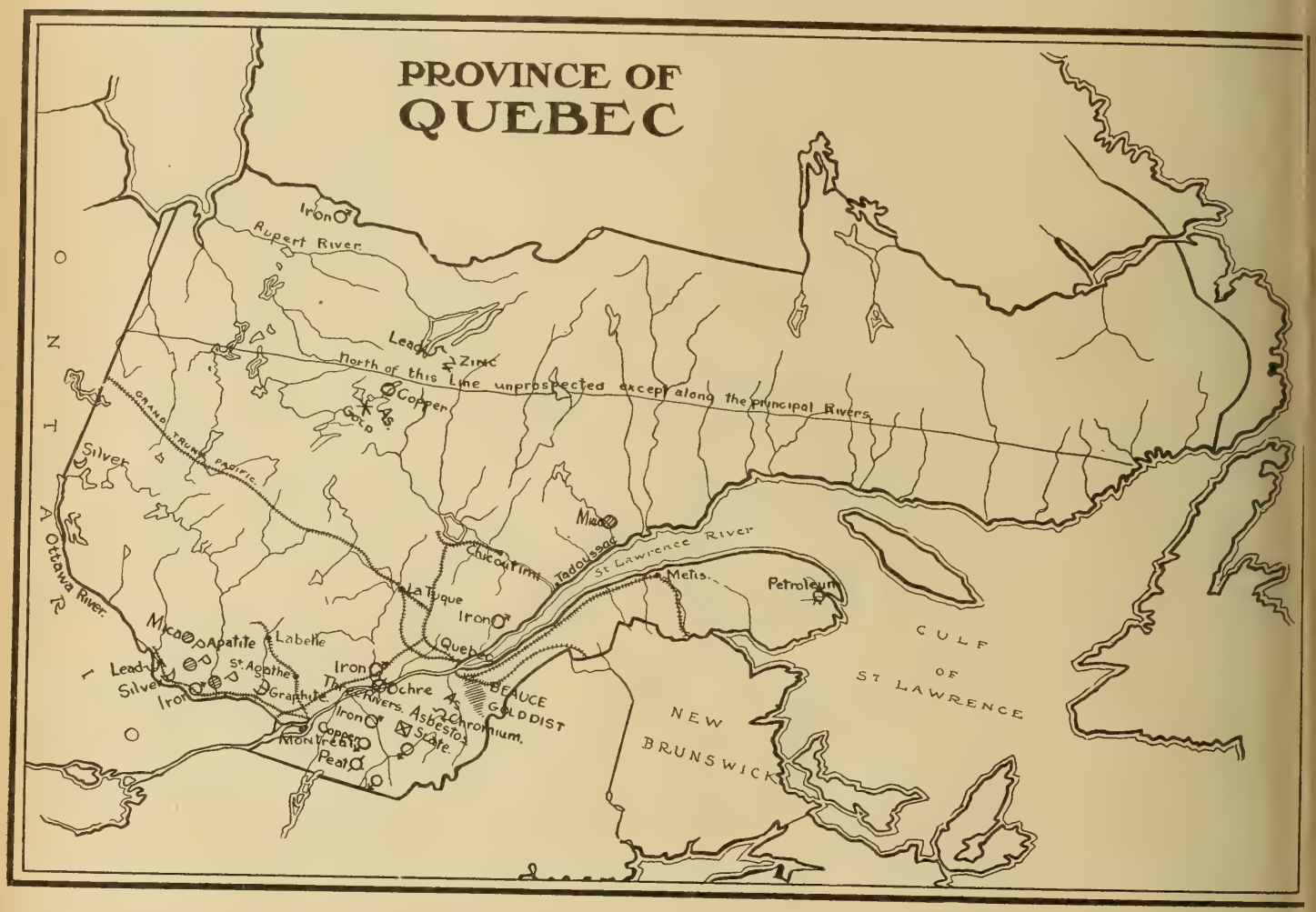
The Canada Iron Corporation, Limited, is the only siderurgical company operating in the Province of Quebec. That company has two blast furnaces at Drummondville and one at Radnor Forges, where charcoal pig iron is produced.

The whole of the ochre came from deposits in the vicinity of Three Rivers which have been worked for a long time. A portion of these ochres is calcined and used in making mineral paints, and the remainder in purifying lighting gas. Shipments of calcined ochre amounted in 1909 to 1,940 tons valued at $25,093, while the gas companies took 2,000 tons valued at $3,000.

The ochre deposits of that region cover large areas. One of the latter, at St. Malo, has been followed for a length of several miles, its width is from 300 to 600 feet and its depth varies between one and twenty feet.

Chrome.

During the year only 2,470 tons, valued at $26,604, were shipped. This is a marked decrease as compared with the previous year. The operators say they have considerable quantities of chrome iron ore in stock.



The iron industry has not been very active in 1909. The furnace of Radnor Forges alone was in blast, but it consumed only 3,300 tons of native ore. The chief source of supply is Ontario ore.

The following table contains a statement of the raw material used at Radnor Forges:

Imported ore	Tons,	10,256
Native bog iron ore	Tons,	3,300
Charcoal	Bushels,	641,742
Pig iron produced	Tons,	4,750

Ochres.

Our production of ochre in 1908 amounted to 3,940 tons, valued by the operators at $28,093 at shipping points.

A new company has taken over the plant and properties of the Thetford Chrome Company, lot 16, range A, Coleraine. That company is the Chrome & Asbestos Mines, Limited, which began working in June, 1909. Although there has been no production this year, preparations were being made for operations on a large scale in 1910. The whole of the concentrating works were being remodelled and twenty-five dry concentrating machines, of the Behrend system, were being put in.

It is intended to effect the concentration by crushing the ore in two jaw-crushers. It then passes into a dryer, then through rollers which crush it so that it may pass through a screen of 20 meshes to the inch. It is

afterwards sized by screens, and concentrated by Behrend dry concentrators.

Copper.

We have received returns of production of copper from only one company which works the Eustis mine.

The Albert Copper Company which owns the Albert mine at Capelton, lot 8, range 9, of the township of Ascot, did no work in 1909.

Mr. A. O. Norton, who has for some years carried on development work on a small scale at his mine on lots 2 and 3, range 11, township of Ascot, has continued to develop it, but has not yet shipped any ore.

Mr. J. McDonald, of Sherbrooke, has given an option on his property in Weedon, lot 22, range 2, Weedon Township, to a New York syndicate. A small development plant has been put up and the work of prospecting has been actively pushed. The shaft is one hundred feet deep and about one hundred feet of prospecting drifts have been run.

Some prospecting work was also done on copper deposits in the first range of St. Joseph, Beauce County.

The copper deposits of the Eastern Townships have already been the object of much study and working. One of the most recent reports dealing with the subject is that by M. John A. Dresser, entitled: "Report on the Copper Deposits in the Eastern Townships, Province of Quebec," published by the Geological Survey of Ottawa.

The most important deposits are generally in lenticular form. The average ore is low grade, but some rich zones of very high grade are met with.

The copper industry in the Eastern Townships seems, to a certain extent, to turn in a circle. The ores are not very rich, but, on the other hand, it is probable that they exist in considerable deposits and that development and prospecting work would lead to the discovery of large quantities of ore containing from 3 to 4 per cent. of copper. Such work, however, would entail considerable expense in sinking shafts, mining drifts, diamond drill boring, etc.

Low grade copper ores should be treated near the mines, which necessitates the erection of smelters. Consequently mine owners do not venture to incur the expense of development until they are sure that they will be able to dispose of the product of their mines to smelting works close by, and, on the other hand, one can understand the hesitation of manufacturers and capitalists to build and install a smelter without first being sure of the supply of ore.

A solution of this problem would be the amalgamation of several individual copper properties in a powerful company which might, after developing the deposits, operate smelters, as in the Boundary district of British Columbia where successful operations are carried on with large quantities of ore containing less than one and a half per cent. of copper, or as in Tennessee where the ores contain less than two per cent.

During the field season of 1909, Mr. A. W. G. Wilson, of the Mines Branch of the Federal Government, made a study of the copper deposits of the Eastern Townships and his report is opportune at the present moment.

Gold and Silver.

During the first six months of the year 1909, active work was resumed in connection with the gold-bearing lands of the Eastern Townships, but we have no production to record.

The right to mine for precious metals in the seigniory of Rigaud-Vaudreuil, formerly the scene of important work on the alluvial deposits of the Gilbert and Chaudiere Rivers, has been acquired by a syndicate which intends to begin operations at once. The company formed for the purpose is incorporated under the name of "The Dominion Gold Fields of Canada" with a capital of $1,000,000. It is proposed to work with steam shovels or dredges and the technical direction of the work has been entrusted to a Californian engineer.

The Marsborough Gold Fields Company, which has gold-bearing lands in the Lake Megantic region, has not sent in a report on its operations. That company put up a small stamp mill in 1908 for the purpose of making assays of the ore taken from veins of gold-bearing quartz, but we have no information as to the results.

In the County of Pontiac several companies have done some prospecting of more or less importance. It is said that very encouraging indications of the presence of argentiferous ore have been found in the Township of Fabre. It is too early yet to give an opinion regarding the value of the discoveries made in that township which lies on the east side of Lake Temiskaming, opposite the Cobalt district, but everything leads to the belief that prospecting will be actively carried on during the year 1910.

The Pontiac and Abitibi Gold Mines Company is working in the Township of Boischatel, to the northeast of Lake Opasatica, and is stated to be putting up mills for treating gold ores; the plant was transported over a road made by the company, connecting the mine with Larder Lake, a distance of about 18 miles. The lake is crossed in summer by a steamboat to reach Larder Lake city, whence a road has been made to Boston station on the Temiskaming and Northern Ontario Railway.

We also note that the Height of Land Mining Company has carried on rather extensive prospecting in the Township of Villemontel, County of Pontiac. The ores found so far consist of molybdenite and bismuth.

Asbestos.

The chief feature of the asbestos industry in 1909 was the amalgamation of several individual operators into powerful companies with large capitalization.

We note the formation of the Amalgamated Asbestos Corporation, with a capital of $25,000,000, which absorbed the following companies:

King Asbestos Mines, Thetford Mines.
Beaver Asbestos Company, Thetford Mines.
British Canadian Asbestos Company, Black Lake.
Standard Asbestos Company, Limited, Black Lake.
Dominion Asbestos Company, Limited, Black Lake.

The Black Lake Consolidated Asbestos Company, with a capital of $5,000,000, absorbed the following:

Union Asbestos Mines, Black Lake.
Black Lake Chrome and Asbestos Company, Black Lake.
Dominion Chrome Company, Black Lake.
Imperial Asbestos Company, Black Lake.

It is stated that great advantages will result from the merging of the mining interest into these two companies. In the first place the cost of management will be greatly decreasel by being centralized. It will be easier to establish for the trade, a methodical and standard classification of the various grades of asbestos and the importance of this feature cannot be exaggerated.

In the past, there has been no recognized standard and the various qualities of the different mines did not correspond to one another, to the great confusion of

the consumer who could only judge of what he bought on seeing samples. The Amalgamated Asbestos Corporation has already taken measures towards standardizing, but some time will be needed to effect such changes, which will certainly result in advantages both to the producer and to the consumer.

The value of the total production of asbestos in Canada in 1909 is slightly below that of the previous year, but it must not be inferred from this that there has been the slightest decline in the industry. On the contrary, the decrease is rather due to the fact that some important companies have made preparations during the year to greatly increase the production of their mills in 1910, and such changes have led to periods of inactivity while the necessary changes were being made both in buildings and plant.

On the other hand, it cannot be denied that the capitalization of the two above-mentioned companies is very high and, although several of the amalgamated mines are among the best and most important in the districts of Thetford and Black Lake, the high capital will certainly militate against a rapid increase in the shares of the companies.

However, the reserves of asbestos-bearing rocks are very large. Depths of 200 feet below the surface have been reached in some quarries and, at that depth, no marked change has been noted in the percentage of asbestos in the rock extracted. There is no doubt that there is no reason to fear any diminution in quality for a long while.

We have received reports of the production of nine companies representing fourteen mines in operation. The total value of the asbestos produced amounted to $2,296,584, not including $20,468 worth of asbestic which is an inferior product obtained in the course of the preparation of asbestos for the market.

But, besides these nine companies, about an equal number were preparing to produce in 1910. The companies having works and mills under construction in 1909 were:

The B. and A. Asbestos Company, East Broughton.
Berlin Asbestos Company, East Broughton.
Belmina Consolidated Asbestos Company, Belmina.
Frontenac Asbestos Mining Company, East Broughton.
Black Lake Consolidated Asbestos Company, Black Lake.
Jacobs Asbestos Mining Company, Thetford.

There are also three other projected mills and the Bell Asbestos Mines Company is altering its plant so as to increase its capacity to 1,000 tons of rock a day. It should be noted that the tendency is to build mills of ever-increasing capacity. Some years ago model mills were fitted up to treat from 200 to 300 tons of rock per diem, while at present they are being put up with a capacity of from 1,000 to 1,200 tons.

Prospecting has likewise been carried on at various places in the serpentine belt. An important discovery is mentioned on lots 23 and 24, range A, of Coleraine, where a new company, the Thetford Asbestos Syndicate, with its offices in the Liverpool, London & Globe Building, Montreal, has had considerable work done. This company will soon be in a position to produce.

On the whole, the asbestos industry of the Province of Quebec is flourishing. Almost the whole of the world's production of this substance comes from Canada and Russia and, in 1909, Canada's proportion was nearly four and one-half times greater than that of Russia. In fact, the asbestos mines of the Province of Quebec shipped 63,965 tons last year, while those of the Ekaterinburg district, in the Ural Mountains, during the same period, was 814,134 poods, equal to about 14,500 tons, according to an article which appeared lately in the commercial and industrial gazette of St. Petersburg.

The Canadian asbestos is obtained by working the deposits of the serpentine belt running through the Eastern Townships of the Province of Quebec. There are three very distinct asbestos-bearing areas which are, in order of importance: The Thetford, Black Lake area, the Danville area and the East Broughton area.

The serpentine belt consists of igneous and metamorphic rocks comprising peridotites, pyroxenites, diabases, granites and serpentinous talcous schists. Although the serpentine rocks occupy a much more limited total area than the other constituents of the belt, they are much more important from the economic standpoint and are more easily recognizable through their particular characteristics. Serpentine results from the alteration of intrusive masses of peridotite or olivine rock and in this altered rock are the veins of asbestos which belong to the chrysotile variety. The relations between the vari-altered rock, are the veins of asbestos which belong to the chrysotile variety. The relations between the various constituents of that belt of rocks are complicated and have not yet been established with any degree of certainty, but everything leads to the belief that they are old and it is probable that the rocks are of Cambrian age.

The percentage of asbestos in the rock extracted from the mines varies greatly in proportion to the veins running through it. It sometimes amounts to a maximum of from 12 to 15 per cent., but, as an average of mining operations extending over a period of one year, the yield does not generally exceed four or five per cent.

The presence of this mineral in the Ural Mountains was discovered about 200 years ago, but it was not systematically mined until about 25 years ago. As in Canada, the methods followed at the outset were very primitive, but the industry has been developed and many of the mines are now provided with the most modern plant, the motive power being electricity.

The principal mines are situated about 57 miles to the north of Ekaterinburg in the Ural Mountains. According to a paper read by Mr. Kriganouski at a meeting of the Imperial Academy of Sciences, in 1903, the mining district covers an area of 18 miles from north to south, and of 2 to 3 miles from east to west. The mines are limited to a mass of serpentine resting on schistose rocks to the west and cut off by a granitic intrusion on the east. The serpentine is traversed by dykes of diabase and porphyry and also by veins of quartz. Asbestos is not found everywhere in the serpentine; on the contrary the deposits are in ellipsoidal areas whose main axis invariably runs north and south and which attain a maximum length of 3,500 feet. The fibres of the veins are perpendicular to the walls as in the case of the Canadian asbestos. The richest asbestos-bearing rock yields over 50 pounds of asbestos to the cubic yard of rock, but, in other mines, the yield is from 28 to 33 pounds.

The work is done in open cuttings, the quarries not being deep; so far the depth has not yet exceeded 70 feet. The serpentine is, as a rule, soft enough to be got out without the use of explosive, but, as the depth increases, the rock becomes perceptibly harder and dynamite is used in the deeper workings.

Russian asbestos is said to be not as silky as Canadian asbestos and is not as easily woven.

The Mica Industry.

This industry has been inactive during the year 1909. The figures we have received in connection with the production show a considerable decrease from the year 1908. The quantity of mica from the Province of Quebec for which a market was found in trade and industry in 1909, is valued at $27,034 only, as compared with $95,311 in 1908. Of thirty operators who sent in returns, nineteen only had worked and thirteen only had shipped products.

The figures given above represent the value of the mica shipped. There are, therefore, considerable quantities of this material in stock awaiting an improvement in the market and a rise in prices, for shipment. The conditions of the mica market have been very unfavourable during the year; prevailing prices have been below the average.

Phosphate of Lime.

Phosphate of lime may be considered as a secondary product extracted while mining mica, for, at current prices, that substance could not be worked solely on its own account. The shipments in 1909 amounted to 525 tons, valued at $4,800. The whole of this quantity was used by the Chemical and Fertilizer Company, of Buckingham.

Graphite.

Active operations have been resumed in the graphite industry of the Buckingham region. In 1908, work was limited to prospecting and experimenting, but this year products to the value of $10,399 were shipped.

Operations were confined to the Buckingham district. Nothing was done in the vicinity of Calumet or Grenville.

Some work has also been begun by a Montreal syndicate, the Graphite Limited, Board of Trade Building, Montreal, which has prospected in ranges 6 and 7 of the Township of Amherst.

It should be noted that a considerable amount of prospecting has been done in various places, which augurs well for the year 1910.

Magnesite.

Work was continued in 1909 on the magnesite deposits of Grenville Township, in Argenteuil County. A quantity of 630 tons, valued at $2,508, was shipped to Montreal.

These deposits have attracted much attention for some years because they are the only ones in Canada capable of being worked. As mentioned in previous yearly reports on mining operations in the Province of Quebec, the most important use to which it is put is as a refractory substance for lining various high temperature metallurgical furnaces. For this purpose there would be a considerable market in the United States and Canada for the product of the Grenville deposits.

Magnesite, when used as a refractory substance, is calcined and crushed. After undergoing this process it is worth from $25 to $37 per ton of 2,000 pounds in New York. It should be noted, however, that for this use magnesite must be very pure, that imported from Greece containing an average of 95 per cent. of carbonate of magnesia. The operators working the Grenville deposits assert that they can meet the consumers' demands as regards purity.

So far a depth of fifteen feet only has been reached and it is said that the magnesite at that depth is already purer than at the surface.

The present means of transportation are a serious obstacle to the rapid development of these deposits. The mine is about thirteen miles from Calumet, the nearest shipping station. No shipment can be made in summer over the road connecting the two points; thus the operations are limited to a few months in winter when loads can be conveyed over the snow roads.

The company operating there is the Canadian Magnesite Company, Eastern Townships Bank Building, Montreal.

Portland Cement.

The manufacture of Portland cement is one of the most flourishing in the Province of Quebec. This year we have to record a marked increase in production over 1908.

The chief feature of this industry in 1909 was the merging of the various companies manufacturing cement in the province into an association whose influence has a national character. In fact, the Canada Cement Company has acquired the three large cement factories of our province, together with several others in the Provinces of Ontario, Alberta and British Columbia. It is expected that the result of this amalgamation will be a considerable saving in the cost of management and especially of transportation, by which consumers will certainly benefit.

The manufacture of cement has made remarkable progress for some years past. Previous to 1904 there was but one factory in operation, whose production varied between 25,000 and 40,000 barrels a year. In 1905, the International Cement Company, of Hull, began producing and since then the figures have grown year by year as may be seen by the following table:

Year.	Quantity. (barrels)	Value.
1904	33,500	$ 50,250
1905	254,833	408,000
1906	406,103	625,570
1907	.....	640,000
1908	801,695	1,127,335
1909	1,011,194	1,314,551

Building Materials.

The figures we give this year in connection with other building materials, such as lime, building and ornamental stone, bricks and other clay products, slate, marble, etc., are necessarily very incomplete because there are many producers of slight importance from whom it is difficult to obtain reports. The same remark applies in the case of mineral waters.

It will be seen by the general table that we have recorded a production of marble valued at $130,000. This is the product of the Missisquoi Marble Company, whose quarries are at Philipsburg. That company has installed a modern mining plant and very complete dressing works. The product is a very fine ornamental stone which finds a market in the United States and Canada. A considerable proportion of the product in 1909 was sent to Buffalo in the rough state. Some marble was also shipped from Philipsburg to Ottawa, Toronto, St. Catharines, Winnipeg, Edmonton, Victoria, Halifax, Moncton and other points in Canada.

Three methods of precipitating gold and silver from cyanide solutions by means of zinc ore are in vogue. First, zinc dust is mixed with the solution and the precipitate is treated in filter presses; or second, the solution is passed through a spongy mass of zinc shavings, the precipitate being cleaned off by hand-washing; or, third, the solution is passed over zinc plates which are automatically cleaned of the precipitate.

ABSTRACT OF REPORT OF MR. JAMES ASHWORTH.

The accompanying plan was prepared by Mr. W. F. Robertson and his assistant, Mr. Nation, from plans and information supplied to them, and also an enlarged plan of same, which was of very valuable assistance to every witness who was called before the Court. Mr. Shepherd also prepared large diagrams of some of the separate parts of the mine, and these figured prominently in the enquiry. In addition to these plans, Mr. Robertson also prepared a drawing on a large scale of the "cave" in No. 2 1-2 level, showing graphically the condition of this particular length of the level.

The Wellington Colliery Company did not produce any plans or explanatory drawings. The first point of importance that presented itself to me was the very small volume of air in circulation in No. 4 counter-level, but I was assured that this was due to the disorganized condition of the mine, although it was the eighth day after the explosion. No great mechanical damage was in evidence on No. 4 West level, but when we reached No. 3 West level there were evidences of contrary forces which required the most careful attention. The first of these was a damaged boot torn off the foot of a labourer named Milos, whose body was found ten or twelve yards on the out-bye side of it, thus indicating that at the time of the explosion his foot had been held fast, possibly by a track-frog, and that the force which affected him had torn his right foot out of this boot, splitting the top of it from the lace-holes to the toe and partly separating the sole from the top, also breaking the fibula of his right leg, and projecting his body out-bye with such force that the top part of his skull was terribly fractured, and this injury caused his immediate death. Dust was also driven into the skin of the face and through his pants into his leg. Still farther out-bye pieces of brattice-cloth showed evidence of contrary forces, and near the foot of room 24 two bodies were found close behind a trip of three loaded cars. They were slightly burned, and some timber was piled on the top of them. The mule drawing the trip appears to have been killed instantaneously, as there is no evidence of its kicking. A strong force had also come down Nos. 24 and 25 rooms from towards No. 2 1-2 West level, tearing down the brattice-cloths and some timber also. Near the face end of the level is room 29, and the condition of this room evidently demanded careful investigation.

Samples of dust were taken off the coal which had fallen from the face, and also off a shovel. Other samples of dust were taken in the level for microscopical and analytical examination. In the level close to the in-bye chute of No. 29 room the body of the miner working in this room was found, and was certified by the doctor as being only burned on the hands. At the face of room 29, which had only recently been started, I found evidence of blasting, and the appearance and position of the coal and of the miners' tools led me to infer that it had had some connection with the explosion, particularly as the fallen coal was thickly coated with dust. I probed behind the coal and distinctly felt that a portion of the shot-hole still remained. On calling the attention of Mr. F. H. Shepherd and Mr. Andrew Bryden to this fact, they assured me that the shot had been fired the day before, and that the fireman said he found it when he made his rounds in the early morning before the explosion. This difference of opinion came to public notice in the Coroner's Court, when Mr. Shepherd expressed his disagreement with my deductions, and the Court was adjourned after the Coroner had directed that the jury should visit the mine and see whether or not there had been a shot-hole behind the broken coal. Mr. Hawthornthwait, M.P.P., Mr. Wolflin, U. S. A. Geological Survey, Mr. Cosier, the fireman in question, and others accompanied the party. The result was that my statement of fact was completely verified; and there was the further evidence that the shot had been fired on the morning of the explosion, and that Mr. Shepherd had been very seriously misled by the fireman Cosier. This shot had therefore been fired before the arrival of Mr. Alex. Shaw, who, having temporarily taken up the duties of the usual shot-lighter, had told the men that he would be in the mine by 9 o'clock to attend to the shot-firing. Microscopical examination

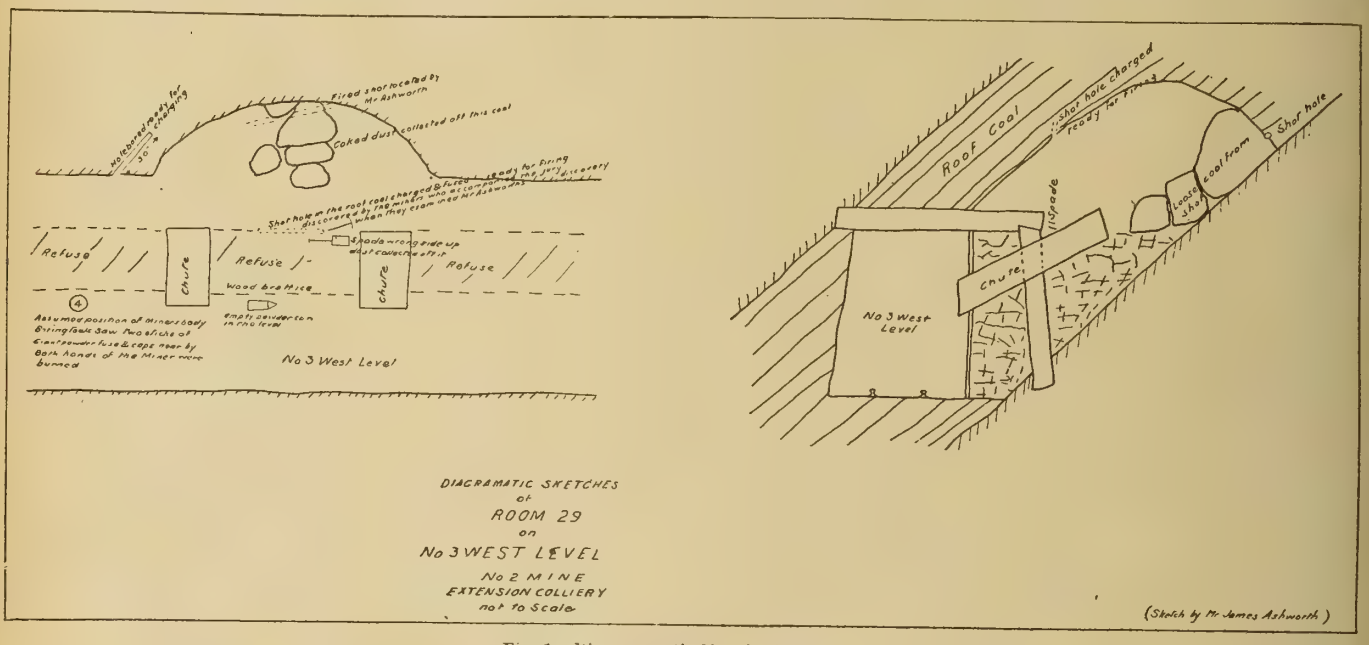


Fig. 1. Diagrammatic Sketch of Room 29.

by myself and others of the dust collected off the coal shows plainly that it has been affected by considerable heat, and this is also proved by the appended chemical analysis:

"Moisture, 9.69; Volatile Combustible Matter, 21.60; Fixed Carbon, 28.70; Ash, 20.01. The coking of the coal particles of this dust is very distinctly shown under the microscope, also in a sample taken off the top of the coal on the loaded cars between Nos. 23 and 24 rooms."

No. 29 room had an inclination of about 60 degrees, and was fitted with two chutes, down which the coal ran to the level where it was loaded into cars. The body of the miner Thomas, who worked in it, was recovered by a man who crawled in and brought it out of the level before it was considered safe to take a lighted lamp so far, and therefore the exact spot where it was found is only approximately known. The doctor who examined Thomas's body certified that it was burned on the hands and that the man died from carbon-monoxide poisoning. Why he should be burned on his hands only, seems a mysterious feature, but it shows that flame was present at this point. On every occasion when I inspected No. 3 West level I found not less than 3 per cent. of fire-damp mixed with the ventilating air-current.

Proceeding into No. 2 1-2 West level, I found a similar percentage of fire-damp. In No. 27 room there had been a heavy "cave" of the roof coal and practically everything in the room was buried under it. The miner working here, A. Keserich, had left his room for some reason or other, and was found in the level on the outbye side of the stall, and where the roof had not fallen. His body was the most severely burned of any in the mine, and the doctor certified that the hair, moustache, head, neck, hands, and left side of the chest were burned by fire. Farther out-bye a heavy "cave" of roof coal had taken place for a length of 240 feet (see Mr. Robertson's plan). The top of this cave was coated with dust affected by heat, as shown under the microscope, and therefore it had been deposited after the fall took place. The chemical analysis shows: Moisture, 3.69; Volatile Combustible, 27.70; Fixed Carbon, 36.00; Ash, 32.61.



Fig. 2. Plan of Extension Colliery No. 2.

Out-bye of this fall was a bridge of 36 feet long, where the roof had not fallen, but the timber supporting it had been knocked out by a force from the out-bye side, which had also thrown some of it on to the talus of the 240-foot fall. This force was caused by another cave of 239 feet in length, which at the east or out-bye end was 18 feet high. It was evident, therefore, that this cave took place after the explosion, and that the first-referred-to cave occurred before the explosion. This reasoning is further supported by the fact that some of the timbering that had been set up to support the roof of the first length was standing upright, with the fallen coal all around it.

The ignition and explosion of the fire-damp brought down by the first cave was undoubtedly the force which caused the main explosion and burned the men in the headings on the higher side of the level from No. 20 to No. 26, and also caused the pressure, burning, and percussive effects demonstrated in these working places.

degrees Fahrenheit. The mine was absolutely wet in the majority of places. A test was made with the Pieler spirit-lamp in the whole current of the return air, and although the tip of the flame was ill-defined, it was considered to be equal to a 2 per cent. content of fire-damp. The evidence given as to the volume of air circulating through this mine was so various that your legal representative, Mr. Harold Robertson, asked the coroner to send Mr. Dick, Inspector of Mines, to visit the mine and report the volume passing at three separate points. The estimate given by Mr. Dick in his evidence-in-chief was 17,500 cubic feet at the delivery end of the return, and at the same place Mr. Shepherd had 28,080 cubic feet as his measurement. Mr. Bryden gave three separate estimates of the volume of air in circulation: Firstly, of 90 per cent. of the whole return for the working places; then 25,000 cubic feet; and, later, 10,000 cubic feet at the faces. Mr. Dick reported to the coroner that he measured in the mine return air-way

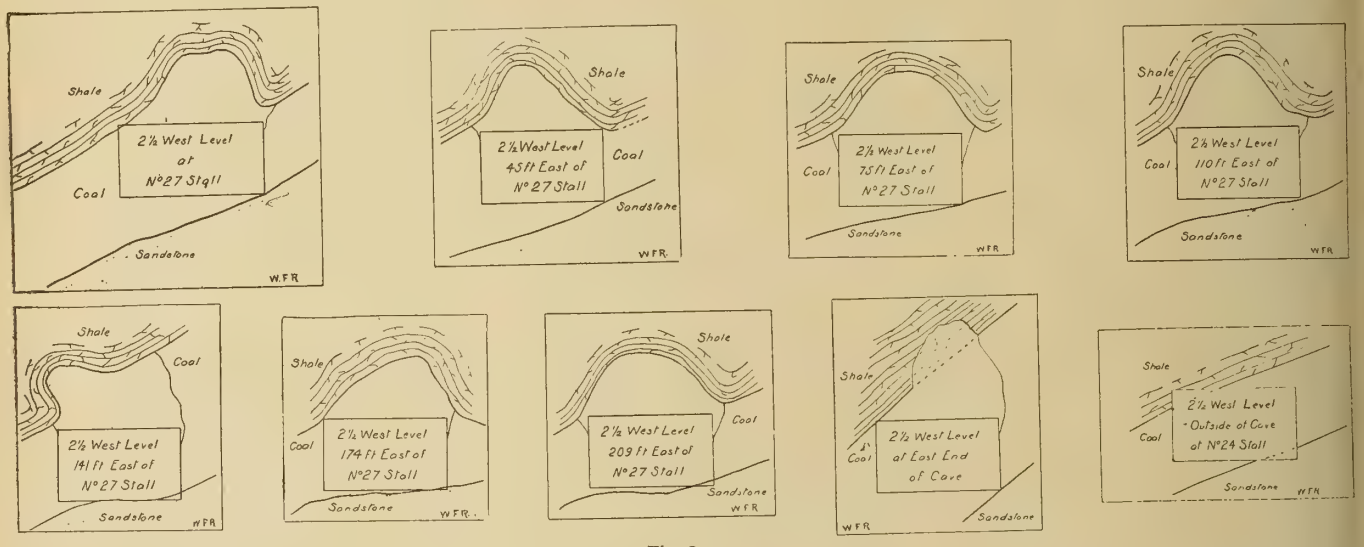


Fig. 3.

When the whole of the return air from this section of No. 2 mine was tested for fire-damp in the crosscut between Nos. 19 and 20 rooms, it showed fully 3 per cent. of fire-damp. Another evidence of the direction of force on No. 2 1-2 West level was found where No. 15's body was found. This boy had been driving a mule drawing two empty cars, and it is surmised that he was riding on the front car when he was blown into the car and burned on the face, neck and hands. The mule was either blown or jumped into the first car with its forelegs and was killed. The only animal which survived the explosion was a mule in No. 4 level. Several men on No. 2 1-2 West level, out-bye of the fall, were killed in various places on the level by carbon-monoxide poisoning, and were also slightly burned.

On the 16th inst. I accompanied Mr. F. H. Shepherd and Mr. Bryden to make tests on the volume and humidity of the air circulating in No. 2 West mine. The whole volume of return air amounted to 28,080 cubic feet per minute. For some reason or other the anemometer would not work in the crosscut between Nos. 19 and 20 rooms on No. 2 1-2 West, and no further tests could be made. Hygrometer tests were made in many places and all proved that the air in the mine was practically saturated with moisture, and in no case was there less than 5.10 grains per cubic foot, and not more than 5.51 grains per cubic foot. The greatest heat of the air inside the mine was only 59 degrees, and the lowest 52

34,500 cubic feet; in the intake in No. 4 West level, 16,000 cubic feet; and between Nos. 3 and 4 West levels, 6,600 cubic feet per minute. These figures were so conflicting that Mr. Robertson did not cross-examine on them. It is, however, important to consider them very seriously when deciding whether or not the mine was supplied with a sufficiency of air to dilute the gas produced, and to make the mine safe for shot-firing. I have not the least hesitation in saying that, on every one of the five visits I paid to this mine, it was unsafe to fire shots of black powder or giant powder in any of the working places on Nos. 2 1-2 and 3 levels of No. 2 West mine.

The English Royal Commission on Mines appointed a sub-commission to report on the ventilation of mines. After examining mines in England, Scotland and Wales, they suggested that 2 per cent. of fire-damp in the volume of air circulating in any working place should be considered dangerous. This suggestion, however, did not receive the approval of the coal-owners, and a minimum of 3 per cent. was suggested by one district as an alternative, and because the majority of officials cannot detect 2 per cent. of gas with an ordinary safety lamp. The matter is still *sub judice,* I believe.

As previously stated, there was at least 3 per cent. of gas present in the air ventilating Nos. 2 1-2 and 3 levels of No. 2 West mine of the Extension colliery, and therefore, on this basis, the volume of air was inade-

quate. What percentage of gas was called a "cap" by the Extension mine officials was not very clear, but the impression conveyed to my mind was that only such gas was reported as would bring the air-current very close up to the explosive point—that is, far above 3 per cent. The officials, however, stated in evidence that they considered a half-inch cap dangerous, and some thought 3 per cent. was dangerous.

In Messrs. Dick and Bryden's reports on the volume of air circulating in the mine, a leakage of not less than 27,900 cubic feet of air per minute was unaccounted for, and this leakage shows how important it is that the intake air in a mine should always be measured and compared with the whole of the return volume, and to thus ascertain the percentage of loss. The current of air ventilating the western part of No. 2 mine was also complicated by a current of air coming from No. 4 level east, and thus when the explosion occurred the after-lamp driven into the slope through the doors of Nos. 2 1-2, 3, and 4 levels was compelled to circulate with the air into the eastern part of the mine and return through No. 4 West counter-level. The west side might, therefore, have been more quickly cleared of after-damp if a heavy curtain hanging in the diagonal slope to divert the air into No. 4 East had been lifted up, and thus permitted more air to enter No. 4 West counter. It is surprising, therefore, to find that twelve men escaped alive. The question as to whether or not other five men lost their way is immaterial, because they were hemmed in on all sides by after-damp.

I have to suggest, firstly, that the ventilation of the east and west sides of No. 2 mine be by entirely separate air-currents; secondly, that the use of safety-lamps be made compulsory as the means of lighting; thirdly, that only permissible explosives be used in place of black and giant powders; fourthly, that shot-firing be permissible only under statutory regulations; fifthly, that no shot be fired where there is more gas present than would be indicated by a blue cap 1-4 inch high.

Increasing the Number of Inspectors.—The popular idea appears to be that more men should be appointed to examine and report on mines, and that such reports should be equal to the standard report of a colliery fire-boss. Personally, I do not think that it will work out as satisfactorily as it might appear probable to do at first sight, because such an inspection lowers the status of an inspector, who, from my point of view, should be equal to a first-class certificated manager, and should be able to supervise the manager and his officials, in the same way that a first-class certificated manager supervises his under-officials. On this basis an inspector of mines would take a more general view of mining, and would in no sense relieve the fire-boss of his responsibility, nor himself assume and responsibility for the safety of a coal-mine.

Cause of the Explosion.

Although the first cause of this explosion has not been positively ascertained, yet it has been demonstrated that if fire-damp had not been present there would have been no explosion, because coal-dust took no very pronounced share in it. If, therefore, a shot fired in No. 29 room on No. 3 West level were the initial cause, then it is clear that the ventilation was too small in volume to keep the mine clear of gas; but if the fall of roof in No. 27 room of No. 2 1-2 West level came down without the assistance of the disturbance caused by the shot in No. 29 room, then I should say that this very large fall of roof coal, which could not have been foreseen, brought down a large volume of fire-damp, and that the explosion originated at the open light of the miner No. 16, as shown on the accompanying plan.

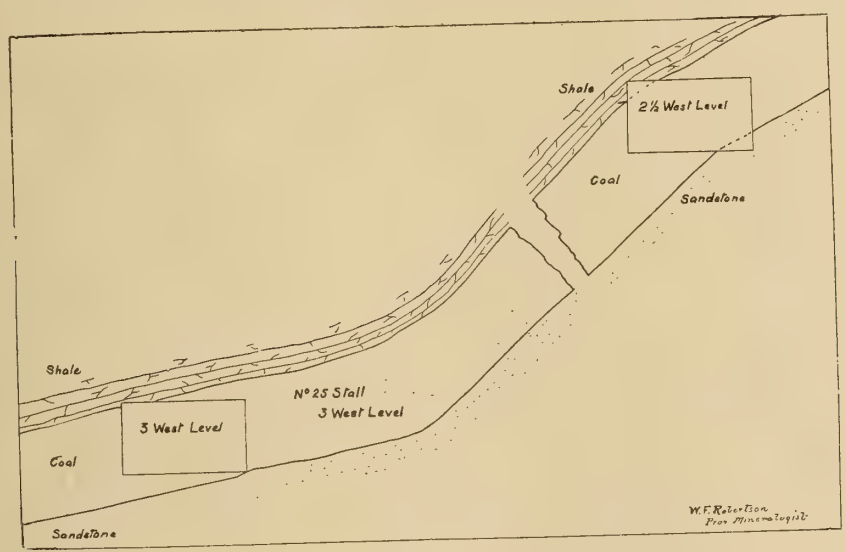


Fig. 4.

I have lastly to recommend that double doors be made compulsory in all cases where the system of ventilation is similar to that of the slope district of the mine in question.

Below I apend the report of Mr. S. D. Wark, of the Crow's Nest Pass Coal Company, Limited, Fernie, B.C., on a sample of dust from No. 29 room of No. 3 West level of the Extension mine, No. 2 district:

"Two slides were made, one of coal and another of the dust, and examined under the microscope, the object being to try and detect a difference, if any, in the structure of the two. An examination of the dust showed in a convincing way that it had been subjected to fire. It showed a steely grey appearance very much like coke, the boiling or swelling in the process of coking being very pronounced. The coal, on the other hand, showed no such alteration.

"By way of comparison, another slide was made from our own coke, and its likeness to the dust was very distinct.

"Following this, a test was made to try and detect whether any of the volatile matter had been driven off.

The sample was first dried for about an hour until it ceased to lose weight, and when examined again the steely appearance was quite evident to the naked eye, differing entirely from the dried coal-dust. An analytical comparison of the two samples shows the following:

	Moisture.	Vol. Matter.	Fixed Carbon.	Ash.
(29)	9.69	21.60	48.70	20.01—100%
Coal	1.05	35.00	56.95	7.00—100%

and, therfore, a decided contrast in the volume of their volatile contents.''

* * * * *

Since writing and forwarding my report on the No. 2 Extension mine explosion, I have received a copy of the plan prepared by Mr. W. F. Robertson, blue prints of Messrs. W. F. Robertson and F. H. Shepherd's

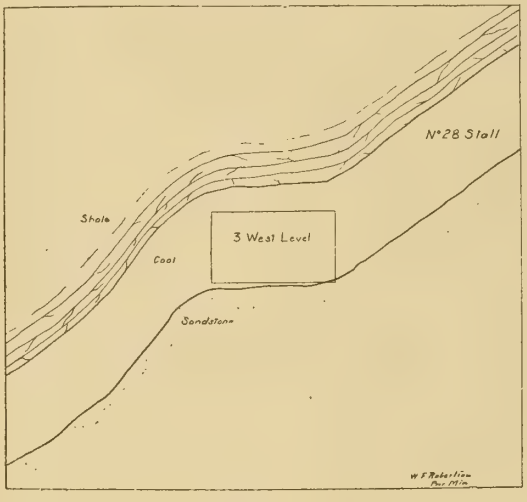


Fig. 5.

sketches, and also a copy of the verdict of the jury.

I notice that the plan does not show the entire course of the ventilation before the explosion, and, consequently, the direction in which the ''auxiliary'' current of air from the down-cast shaft, marked in the right-hand bottom corner, passed through some portion of No. 2 east workings, and was then added to the intake air entering No. 4 West counter-level. The ''cap'' of fire-damp found in No. 4 West counter-level probably came along with this auxiliary air-current. The plan shows single doors on Nos. 1 1-2 and 2 West levels, as well as on Nos. 2 1-2, 3 and 4 levels, and that coal working was proceeding on No. 1 1-2 level. These single doors evidently account to some extent for the great loss in the volume of the intake air-current entering the lower part of the mine.

With reference to the verdict of the jury, the principal point calling for attention is the apparent assumption that the fall or cave of roof coal in No. 2 1-2 West level took place under normal conditions, and without the assistance of any disturbing influence. It is, however, quite clear that there were other and prior manifestations of force preceding this cave. Thus there was the shot in No. 29 room of No. 3 West level, which was specially uncovered by the coroner's order for the jurymen to see, and the blowing of the man Milos (No. 6 body) out of his boot.

The positions in which the bodies of several men were found, away from their working places, showed that something had scared them before the explosion occurred at the cave-in on No. 2 1-2 West level. Thus No. 2 and 3 men had run out quite 200 feet from the face of No. 3 level; Nos. 7 and 8 had run about the said distance out of the face of No. 2 1-2 West level, and No. 16 had gone out of No. 27 room on the same level. Only one of these men, No. 16, was burned. The absence of burns on bodies Nos. 7 and 8 is of the greatest importance, because Mr. Shepherd fixed on the end of No. 2 1-2 West level as being the place where the explosion originated, for he says, ''the explosion was caused by the compression of the atmosphere in the face of No. 2 1-2 West level.'' He also acknowledges that there was coking near the face of the level, and of the dust on the loaded car at the face—and yet the men were unburned, and one man left his cap and lamp behind him near the face. Certainly, if these men had been in their working place when the flame of the explosion entered it, they must have been killed on the spot. Mr. Shepherd, in his written evidence, stated that there was no evidence of flame in No. 3 level, but, to my mind, there are most important traces of flame at this point. First, in the fact that the hands of the miner Thomas were burned until the skin hung on them like a glove, and then the fact that the dust I collected in No. 29 stall was coked.

Other important collateral evidence has been found in No. 29 stall—namely, a hole 50 inches deep bored into the roof coal charged with nearly one whole stick of giant powder and fused ready for firing; also another shot-hole 30 inches deep on the left-hand side of the room, uncharged. It is fair to assume that Thomas had drilled a series of three holes, and then removed his drilling tackle into the level; he then charged two holes, in contravention of Rule 9A of the ''Coal Mines Regulation Act,'' and fired one, probably intending to fire the other afterwards. It is not improbable that he was preparing to charge the 30-inch hole also, as two sticks of giant powder (not in a case), fuse, and caps were close to where Thomas's body was found.

These facts confirm my original opinion that the first factors in this disaster are disclosed in the surrounding conditions of No. 29 stall on the No. 3 West level.

With regard to the jury's No. 3 recommendation, life-saving oxygen apparatus such as the Draeger, Weg, etc., is expensive to buy and expensive to maintain, and if any of these apparatus had been in use at the Extension mine they could not have saved any lives. I might, however, mention a much simpler apparatus which I have often used—namely, the Denayrouse. It consists of a mouth and nose piece and a valve for the expired air placed at one end of a strong flexible tube, which is attached by a belt to the wearer, and the other end of, say, 100 feet of tube is coupled to an air-pump. This apparatus is easily kept in order and may be stored in any convenient place underground.

The August number of the Mexican Mining Journal is a special cyanide number. Special articles from many prominent experts and operators are presented. Eighty-two pages of reading matter are given over to articles on every phase of modern cyanide practice.

The Coal Mines Regulation Act of British Columbia provides that all the officers of a company having charge of work underground shall hold Government Certificates of Competency. These can only be obtained by passing an examination before the Managers' Board. Three certificates are granted, the First-Class or Manager's, the Second Class or Overman's, and the Third Class which must be held by every shiftboss, fireboss, or shotlighter.

MINING AND METALLURGICAL OPPORTUNITIES IN CANADA.

(Written for the CANADIAN MINING JOURNAL by A. B. WILLMOTT, Mining Engineer, Toronto, Ont.)

Prefatory Note.—In the following brief article attention is called to some industries connected with mining, which apparently might be profitably established in Canada at once. Where data are available the market is given, and the source of the raw material indicated. I do not pretend that I have critically examined into all the conditions that make for success, but only that the subjects mentioned are worthy of careful study by investors looking for meritorious propositions.

I.

Soda.

The report of the Department of Customs for the year ending March 31st, 1909 (the latest available), shows a consumption in Canada of caustic soda, soda sal and soda ash valued at $479,882. There was a further consumption of salts of sodium, omitting sodium nitrate, of over $150,000, some of which might be profitably manufactured. It thus appears that there is a market in Canada at present for over half a million dollars worth of sodium products. The following table compiled from the report referred to shows the present source of the sodium compounds consumed in Canada and their value as entered at the customs house:

Countries.	Imports. Quantity. Lbs.	Value.
Soda Ash—		
Great Britain	17,686,755	$138,811
United States	4,503,266	41,124
	22,190,021	179,935
Caustic Soda—		
Great Britain	7,368,959	139,525
Germany	100	10
United States	3,334,996	67,552
	10,704,055	207,087
Soda Sal—		
Great Britain	4,230,678	24,495
United States	6,867,461	68,365
	11,098,142	92,860
Total	43,992,218	$479,882

Salt, which is the raw material for all these compounds of sodium, occurs in great abundance in Ontario. In the district bordering Lake Huron and Lake St. Clair, from Lake Erie northwards as far as Kincardine, are strata of the Upper Silurian abounding in salt. At Kincardine the salt bed is found 880 feet below the surface, at Clinton at 1,170 feet, at Courtright 1,620 feet and at Windsor 1,272 feet. The quantity of salt is inexhaustible. At Goderich the six beds aggregate 126 feet of solid salt. At Blyth a bed 80 feet thick is known; at Petrolea, one 105 feet thick; at Windsor, one 250 feet thick. All the beds are not of equal purity; the second and third at Goderich are among the purest known, yielding on analysis 99.7 per cent. of salt. These beds are exploited by driving down a casing pipe to the salt bed in which is inserted a second pipe of smaller diameter. Water is forced down the outer pipe and rises to the surface through the inner, charged with the salt which has been dissolved. These brines are largely sodium chloride, with very small portions of calcium chloride, magnesium chloride and sulphate of lime.

The production of salt from Ontario in 1908 was 79,975 tons, valued at $378,798.

That these salt beds are well adapted for the soda industry is abundantly shown by the fact that across the Detroit River the Solvay Company has a very large plant manufacturing various soda products from the same salt beds that occur in Ontario.

On seeking a suitable locality for such an industry transportation of both raw and finished products must be taken into account, and to a lesser extent the cost of fuel or power. The source of salt will naturally be some point close to the Great Lakes, like Goderich, Sarnia or Windsor. Such a point offers water transportation for the finished products as well as rail, and further permits the importation of coal for fuel at a low figure. On the other hand, if electrolytic soda is to be produced some point in the Niagara Peninsula, where electric power is cheap, would seem more suitable. At any rate Ontario affords large quantities of salt of excellent purity and cheaply produced. There are, further, cheap power and excellent transportation facilities. Added to this there is a market now for half a million dollars' worth of sodium compounds yearly and the probabilities of a great expanse.

(To be Continued.)

THE PRICE OF COAL.

There has just been issued by the Federal Department of Labour a bulky special report entitled "Wholesale Prices in Canada—1890-1909." Mr. R. H. Coats, B.A., associate editor of the Labour Gazette, is the compiler.

The tabular statements showing the wholesale prices of coal are noteworthy. In 1890, the average wholesale price per ton of 2,000 pounds on wharf at Montreal was $2.462. For four successive years the average price remained at precisely the same figure. Then, up to 1900, there were very slight drops. During 1900, the price went up to $3.075, and in the succeeding year it reached $3.498. During 1909, the average price was $3.602. The increase in price, therefore, during 20 years is only 64 cents, or about 21 per cent. of the price in 1890. These figures apply, of course, almost exclusively to Nova Scotian coal.

In 1890, anthracite sold in Montreal at an average price of $4.875. In 1909, the price was $5.683—an increase of 80.8 cents, or about 16.6 per cent. of the former price.

The El Oro mine has ore reserves totalling 441,639 tons, and averaging $8.06 in gold per ton. The ore also carries 3 ounces of silver per ton. The ore ranges in gold content from $6.15 per ton to $18.09 per ton. In the previous year the average gold content was $9.10 per ton.

THE ENGINEER GROUP, ATLIN MINING DIVISION, BRITISH COLUMBIA.

Reported High Gold Returns from Small Quantity of Quartz.

BY E. JACOBS.

British Columbia newspapers lately printed a news despatch from Atlin, in which statements were made to the effect that 20 pounds 8 ounces of gold had been obtained from 800 pounds of quartz put through a stamp mill at the Engineer mine; that three tons of selected ore on hand will return from $6,000 to $10,000 per ton; that about 200 tons of ore taken out since January will average $150 per ton; and that a 100-stamp mill is to be erected. In view of the unusually high-stated value of the "selected" ore and the impression of the importance of the mining development there, as suggested by the alleged intention to erect so comparatively large a stamp mill on the property, the information given below has been taken from provincial official reports, so that those interested may be assisted in arriving at reasonable conclusions in this connection.

The original Engineer group was owned by the Engineer Mining Company, of Skagway, Alaska. It embraced thirteen mineral claims situated in Atlin mining division, on the east side of the southern part of Taku Arm, this arm being a branch of Tagish Lake. The old route from Log Cabin, on the White Pass and Yukon Railway, via Otter Lake to Atlin, crossed Taku Arm and entered Taku Inlet, the mouth of the latter having been known as the Golden Gate. The Engineer group is about nine miles south of the Golden Gate.

In the summer of 1900 the provincial mineralogist, Mr. Wm. Fleet Robertson, paid an official visit to Atlin district, but having to proceed thence to Chilkat district before the season was far advanced, he had not time to personally examine the Engineer group. However, he obtained from the secretary of the Engineer Mining Company, then resident at Skagway, the following particulars, which were printed in the Annual Report of the Provincial Department of Mines for 1900:

"The property was taken up by a locating party of engineers of the White Pass and Yukon Railway, hence the name 'Engineer' group. The discovery was made on a small stringer of quartz carrying free gold visible to the naked eye. Assays of specimens taken from this stringer gave any results up to $13,000 per ton. Development work was begun on this stringer and continued over the greater part of the property. In following the stringer a large body of quartz was struck, running at an angle of 60 degrees with the strike of the former. Further prospecting disclosed parallel ledges and stringers, and samples of quartz were taken and assayed, but gave little satisfaction. Four tons of ore from the rich stringer was then taken out and was milled at Juneau, some $23 per ton having been saved on the plates and one per cent. of concentrate, worth $83 per ton, obtained. A tunnel was then started from the shore of the lake and was driven 250 feet through slate, the formation dipping into the mill. At 215 feet in, and not quite at right angles, this tunnel cut a quartz ledge 20 feet in thickness. The company had nine men at work during the summer."

In a prospectus issued by the company there was shown a table giving details of results obtained by fire assay of five samples, described as general average samples, and from cyanide tests of three similar samples. The assay returns in gold and silver ranged from $10.54 to $17.09 per ton, with an average of $13.05; those from cyanide tests were from $30.03 to $59.63 per ton, with an average of $40.95. It was stated that "the great presence of tellurides in the ore accounts for the small fire assay of the identical samples. All cyanide tests have been made after a preliminary roasting of the ore."

The provincial mineralogist wrote: "I shall make no comments upon the remarkable differences shown above between the fire assays and cyanide tests on identical samples. A number of selected, not average, samples of the ore were obtained from the company, certain of which showed free gold, but, although tested repeatedly by the provincial assayer, none of the ore could be found to give the reaction for tellurides, although obtained from the company as samples of the telluride ore and in order that it might be so tested."

In the Annual Report for 1904 the provincial mineralogist gives the following information relative to this group: "Since 1900 considerable money has been spent on its development by the Engineer Mining Company. The claims, which have not as yet been surveyed, extend along the lake shore and part way up the mountain, covering the bench-like foothills, which are some 400 feet higher than the lake. The property has not been worked this past year. A tunnel, driven to crosscut a large body of quartz outcropping on the bluff above, had been started below the level of highest water mark, and had, in consequence, been flooded by the spring floods. The tunnel ran in straight for about 200 feet, and at a point 175 feet from the portal, a drift had been made to the right for about 115 feet, from which exploratory cross-cuts, etc., had been run to the extent of about 75 feet in all. The tunnel had cross-cut through slate, cutting in its length several small quartz veins, and the main vein was developed by the drift which showed the quartz to be from 7 to 20 feet wide. This main quartz lead continued in the drift for about 80 feet from the tunnel intersection, when it seemed to disappear into the wall, and the subsequent exploratory workings had not picked it up again, except as small stringers. The quartz is white and vitreous in appearance, showing very little mineralization, while samples therefrom gave only a trace in gold. The tunnel had been laid with steel rails, and well equipped with cars, blacksmith shop, sheds, etc. This is the largest showing of quartz seen on the property, but it is not the showing for which the stamp mill was brought in. That showing is located some 600 feet further to the south along the beach at the original point of discovery. Here, a small stringer of quartz at right angles to the general trend of the larger quartz vein—viz., east and west—cuts from the shore into the hill, on which from the beach a shaft had been sunk 30 feet, and from this shaft it is reported most of the rich samples taken from the property were obtained. Where this stringer should cut the hill, and 100 feet above high water, a 3-compartment shaft had been sunk for 70 feet. This was well equipped with a Joshua Hendy steam hoist and locomotive boiler, all covered over by

he frame of a fine building, which had never been completely boarded in, but was left unfinished. Just below, near the beach, has been erected the frame-work of a stamp mill and bins, all excellently built, but only half completed, while on the beach in a cabin is apparently the complete machinery for the mill which has never been erected."

The foregoing information, it should be kept in mind, relates to the Engineer group as officially described in the years 1900 and 1904 respectively. There was also a brief reference to the property in the Annual Report of 1902, as follows: "Some development work was done during last winter, and a triple-discharge Hendy stamp mill complete is now being installed on the property at an estimated cost of $15,000. The mill is expected to be in position and ready for work by February 1st, 1903, and as soon as warm weather sets in it is expected to open up on the ore body and start crushing." That expectation, however, was not realized. The only official mention made of this property since 1904 was this brief notice in the Annual Report for 1908: "Two years ago the original holders of the Engineer group allowed some of their properties to lapse and they were located by local parties, who have been doing some development work during the year and who are reported to have discovered some very rich ore. This rich ore is only found in small stringers, but I am informed that several larger and better defined ledges have been discovered on the properties."

Of course, it may be that the Engineer mine mentioned in the press despatch recently published, is distinct from that the official information above quoted relates to, but the probabilities are that the properties are identical. If so, it would appear that it is not reasonable to conclude that anything like sufficient development work has been done and ore blocked out to afford justification for the erection of a 100-stamp mill. It is not at all unlikely that a comparatively small quantity of selected and unusually rich quartz was accumulated during the time it was regarded as prudent to "keep quiet" pending the obtainment of a good title to the property, but beyond that it will be well to await full and thoroughly reliable particulars before giving full credence to the recently-published statements concerning this mine. It is satisfactory to learn that the Provincial Department of Mines has sent Mr. Herbert Carmichael, provincial assayer and assistant to the provincial mineralogist, to investigate on the spot and thereafter make an official report to the Minister of Mines. Meanwhile it will be well to suspend judgment, for recent experience has shown how utterly unreliable some of the so-called mining news published by newspapers has been.

THE ELECTRIC OPERATION OF THE INDIANA STEEL PLANT.

By Frank C. Perkins.

At Gary, Indiana, the new works of the United States Steel Corporation is very largely operated by electric power and the controlling apparatus of the Cutler-Hammer type utilized at the Indiana Steel Plant is of special interest.

The accompanying illustration, Fig. 1, is a view of the rail mill at Gary, Indiana, looking across the rail transverse and bloom shear table. In the pulpit immediately behind the bloom shear will be seen the starting panel for the bloom shear motor and the controlling apparatus for the stop motor. The illustration, Fig. 2, is a view underneath the tilting table at the 3-inch roughing mill, while at the left will be seen the automatic limit switch for stopping the table at the top and bottom, while at the right will be noted the disc brake and the conduits and methods employed in bringing the power cables to the apparatus. The electrically-operated 3-high roughing roll at Gary, constructed by the United Engineering and Foundry Company, of Youngstown, Ohio, will be noted in illustration, Fig. 3, which also shows the operating pulpits and controlling apparatus.

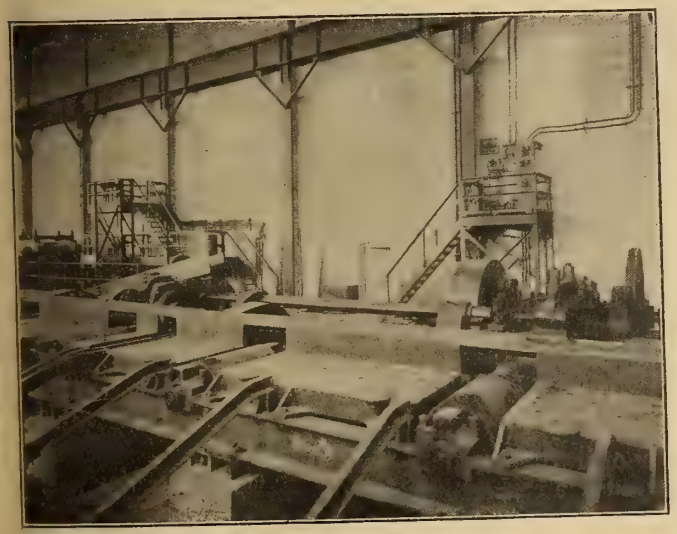


Fig. 1.

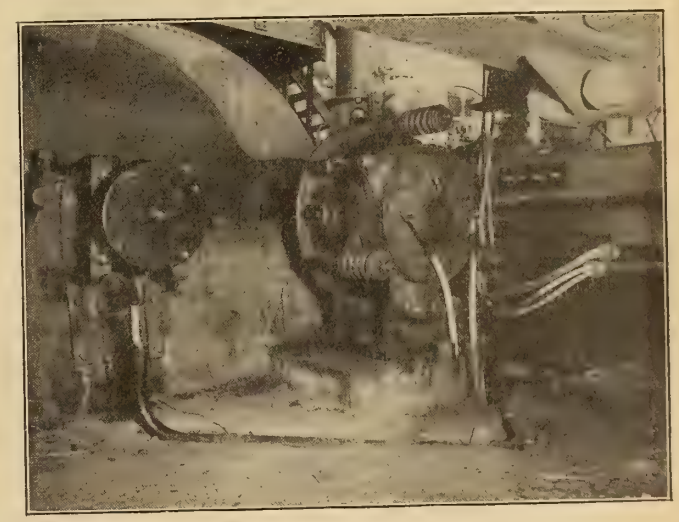


Fig. 2.

A typical contactor controller installation at the electrically driven rail mill at Gary, is shown in the accompanying illustration, Fig. 4. At the right of the control panel will be seen an auxiliary panel equipped with electric lamps for ground testing.

It is clear that the problem of control presented by the multitude of motors installed at this plant involve

many interesting features. The solution of these problems has engaged the attention of the many experts for many months and the automatic controlling devices installed at Gary represent the most recent developments in the art of electric control as applied to steel mill machinery.

There are automatic controllers in connection with motors on the transfers which make it possible for the operator to transfer the rails from one table to another by a simple throw of the lever, the motor being automatically stopped after the transfer has been completed.

There is a regulating system in the power house for use in connection with the storage battery plant, the object of this system being to maintain the power house load as near constant as possible. The various motor generator sets and converters, comprising this regulating system may be started and stopped from the bench board in the switching gallery by means of remote control field rheostats.

It is held that one of these remote control starters is remarkable for its great capacity and it is used in connection with a motor generator set which is started from the direct current end, and, although the starting current is not abnormally high, the rheostat is designed to carry 10,000 amperes under maximum working load conditions. This is believed to be the largest remote control starter ever built.

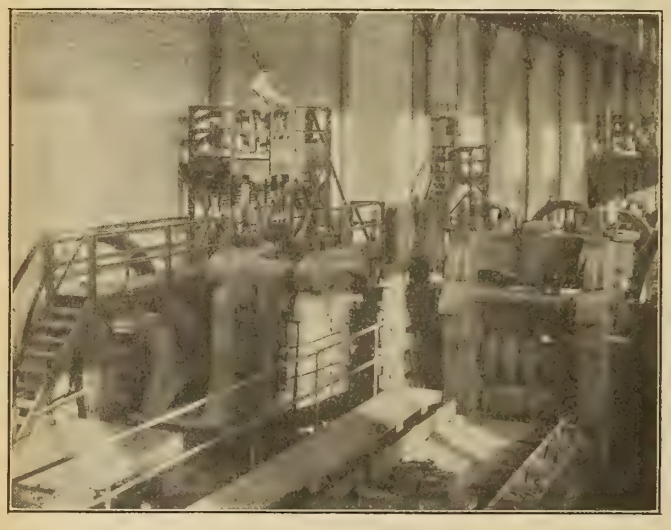


Fig. 3.

In connection with the various generators in the power house there are also installed a large number of Cutler-Hammer remote control field rheostats and field switches. The controlling apparatus is located in the basement as near as possible to the generators and are operated from the bench board located in the power house gallery. It may be stated that these rheostats used are of a unique design, they are of the "Cross head" type and are driven by means of vertical motors and are provided with automatic devices which insure the stopping of the motor at either limit of the "Cross head," travel, this is to say, either when all resistance has been cut in or cut out of circuit. Means are provided, also, for operating these field rheostats by hand in case of damage to the motor.

The controlling apparatus in the gas producer plant, where gas is generated for the open hearth is so arranged that it can automatically weigh and record the amount of coal used. At first the coal is received in the hopper-bottom cars from which it is dumped into a bin. A motor operated double skip hoist takes the coal from this bin, the door of the coal chute being automatically opened by a mechanical connection as the skip bucket settles into the pit beneath the bin. The opening of this door permits coal to discharge from the bin into the skip car and when 4,000 pounds of coal has been run into the car a counter weight is lifted and this automatically starts the hoist which lifts the loaded skip to the top where it dumps automatically and the hoist is stopped.

When the first skip car is in the dumping position, the second is lowered beneath the chute and the operation is repeated. The cycle continues as long as there is any coal in the bin and by means of a counter for counting the number of trips, the amount of coal delivered to the gas producer is accurately determined and recorded.



Fig. 4.

The automatic remote control devices installed in the rail mill are among the most notable at the plant. The control of the elevating and tilting tables, the bloom shear and the transfer is of special interest. The elevating table on the 48-inch blooming mill, weighing about 250,000 pounds is supported on huge bell cranks which are connected to a rotating crank driven by a 250 h.p. motor operating at 150 revolutions per minute.

Automatic controlling devices are used in the throwing of a master lever which starts the table from the lower level position and raises it to the highest level where it is automatically stopped. In lifting the table from the low to the high level, the rotating crank revolves through an arc of 180 degrees and on throwing the master lever to the reverse position the rotating crank revolves through another 180 degrees in the same direction, bringing the table to the low level once more. The operation of raising or lowering the table can be accomplished in a period of two seconds which is quite re-

markable when the masses to be accelerated, slowed down and stopped are considered.

A 75 h.p. induction motor operates the bloom shear, there is a pin on the clutch driven by a direct current auxiliary motor of 5 h.p. and the circuit of this 5 h.p. motor is interlocked with the controlling device for the 75 h.p. alternating current motor so that the former cannot be operated except when the latter is running at full speed. The latch is operated by a crank to which the 5 h.p. motor is geared. Pressure on a push-button under control of the operator, causes the motor to run long enough to revolve the crank 360 degrees thereby releasing the clutch and returning the pin to the initial or "Off" position.

It may be stated that the equipment of the tilting table is very similar in arrangement to the elevating table, one end being pivoted and the other end supported on a bell crank. The tilting table is driven by a 150 h.p. motor controlled by a Cutler-Hammer controller similar to that designed for the elevating table.

It will be noted that the steel produced in the open-hearth is cast into ingots which are delivered to the soaking pits where they are re-heated for rolling into rails; there are twelve soaking pits in all, six on either side of the rail mill. Two electrically-operated ingot buggies deliver the heated ingots to the rail mill, each buggy serving six pits.

These ingot buggies have a most ingenious system of control. On account of the length of the building in which the soaking pits are located, it is impossible for the operator stationed at the mill to see when an ingot buggy is opposite a particular pit. It was, moreover, necessary to guard against the possibility of the operator becoming confused and bringing both ingot buggies to the mill at the same time, which would result, of course, in a collision.

For guarding against this contingency a special automatic controlling system was provided and it also enables the operator to stop the ingot buggy at any of the pits by merely setting a controlling lever on the notch corresponding to the pit in front of which it is desired to halt the buggy.

It may be stated that the operator in the mill has in front of him two master levers for the control of the two buggies. Each of these controlling levers can be set in any of eight positions, one of these positions corresponding to the mill itself, six to the six soaking pits which the buggy serves, and one off position. If, when one of the ingot buggies is at the mill, the operator desires it to go to pit No. 5 and there stop, he merely moves the controlling lever to the position corresponding to pit No. 5. Immediately the buggy proceeds to that point and is there automatically stopped and there is a suitable interlock between the two controlling levers which renders it impossible for the operator to throw both levers to the mill position at the same time.

A clear track for each buggy is therefore insured. This controller equipment of the Gary electrically-operated steel plant undoubtedly represents the most up-to-date and successful in modern electric motor driven steel mill practice to-day.

The Portland Canal district has now a population of about 3,500 persons. This estimate does not include men employed on railroad construction.

A pyrite ore containing 40 per cent. recoverable sulphur usually assays between 42 and 43 per cent. Payments are customarily made on the assay values.

ARE BRITISH COLUMBIA ORES IMPROVING?

By E. Jacobs.

Among other notes on "The Financial Situation," the Toronto Globe on July 30th printed the following: "Are the British Columbia ores improving? The British Columbia Copper Company is bettering its position through increased gold values which have been encountered in its operations, and now comes the Consolidated Mining & Smelting Company with an increase in the percentage of gold in its metal production from 42.79 last year to 46.6 per cent. in the fiscal year ending June 30th. The larger percentage last year was important enough to add $458,000 to the company's receipts, in fact, the increase in the value of the metal production is due entirely to the gold. Silver and lead fell below the previous year, and copper made a very slight increase. The gross value of metal amounted to $5,911,000, and despite the very unsatisfactory condition of its markets, notably lead, the company ought to be in a position to make some dividend announcement in September."

British Columbia Copper Company.

First, as to the increase of gold shown in recent reports published relative to results obtained by the British Columbia Copper Company; probably this is due to the fact that the company has during June and July been smelting ore from its Wellington group mine, in which gold is the chief constituent of value, as well as copper ores from its Mother Lode and Oro Denoro mines. In June approximately 1,500 tons of Wellington mine ore was shipped to the smeltery, that having been the first month in which ore from that source was received at the company's works at Greenwood. Now, information obtained when I visited the mine last winter was to this effect—the greater part of the ore up to that time opened by development workings was oxidized and contained practically no metal of value other than gold, which, was stated to run from $6 to $7. per ton. In places bunches of sulphide ore, arsenical iron pyrites, had been found, some of these comparatively large; from this ore assay returns up to $20 per ton and even better had been obtained, chiefly in gold, but with about 2 per cent. copper. Allowing that 1,500 tons of oxidized ore had been smelted in June, this would probably add $9,000 to $10,000 to the value of gold recovered in that month. It may be, though, that these figures are high for June, since it is not unlikely the tonnage of copper ore smelted that month was reduced proportionately. Again, a little gold occurs in association with the copper, so that allowance should be made for this as well. These comments are not intended as a precise statement of the amount of gold recovered by the British Columbia Copper Company, but to indicate what is probably the chief factor in the improved situation alluded to by "The Globe." Since the Wellington group mine shipped about 2,500 tons of ore in July, it will easily be seen that returns for that month should show a still larger proportion of gold recovered, conditionally, of course, that the ore was smelted and not stored at the smelter.

Consolidated Mining and Smelting Company.

Now as to the larger percentage of gold shown in the returns of the Consolidated Mining and Smelting Company for the fiscal year ended June 30th, 1910, as compared with that of the immediately preceding fiscal year: if the tables printed in the Canadian Mining Journal of August 15th, be referred to (for my contribution on that date gave particulars of the opera-

tions and results of the company for its last fiscal year) it will be seen that the percentage of gold was 47.6, not 46.6 as stated by "The Globe." Without being informed as to the source of the larger proportion of gold produced at the company's big works at Trail, I state it as my opinion that most likely the increase, or most of it, came from the company's War Eagle mine, for it is well known that much ore containing a higher average gold value than usual was discovered in that mine during the fiscal year under review. It is worthy of note that the tonnage of ore from the company's Centre Star group of mines at Rossland, which includes the War Eagle, was 194,013 for the year to June 30th, 1910, as compared with 183,040 tons for that to June 30th, 1909, and it seems reasonable to conclude that the War Eagle contributed its share to the increase shown, and that of ore carrying a higher value in gold than in the preceding year mentioned. But apart from the question of the proportion of gold in the total value of metals produced during the year, the importance of which can only be properly determined by an analysis in detail of the several conditions which led to that result, there are two plain facts warranting much satisfaction with the progress made during the past fiscal year, at least as viewed from an industrial point of view. These are that (1) the tonnage of ore received was 485,457 tons in 1909-10, as against 347,417 tons in 1908-09, and (2) that there was substantial increases in gold and copper recovered, which left a considerable margin in value above the decreases in silver and lead. The quantities of metals produced in the respective fiscal years are shown in the following table:

	To June 30th, 1909.	To June 30th, 1910.
Gold, ounces	114,929	137,614
Silver, ounces	2,443,475	2,162,408
Lead, pounds	43,675,077	42,365,816
Copper, pounds	4,637,631	5,974,959

These figures show that against a loss of approximately 1,300,000 pounds in lead and 280,000 ounces in silver, there was a gain of nearly 22,700 ounces in gold and 1,337,000 pounds in copper, the final result being a gain in value of $406,000.

General Conclusions.

Speaking generally, I do not know of any changes in conditions that warrant an assumption or conclusion that there has lately been a definite improvement—that is, increase in average value—of ores mined in British Columbia. There will, of course, from time to time be changes in value of ores mined in the larger mines of the province, except in such cases as the Boundary mines from which thousands of tons of ore are taken daily. There will, also, be improvements in mill and smelter returns, the result of the use of machinery or metal-saving appliances better adapted for the recovery of the valuable metals contained in the ores treated; or, it may be, more efficient methods will be followed, so that the precentage of recovery is greater, but taking into consideration only the marketable metal contents of ores, no facts nor changed conditions have come to my notice that justify a belief or conclusion that the general run of ores mined in this province shows increased average values.

A few words in regard to the exceptions made in the foregoing paragraph—it may be added in explanation that in the case of the Granby mines, at Phoenix, the production of which over a period of seven months of the current year, to July 31st, has been on an average of 3,350 tons a day, or of the British Columbia Copper Company's Mother Lode mine, producing approximately 1,000 tons a day, the bulk mined and smelted is so large that the effect of shoots of ore of better grade being occasionally met with does not materially affect the general average value of the yearly production.

There are other instances, though, where different results are experienced, notably in such a case as that of the War Eagle mine, Rossland, where, as already intimated, a decided increase in value has been a gratifying experience within a period of probably less than twelve months. Not that such good quality ore had not previously been found in that mine, but that after the practical exhaustion of shoots found earlier, a large body of high-grade ore, the existence of which was not previously known, was found and is now being mined.

In closing, it may prove of interest to have an allusion made to the Nickel Plate mine, near Hedley, Similkameen. Eighteen or twenty months ago the then owners of that mine, which is the only comparatively large mine in British Columbia from which gold ore is being milled, were anxious to sell the property. A thorough sampling convinced a competent engineer, familiar with the mine, that it could be restored to a similar profit-yielding basis to that it had formerly occupied, so he unhesitatingly recommended its purchase by New York capitalists. To-day there is ore being mined from an ore body 80 feet in width and of an average value of $12 per ton. Further, improved milling practice and more efficient gold-saving appliances are together showing such markedly better results that this year's tonnage of ore mined and milled—should no unforeseen contingency arise to interfere with operations as now being carried on—will be at least 25 per cent. larger than in any previous year, while the average recovery of gold per ton will also be higher. To those who, like the writer in the Toronto "Globe," are not informed as to the reasons for such improvement in conditions, it may appear that higher-grade ore is being mined and milled, but to those who know the facts it is manifest that competent management and the utilization of improved methods and appliances are chiefly responsible for the decided change for the better that has been brought about.

CORRESPONDENCE.

The Editor, CANADIAN MINING JOURNAL.

The phrase "intellectual proletariat" has been in use for many years in connection with the Socialist movement, but not at all in the sense in which you employ it, as denoting ineptitude or want of training. As used by Socialists it includes those brain-workers of all kinds who are dependent for their living upon their employment by others, and, therefore, should realize that they have common interests with manual labourers who are in the same position economically, notwithstanding that the latter receive "wages," while the intellectual proletariat draws a salary or commission.

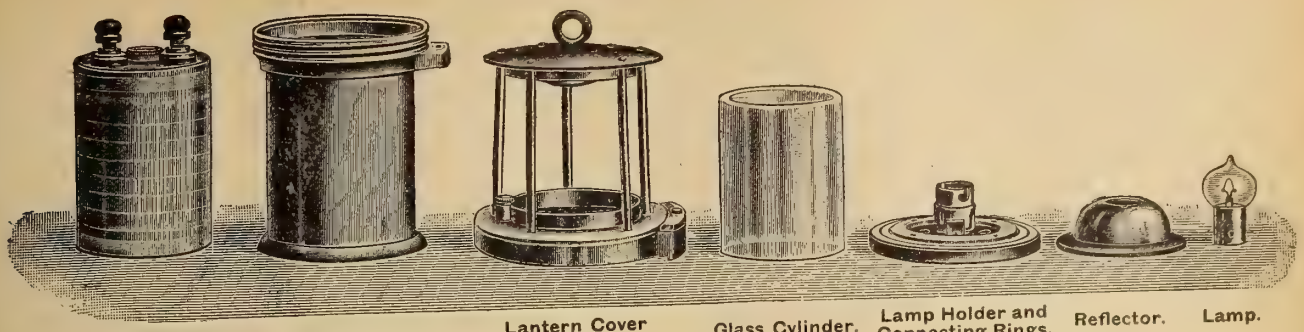
Yours truly,

PHILLIPS THOMPSON.

119 Indian Road, Toronto,
August 18th, 1910.

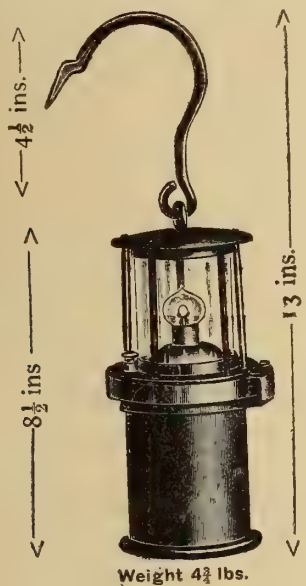
The daily duty of the 1100-lb. stamp used at El Oro, Mexico, is 10.33 tons. The ore is crushed to 6-mesh or 8-mesh. The stamps drop eight inches, 101 times per minute.

INDUSTRIAL SECTION.



THE "GOOD LUCK" MINING LAMP.

The "Good Luck" miners' safety lamp is of the newest type of self-contained electric light. The casing is one aluminium casting free from zinc. It is threaded round the upper circumference and gives a substantial fixing for the lantern base, which is bored out and threaded to suit. Thus is formed a complete, dust-proof, gas-proof, and air-tight combination. A heavy glass cylinder, ground to suit exactly, is fitted as a lantern glass and protects the lamp from all possible injury. The lamp itself is one of the latest metallic filament tungsten lamps, taking one watt per candle power, as against four watts per candle power taken by lamps of this form with a carbon filament.



Accumulator.—The two negative electrodes and the one positive electrode that constitute the elements of the battery are especially strong and efficient. The positive consists of a heavy collecting frame in one piece and formed of longitudinal rings superposed at regular intervals. The frame thus formed carries the active material which is allowed to harden on it. By this arrangement not only is the manufacture of the collecting frame much simplified, but a battery of minimum weight and maximum surface is obtained, one that in its formation prevents disintegration. Of the two negative electrodes, each consisting of a double cast lead lattice cylinder, one fits inside of and the other outside of the positive. By this means the entire surface of the positive electrode is in action.

The accumulator is enclosed in a celluloid case, closed at the top with a double cover, and absolutely air-tight. Therefore the lamp can be operated in any position.

The lamp is locked by a magnetic lock and cannot be opened by any unauthorized person. It will burn for from ten to twelve hours with a discharge current of 0.75 amperes, giving a light of about 3 candle power. Orchard & Parker, Stair Building, Toronto, are the Canadian agents.

PAPER MILL PUMPS.

Capacity Equal to the City of Montreal Water Works.

The remarkable part played by pumping machinery in modern pulp and paper mills may be realized from the contract recently awarded by the Powell River Paper Company to the John McDougall Caledonian Iron Works Company, Limited, of Montreal. This contract calls for 11 Worthington centrifugal pumps varying in size from 3 inches to 12 inches at the discharge outlet. Two of these pumps, each having a capacity of 4,200 gallons per minute and driven by electric motors, will carry ground wood stock from the grinders to the screens. Two others, having a capacity of 4,000 gallons per minute each, and direct connected to water wheels, will carry ground wood stock to deckers. The remaining pumps will be used in connection with beaters and digesters and for boiler feed and general purposes.

These 11 pumps will have an aggregate capacity of 37,000,000 gallons daily, which is nearly equal to that of the city of Montreal water department, and will be built in the works of the company on William street. The Powell River Paper Company is backed chiefly by Minneapolis capitalists, and the mill is now being erected on the Powell River, a few miles from Vancouver, B.C.

The Jeffrey Manufacturing Company, office and works, corner Cote and Lagauchetiere streets, Montreal, Que., also having a Toronto office formerly in the Dineen Building, 8 Temperance street, has removed the Toronto office to more commodious quarters at 174 King street east.

Mr. H. W. Scott, mechanical engineer, formerly connected with the home office of this company in Columbus, O., is now in charge of the Montreal office and works.

The Jeffrey Manufacturing Company is an old, established concern, making a specialty of elevating and conveying appartus for handling all kinds of materials in lumber camps, mines, quarries, as well as conveying apparatus for handling materials from the docks, loading to vessels.

New machinery has been installed at the Montreal works for more economical production.

This company also has nearly 100 branch offices situated in the leading commercial centres all over the world.

PERSONAL AND GENERAL.

Mr. H. Mortimer-Lamb has returned from Europe.

Mr. W. S. Lecky has resigned his position as sales manager of Mussens, Limited.

Mr. John Hugh McMillan has been appointed Gold Commissioner for the Portland Canal Mining Division, B.C.

Mr. A. A. Hassan has returned to Brooklyn, N.Y., after a visit to Porcupine. Mr. Hassan will again visit Porcupine during September.

Mr. W. H. Trewartha-James, general manager of the Tyee Copper Company, Victoria, B.C., left that city on August 16th to proceed to the Ketchikan district, Southeast Alaska, on a business trip.

Professor Hardwick, professor of mining at Sheffield University, England, has been visiting mining districts in British Columbia. About the middle of August he was at Victoria, whence he proceeded to Nanaimo to see the coal mines there.

Mr. Sidney Clarke Ells, of Ottawa, son of Dr. R. W. Ells, of the Geological Survey, recently visited Queen Charlotte Islands. Five or six years ago he spent part Ells, of the Geological Survey, recetnly visited Queen Charlotte group, at the time his father was making a geological examination of coal measures there.

Mr. Mason T. Adams, formerly general manager of the Britannia Mining & Smelting Company, with a big copper mine on Howe Sound, near Vancouver, B.C., but now consulting mining engineer with headquarters at Denver, Colorado, recently went up to Portland Canal to investigate the mining situation in that district.

Mr. J. W. Bryant, who for three years has been mining engineer for the Tyee Copper Company, recently left Victoria, B.C., for England. During the first year of his association with the operations of the company he was superintendent of the Tyee mine, at Mt. Sicker, Vancouver Island, and since the practical exhaustion of the big ore body in that mine he has been engaged in examining mining properties for the company, covering an extensive field on the Pacific coast, from Mexico to Alaska, both countries included.

The Westinghouse Electric & Manufacturing Company has recently received an order from the La Blanca & Anexas Mining Company for forty type MS motors to be used in the company's mill at Pachuca, Mexico. The motors ordered range in size from 5 h.p. on the pulp thickeners to 75 h.p. on the tube mills. The order also includes seven 250 k.v.a. O.I.S.C. transformers, and one 12-panel switchboard.

The American Society of Engineering Contractors, of which Mr. D. E. Baxter, of 27 William street, New York City, is president, and Mr. D. J. Hauer, secretary, will hold their annual convention in St. Louis, on September 27th, 28th and 29th in the coliseum. The local committee of arrangements is E. H. A. Badie, chairman; J. L. Westlake, W. C. Swartout and L. C. F. Metzger. Papers will be delivered by J. B. Goldsborough and Ed. Wegmann, both of New York, on "Dam Construction for City Water Supplies," and by Geo. C. Warren, of Boston, on "Work Preliminary to Street Paving and Road Work." A banquet will be held, and several sight-seeing trips will be made to important engineering works in and around St. Louis.

The American Peat Society, through the efforts of President Dr. Eugene Haanel, Director of Mines, Department of Mines, Canada, held a series of meetings from July 25th to July 27th at Ottawa. The Canadian Government has a fuel testing station at Ottawa, which is equipped for the testing of power purposes for peat only. The power plant consists of a double-zone peat gas producer, wet coke scrubber, tar filter and dry scraper, a 4-cycle single-acting Keating gas engine of 60 effective horse power, a 50 k.w. direct-connected Westinghouse direct-current generator, and a resistance stand for absorbing energy generated. The power generated at this station will later be utilized in running the machinery of a metallurgical laboratory. The peat for the operation of the producer will be supplied from the peat bogs owned by the Dominion Government, near Caledonia Springs, about 40 miles distant from Ottawa, and has an area of about 300 acres. The Anrep process for manufacturing air-dried peat is employed, the plant installed having a capacity of about 30 tons per day of air-dried peat.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Company, Limited, Employees' Benefit Society.

The new society is now in full operation, and a committee has been nominated to wait upon the Nova Scotian Government in Halifax and lay before them a statement of the work which it is hoped the society will perform. It is believed that the committee have a very good case to lay before the Government, and have excellent grounds for requesting a continuance of the grant which has been made in the past to the Colliery Relief Societies. On the 1st of July the accumulated assets of the various relief societies which have amalgamated to form the Dominion Coal Company Employees' Benefit Society amounted to, roughly, $47,000. The Dominion Coal Company has made an initial contribution to the society of $21,000, making a total fund of $68,000. It is estimated that the liabilities of the society for payments to widows and orphans already dependent on the funds amount to $24,000, which leaves the new society with an actual surplus of $43,000, with which to begin what everyone hopes will be a long and beneficial life.

A comparison of the benefits which will be given under the new schedule with those given under the constitutions of the old relief societies shows that the provisions which will be made in future for incapacity or death of the bread-winner will be very much more adequate. Under the old schedule a man incapacitated from work either by sickness or accident received $3.50 per week for twenty-six weeks; at the expiration of which period the extent of further relief allowance was decided by the managing committee. Under the new schedule, men similarly incapacitated will receive $6 per week for twenty-six weeks, $3 per week for a further period of twenty-six weeks, and then $2 per week for the two years following; after which, if the disability continues, it is in the power of the officers to make special grants in deserving cases. Under the old schedule, the death claim varied from $60 to $100. Under the new schedule, the amount immediately payable at death to dependents will be $100. It is not intended that this amount should be in any way analogous to a death payment under the ordinary insurance society or under the Compensation Act, but it is intended merely to cover the immediate necessities connected with interment. Adequate provision is made for widows, who, under the new schedule, will

receive $8 per month for five years, compared with $8 per month for one year only under the old schedule. The sum of $3 per month is allowed for each child until it reaches the age of fourteen years; under the old schedule the allowance was $2 per month until the age of thirteen years. In addition to the foregoing benefits, provision is made for special grants to members partially or totally incapacitated by the loss of eyesight or limbs. These special grants are in all cases in addition to the regular weekly indemnity. These much-extended benefits require, of course, a larger income, and the workmen have increased their monthly contribution from 25 cents to 50 cents per man. The company has agreed to contribute equally with its men; that is, it will pay into the funds of the society monthly an amount equivalent to that collected from the workmen. The Nova Scotian Government have contributed in the past to the relief societies three-tenths of a cent per ton raised, which is equal to, approximately, 12 cents per month per man. Therefore, the society will have an income of about $1.12 per month per man. The rules of the society make no distinction between sickness and accident, and the records of the past show that only one-third of the money paid in relief has been disbursed for accidents, while two-thirds has been paid out for relief during sickness. It is calculated that in the case of a normal family, consisting of the mother and four children, they would, in the event of the death of the bread-winner from any cause, receive in relief payments approximately $2,000, extending over a period of ten or twelve years.

The aim of the society is, in case of incapacity for work or death, to provide for those dependent upon weekly earnings a system of relief which shall approximate as nearly as possible to the normal conditions under which a workman receives his income, and to avoid what is one of the worst features of some forms of industrial compensation, namely, the payment of comparatively large sums of money to persons not accustomed to its possession. The relief payable is based on the necessity, being graduated according to the size of the dependent family.

Considerable attention and care has been paid to the framing of the constitution of the new society, so that it may have a long and useful life and properly carry out the very needful purpose for which it is designed, and the committee who are deputed to interview the representatives of the Government have no reason to be ashamed of the society they represent, which should have the hearty co-operation and commendation of all who are sincerely interested in the welfare of those employed in the mining industry.

Glace Bay.—The outputs of the collieries this summer have been consistently high, but for the first half of August the production has been considerably interfered with by the holiday season. The large production of the mines during June and July was partly accounted for by the fact that the returned strikers were in need of money, but now that the pinch has passed away, the men are not working so regularly. Prospects for the winter shipping are, however, by no means good, and the wise man will make all the wages possible before the close of navigation. One of the strongest arguments against strikes is that trade lost through the cessation of production is difficult to regain, and there probably never was a case where men had more to lose and less to gain by striking than those Nova Scotian miners who were brought out on strike on the order of the United Mine Workers of America. As was intended, the strike has worked permanent injury to the coal trade of Nova Scotia.

Recent events have shown that the Canadian workman is awaking to the fact that international unionism and the cessation of work at the edict of some labour leader in the United States is working great harm to the industrial interests of Canada. There is a striking similarity between the Grand Trunk strike and the U. M. W. A. strike at Glace Bay, and in every case where Canadian unionists have allowed themselves to be dominated by strike leaders from the States, it has been the Canadian workman who has lost his work and his savings. There was the trouble in British Columbia in 1903, brought about by the so-called Brotherhood of Railway Employees; the C. P. R. machinists' strike, the abortive U. M. W. strikes in Alberta and British Columbia; the U. M. W. strikes at Inverness and Glace Bay, and the Grand Trunk strike, which is so recent in memory. In every case the tale has been the same. The direction of affairs has been in the hands of strangers from the United States, unacquainted with local conditions; the peculiar intimidatory tactics of labour warfare in the United States have been introduced to the uncongenial laws of Canada, the strike funds have been wasted in riotous living and "rake-offs." Then, when irremediable harm has been wrought to the industry affected, and the savings of the men who have followed their careless leaders have been entirely dissipated; when hitherto law-abiding men and women have undergone the indignities of jail incarceration and the inevitable demoralization of mob-rule and license, these "international officers" negotiate a so-called "settlement" or they advise their deluded followers to return to work. The final upshot is that many of the strikers cannot get back their old employment, as their places have been filled by newcomers, and they have perforce to seek a fresh employment and a new residence, if by good luck they may obtain such. Long before this the gentleman from Columbus, Ohio, Indianapolis, or some city of the United States, has returned to his native air, sleeker in person and fatter in purse, and possibly secretly amused at the gullibility and ingenious enthusiasm of the Canadian workman, for their is no doubt these gentlemen possess a sense of humour.

The P. W. A. Picnic.—All the collieries were idle on the 13th of August, on which date the Provincial Workmen's Association held their annual picnic. By the courtesy of the Coal Company, free transportation was granted to the members of the society and their families from the mines to Sydney, from whence they were conveyed by the Coal Company's steamers to Baddeck, a sail of about one hundred miles up the Bras d'Or Lakes. The picnic party was quite a large one, numbering in all some 4,500 people, and the inhabitants of peaceful Baddeck must have been pleasantly surprised at the orderly behaviour of this immense crowd and their prosperous appearance after all that has been written in Nova Scotian newspapers about the oppressed and desperate condition of the miners in Cape Breton before the United Mine Workers of America came to their rescue. The picnic was a demonstration of the strength of the P. W. A. which was worth while, and we think this large gathering of miners and colliery employees compared favourably in all the outward aspects of intelligence and prosperity with any similar gathering either on this continent or across the water. It says a good deal for the self-control and the law-abiding character of the native organization that, throughout all the long period of contumely and intimidation to which they were subjected through the U. M. W. strike at the direction of the foreign officers of this alien organization, they did not once indulge in reprisals but went about their own business in the manner they thought best, which, after all, is what most Canadian working men desire and intend to do.

QUEBEC.

Considerable interest has been excited by the development of the copper deposit located on Lot XXII, Range II, Weedon, and about five miles northeast from Weedon station. The property was purchased from "Jack" Macdonald, of Sherbrooke, about a year ago, by Mr. John R. Allan, of New York, and work was commenced during the past winter. The plant consists of one two-drill compressor, two rock drills, one steam hoist and boiler and diamond drill. Shaft with mainway has been put down to one hundred and ten feet on an angle of about 45 degrees, following the footwall, and at this depth the vein is drifted on to a distance of about one hundred and sixty feet to the southeast and about two hundred and thirty feet to the northwest. At the bottom of the shaft a crosscut has been driven through the

ore body to a thickness of about forty feet. In the northwest drift and at a distance of about two hundred feet a diamond drill hole has been bored along with the vein to a further depth of two hundred and fifty feet in ore of same quality as found in drifts and shaft. A sample of ore from the northwest drift gave the following assay:

Gold	None.
Silver	1.6 ounces per ton.
Copper	14.76 per cent.
Iron	35.6 per cent.
Zinc	5.99 per cent.
Sulphur	41.23 per cent.

The deposit occurs in the sedimentary rock and the frequent granite extrusions apparently account for the deposition of the ore, and the country rock is more or less mineralized over a large area. About a mile distant occurs a range of eruptive hills and towards these hills and to a distance of several miles are found similar copper showings which promise well for the location of other valuable deposits.

The work at the mine has been carried on with energy and by practical men, who are highly gratified by the results so far obtained.

ONTARIO.

Cobalt.—Dividend figures for the first half of the present year show that three Cobalt companies have already redeemed their capital and that several others have almost reached that point. Nipissing has paid 87 per cent. and the cash on hand is more than sufficient to pay the other 13 per cent. on a capital of $6,000,000. In addition to this the ore reserves are larger than ever before and new ground is constantly being opened up. A large portion of their area is still practically untouched, and the probability is that other rich discoveries will be made. Although the Crown Reserve has been shipping only about two years and a half, it has paid 106 per cent. on a capital of $2,500,000. The cash reserve amounts to practically half a million and new discoveries have lately made a material increase in its ore reserves. The T. & H. B. has paid 16,300 per cent. in dividends, but this is due to the extremely low capitalization of $7,761. In addition the greater part of the dividends were paid with money received from the sale of the Silver Queen property. Other companies, such as the Buffalo, Kerr Lake and McKinley-Darragh, have made large dividend disbursements, and are still in a very strong position. During the last few months many important discoveries have been made, which will largely increase the ore reserves. The majority of these new veins were found underground.

The Dr. Reddick Larder Lake mines have gone into liquidation, and a meeting of the creditors was held in Ottawa on August 5th to settle the affairs of the company. This property was the best known in the Larder Lake district and also had the best showing. A considerable amount of work was done on it, but the results were not satisfactory.

The T. & N. O. Railway has started a passenger service on the Kerr Lake branch and is running two trains daily each way between Cobalt and the end of the line. This service fills a long-felt want, as the facilities for getting out to the mines of this section were formerly very poor. It is understood that the Nipissing Central will also build a spur line to the same section of the camp.

In order to develop the big smaltite vein found on the Fisher-Eplett some time ago a crosscut is being run from the 200 foot level of the Shamrock shaft on the adjoining property. Two promising veins have already been cut in this working, but they carried low silver values. On the Princess property, which also belongs to the La Rose Consolidated, a new vein has been found at the 130 foot level about 160 feet south of the shaft. It shows about five inches of high grade ore and is considered the best vein discovered on the property. This will make three high grade veins that are now being worked.

A new high grade vein has been found on the Townsite property near the Buffalo boundary. It is about two inches wide and in addition the wall rock is well mineralized.

Reports from the Mattagami Iron deposits are encouraging and Professor Baker, who reported on them for the Government, was very favourably impressed. Another exposure of ore has been found and has been traced for about 1,000 feet. It is a high grade of iron and suitable for all commercial purposes. In addition to many syndicates who are interested, the U. S. Steel Corporation and Mackenzie & Mann have engineers in the field.

On the Russel claim in the Gillies Limit a considerable amount of trenching has been done this summer and several promising veins have been discovered, although the silver values are low.

The O'Brien, Nova Scotia and Temiskaming lately made another shipment of bullion to England, consisting of 110 bars weighing approximately 98,000 ounces. The shipments of bullion from Cobalt to date are as follows:

	Ounces.
O'Brien	174,666
Buffalo	68,500
Crown Reserve	15,931
Nova Scotia	46,700
Temiskaming	40,000
Total	345,797

In the United States Circuit Court a memorandum has been filed denying the motion of H. M. Hitchings on behalf of himself and other stockholders in the Cobalt Central against Messrs. Nevins, Maloney, Eldredge, Eakins and the Standard Cobalt Mines, Limited, for an order directing the defendants to withdraw the proceedings instituted by them in Toronto for the liquidation of the Standard Cobalt Mines, pending the result of action now in the Circuit Court for that district.

A report recently submitted to the directors of the Crown Reserve stated that although the mine had produced 8,000,000 ounces of silver, the ore reserves were greater than at any time in its previous history. The new vein found 900 feet up the lake has the best showing on the 200-foot level. A raise has been put up eighty feet and it shows high grade ore all the way.

The big mill on the O'Brien property is credited with making an extraction of 90 per cent. of the silver contents of the ore. The total cost, including tramming and marketing charges, is fourteen cents per ounce. Three different products are obtained, jig concentrates, table concentrates, and the product from the cyanide plant. The first two are shipped to the smelter as high grade ore, while the latter is melted down into fine silver bullion which is shipped direct to England.

The drop in Kerr Lake stock is due to the rumour that the next dividend will be at the rate of forty cents per share instead of the usual fifty cents.

At the Reeves Dobie property in Gowganda the ground has been cleared and the new concentrator building is being erected. The machinery, part of which is already on the road, consists of four Nissen stamps, and six tables. This will be installed as rapidly as possible. During this summer the Millerett has shipped three car loads of ore down the Montreal River. Two more car loads are ready sacked in the ore house, but on account of the heavy transportation charges will not be shipped until next winter. The total tonnage of ore shipped from Gowganda and Elk Lake was 436 tons. A new discovery has been made on the Morrison. The English syndicate did not take up its option on the property, and it is now being worked by the original owners.

Mr. E. P. Earle, president of the Nipissing and a director of the La Rose, states that no new steps have been taken in the proposed Cobalt Merger. He was enthusiastic over the recent developments in the Nipissing, where some exceedingly fine ore has been opened up in the Mayer, No. 64 and No. 122 shafts. In the No. 64 on the 270 foot level the vein will average over a foot of high grade ore.

Porcupine.—Two companies are now in the field to generate electric power for the mines, and it is expected that they will have it ready by June of next year. It is probable that the length of time necessary has been under-estimated and that it will take considerably longer. Mr. E. A. Wallberg, head of the Mines Power Company of Cobalt, will erect one plant, having an estimated capacity of 7,000 horse-power, while Messrs. Bilsky and Symmes have obtained a lease on Sandy Falls in Mountjoy Township, where they expect to generate 4,000 horse-power.

The plan of building the dam at the mouth of Frederickhouse River, in order to raise the water so as to allow the running of gasoline boats, has been abandoned. The Government caused this work to be stopped, and although permission to continue was subsequently given, the restrictions were such that the promoters decided not to go on with it.

Another new section known as Cripple Creek is coming in for a good deal of attention. It is about thirty-five miles southwest of Porcupine and some very good discoveries are reported to have been made.

Work has been started on the seventeen Dobie claims purchased by Mr. Lorne McGibbon and associates. A large number of quartz veins have been discovered and some of these show free gold. Twenty-four men are now working and this number will probably be increased when supplies are cheaper.

The maps and reports of a limited section of this district, which were made under the supervision of Professor Miller, Provincial Geologist, have been completed. Three maps have been issued. One takes in the townships of Whitney, Tisdale, Deloro, Shaw, and part of Mountjoy and Ogden, embracing an area fifteen by twelve miles, while the two others show particular areas in Tisdale, one being a section near Miller Lake and the other the country near the Dome and Foster properties. The report states that the quartz outcrops, which are very numerous, are found in rocks of both Keewatin and Huronian periods and that the age of the rocks does not appear to have any bearing on the character of the veins either as regards form or gold content. One characteristic of the veins is that they are irregular as to width. They will widen out into large masses of quartz, sometimes one hundred feet in width, and then narrow abruptly. The geology of the country has been worked out as rapidly as possible and the maps will doubtless be inaccurate in some of their details. The Department, however, considered it would be better to publish them as soon as possible, when they would be of most service. During the rest of the summer the field work will be extended and new maps will be issued during the winter.

BRITISH COLUMBIA.

Mr. Wm. Fleet Robertson, provincial mineralogist, returned to Victoria on August 11th from an exploratory trip in Chilcoten district. Shortly afterwards he went to Lillooet to obtain information relative to mining operations and the prospects of the industry in that district.

Captain Desborough, of the Explosives Department of the Home Office, London, accompanied by Mr. Joseph G. S. Hudson, of the Mines Branch of the Dominion Department of Mines, Ottawa, has been visiting British Columbia. At Nanaimo, Mr. Hudson stated, according to a local newspaper, that Captain Desborough had come to Canada at the request of the Dominion Government to make an examination of, and advise as to the law in Canada regulating the manufacture, use, and testing of explosives. In this connection, it is understood that a bill is being prepared under the direction of Hon. Wm. Templeman, Minister of Mines, to provide for the regulation of the manufacture, etc., of explosives, in which the Mines Branch is interested, owing to there being many accidents in mines in the Dominion due to premature explosions or other results of the use of explosives. It is further stated that at the conclusion of Captain Desborough's tour the Minister of Mines will arrange for holding a conference of those more particularly interested—manufacturers of explosives, representatives of departments of mines, and others—to submit for their consideration a draft of a bill prepared as above suggested.

Cariboo.—Mr. John B. Hobson, who for many years conducted hydraulic placer-mining operations on a large scale in the Quesnel Forks section of Cariboo district, has been visiting placer-gold mines in the vicinity of Barkerville, Cariboo division. It is stated that he has purchased from a well-known miner a placer mine situated on Chisholm Creek, near Stanley.

Slocan.—The management of the Lucky Jim mine, near Bear Lake, is energetically preparing for a resumption of ore-shipping. Fifty men are employed putting in order the old wagon road from Three Forks to Bear Lake, a distance of three and a half miles, so that materials for reconstruction of buildings, ore-bins, tramways, etc., can be hauled to the mine. Men are also working at the mine getting things in readiness for production so soon as it shall be practicable to haul ore to the railway at Three Forks for shipment thence to the United States. At the Rambler-Cariboo mine, too, there is activity, supplies having been taken in by pack-horses. The wagon road from Three Forks will also serve this mine until railway transportation shall again be available. The lessees of the Whitewater group of mines and the representatives of the English companies owning these properties met recently in Vancouver, but there will necessarily be delay in determining what shall be done towards providing for resuming production, owing to the fact that some of those chiefly interested reside in England, while the lessees are in British Columbia.

Work at mines about Sandon and Cody is being continued without interruption. The largest producer in this part of the district in 1909 has been the Consolidated Mining & Smelting Company's Richmond-Eureka mine, which has shipped to Trail about 2,600 tons of silver-lead ore. The Standard, on Four-Mile Creek, Slocan Lake, has made an output of about 900 tons of sorted silver-lead ore, while the Van Roi has sent to the Wakefield mill for concentration a comparatively large quantity of silver-lead-zinc ore. Both the Ellis Silver Mining Company's Eastmont mine, on Ten-Mile Creek, and the Mollie Hughes, near New Denver, have been small shippers this year.

Rossland.—Although the big power plant over the Le Roi main working shaft is not now being used, miners are taking out ore from near the old Le Roi shaft, and there is a good prospect of their being similarly employed for several weeks longer. Air for operating machine drills, etc., is being obtained from the Le Roi No. 2 Company's compressor. The ore is sent to the Consolidated Mining & Smelting Company's smeltery at Trail.

Besides having a big shoot of ore containing good value in gold in its War Eagle mine, the Consolidated Company is mining and shipping ores from both the Idaho and Iron Mask of the Centre Star group. Le Roi No. 2 is regularly maintaining production from its Josie mine, sending the first-class ore to Trail for smelting, and putting a smaller quantity of second-class ore through its concentrating mill.

Nelson.—The mines in Nelson mining division sending ore to the smeltery are the Queen Victoria, near Nelson; Yankee Girl, at Ymir; Emerald, at Salmo, and several others which are producers on a smaller scale. The Granite-Poorman, near Nelson, and the Queen and Nugget, in Sheep Creek camp, are operating stamp mills on gold-quartz ore. Late reports from Sheep Creek give accounts of increasingly favourable developments on several properties, notably on the Nugget and Mother Lode. The last-mentioned mine is being worked by Mr. John McMartin, formerly of Cobalt, whose engineer is credited with the statement that on the fifth level, which has been driven about 700 feet, the vein has been encountered at a depth of 480 feet from the surface. This development is stated to be regarded as satisfactory and quite up to expectations, the ore maintaining both its width and average good quality.

Boundary.—A disastrous fire occurred at the Granby Company's No. 3 tunnel on August 12th. Practically all the sur-

face works of this unit—there are four shipping units at these mines, three being on the Knob Hill Ironsides and one on the Gold Drop side of the mountain—were destroyed. Unfortunately, the destruction of shipping facilities at No. 3 will temporarily reduce the output so that it will be necessary to reduce the number of blast furnaces to be kept in continuous operation at the company's smeltery, from six to four. Production had been at the rate of about 3,000 tons per diem, and this gave a sufficient supply for six furnaces. It is hoped, though, this decrease in the ore supply will prove temporary and not affect operations for long. No. 2 tunnel and the Gold Drop unit are both connected with the Canadian Pacific Railway only, while the output from No. 3 was shipped over the Great Northern Railway. Both railways are connected with the shipping bunkers at Victoria shaft, so it will still be practicable to ship some ore by the Great Northern. The loss of property from this fire included new machine and blacksmith shops erected last winter, crusher house and plant, and two residences, one of which was that of the mine superintendent, Mr. O. B. Smith, Jr. A rough estimate of the loss places that of the mining company at about $100,000, part of which will, however, have to be borne by insurance companies.

District newspapers state that work is to be done with the diamond drill at the British Columbia Copper Company's Wellington group mine, from which ore has been shipped of late. Production was commenced about the beginning of June, and since then some 5,000 tons of oxidized ore has been shipped to the company's smeltery at Greenwood. The chief valuable constituent of this ore is gold, which has been stated to average $6 to $7 per ton. Development work done prior to the recent completion of construction of a spur from the Eholt-Phoenix Railway has made available a considerable quantity of ore; further prospetcing, with the diamond drill, is expected to prove the occurrence of other ore bodies not yet reached.

Similkameen.—The ore body in the upper workings of the Hedley Gold Mining Company's Nickle Plate mine is approximately 20 feet in width and of an average value of $12 per ton in gold. In the lower adit, two ore bodies are being opened by north and south drifts. To provide for the conveyance of ore from this lower adit a branch electric tramway is being constructed from the main tramway between the old workings and the 40-stamp mill at Hedley. The new tramway will afford better facilities for conveyance of ore, the grade being easier than on the main tramway above the point of junction of the two lines. It is probable that ore from the old workings will also be taken out over the new line, after the necessary connections shall have been made between old and new workings. On the Bulldog claim of the Nickle Plate group an ore shoot 25 to 35 feet in width is being opened. Additional equipment is being installed at the stamp mill and cyanide plant, including tube mill, Deister concentrating tables, a circular filter press, and other appliances to assist in making a closer saving of gold.

Coast.—At the Great Granite Development Syndicate's Lucky Jim mine, on Valdes Island, a power plant, lately put in, is now being operated. This consists of an 80 horse power h.r.t. steam boiler, half of a Canadian Rand 15-drill air compressor, two 3¼-inch machine drills, 7x10 double cylinder Lidgerwood hoist, and all accessories. The plant is housed in a 40 x 60-foot frame building covered with corrugated galvanized iron and having room for a second boiler of like size, and the other half of the compressor when these additions shall be needed. A 40-foot gallows frame, with a 9-ton ore-bin or skip pocket, has been erected over the shaft, which is 115 feet in depth. At 105 feet drifts are being run both ways from the shaft in an ore body 8 feet in width so far as opened. The mine is situated about three miles from tidewater, communication being a short distance by tramway to a logging road and thence by the road to the sea. Shipment of ore to the Tyee Copper Company's smeltery at Ladysmith, Vancouver Island, will shortly be in progress.

News from Portland Canal is generally to the effect that on several properties development work is being done, and with promising results. The great harm done the new district by the sending out of such grossly-exaggerated statements as were freely published a few weeks ago, has been recognized, and now even newspapers that were among the chief sinners in the direction of disseminating the absurd stories to which publicity was given are now protesting the folly of such a damaging course. The Portland Canal Mining Company expects to soon commence concentrating ore at its mill, the first unit of which is nearly completed. Good accounts also come of the prospects of the Red Cliff mine, which is stated to have a large surface showing of copper-gold ore, to cut which at depth work is now being done. The excitement over Portland Canal has driven most of the prospectors from the Skeena country, but there are such promising indications in various parts of that big district that its mineral resources will not long be neglected.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—The Libby gold mine at Brookfield is to be pumped out and operated. Two or three prominent Canadians have formed a syndicate to tackle the mine. Mr. Percy Brown, formerly assistant manager of the Boston-Richardson, is the moving spirit.

Bass River.—A group of Oxford investors has taken hold of the abandoned silica (infusorial earth) deposit and plant here. Much energy is being displayed and there is ground for the belief that the venture will be successful.

QUEBEC.

Montreal.—The appearance of Superintendent Denis' Annual Report of Mining Operations has aroused much interest. In noting the falling off of mica and asbestos the general opinion is that this is only a temporary phase and that both industries will pick up rapidly. Asbestos, of course, is in a far different position from mica. But the same cause, namely, overproduction, has affected both minerals.

Further developments in copper are expected. Mr. Denis alludes in his report to the possibility of working several copper deposits successfully on a large scale, and he draws a very instructive parallel between the known Quebec deposits and certain copper mines of the United States.

ONTARIO.

Ottawa.—The Dominion Government has undertaken an investigation, under the auspices of the Mines Department, for the purpose of framing a law for the regulation of the manufacture and use of explosives, with a view to securing the greatest degree of protection possible to those who have occasion to handle them. Attention has been directed to this subject by the heavy list of accidents and loss of life which have occurred in places where explosives are used, an instance of this being cited in the fact that 114 men lost their lives on construction work on the National Transcontinental Railway alone during the past three years from this cause.

Capt. Desborough, inspector of explosives at the naval arsenal, Woolwich, has been engaged to conduct the investigation, and is now on the west coast for the purpose of consulting the British Columbia government.

Capt. Desborough has visited all the explosive factories in the

Dominion with the exception of two, and is confident that the death rate can be greatly diminished by a larger use of black powder, which he believes to be as efficient as the higher explosives in the ordinary work, particularly in railway construction and in such work where the operators are confined to limited space in which to seek safety. This has been found to be the case in Nova Scotia, where the fatalities have been reduced to a very small per cent., only three men having been killed or injured there during the past year.

The great object of the government, Capt. Desborough says, is to regulate by act the manufacture of powder in Canada the same as in England, where the regulations in this respect are the best in the world. The government also has in view a federal mining act, as well as a federal explosives act, whereby the authorities will be able to investigate all accidents in mines. A movement of this kind, he states, is also on foot in the United States, the mining inspectors having petitioned that government to take all mining matters under control, which action, they consider, would tend more to the safety of the employees in the mining industry.

At the conclusion of the tour by Capt. Desborough, the Minister of Mines at Ottawa, will call a conference of the manufacturers of explosives in Canada and the mining departments of the province, at which a draft of an explosives bill will be submitted.

Capt. Desborough states that he has received every courtesy from the managers of the various works visited, and believes he will have their hearty co-operation in the movement started for the better protection of the men required to use dangerous explosives in their work.

BRITISH COLUMBIA.

Nelson, B.C., Aug. 13.—The most disastrous fire that ever visited Phoenix, broke out to-day in No. 3 oil-house of the Granby Consolidated Mining & Smelting Company. No. 3 crusher building was also soon in flames, and sparks set fire to houses in the lower streets of the town, including the Methodist and Presbyterian churches, public school, Pioneer printing office, several residences and the new machine shops of Granby, all of which are reported to have been destroyed.

For a long time, it was feared that the whole town would be in flames, and a train crew with a passenger train was delayed in readiness to carry people out of the city.

Panic prevailed and many houses were emptied of furniture. After a strenuous fight the firemen gained the victory and the fire is now said to be under control.

Vancouver.—Among the visitors to Bowen Island on August 14th were Captain Desborough, chief of the explosive testing station at Woolwich arsenal, and Mr. J. G. S. Hudson, of the Department of Mines, Ottawa. They did not go up on a pleasure trip, but to inspect the powder magazine there, having only just returned from Vancouver Island where they inspected the powder and dynamite plants.

The proposed Canadian legislation will be based on the English Explosives Act, which has been found highly instrumental in decreasing the danger from the use of explosives in the British Isles. Last year in Great Britain fifteen thousand tons of explosives were manufactured for mining purposes, and there were only three accidents, none of them with fatal results.

Captain Desborough and Mr. Hudson left last night for the Crow's Nest Pass where they will examine some of the collieries, particularly one in which there was an explosion from "dust" a few years ago.

Victoria, B.C.—Capt. Desborough, inspector of explosives at the government arsenal at Woolwich, was here early in August. He came to Canada in connection with the legislation dealing with explosives which Hon. Wm. Templeman intends to introduce in parliament next session. It will be based upon legislation in force in Great Britain and European countries, which has proved very effective.

Phoenix, B.C., Aug. 18.—Mike Bauer and D. Hainan were running a machine at Snowshoe mine, when without warning, a large quantity of rock caved in, carrying men and machinery down the slopes below. Both bodies were recovered in a frightfully mangled condition. Both were experienced miners. Bauer has a brother in Milwaukee; Hainan, a Finlander, leaves a wife.

YUKON.

Dawson, Aug. 16.—The Yukon Territory has shipped to the outer world $150,000,000 in virgin gold. The greater part of this has been produced within fifty miles of Dawson, and perhaps 90 per cent. within one hundred miles.

While some of the other camps of the North are falling off in output, the Klondike camp is increasing its yield. This is due to the fact that the Klondike placers on the creeks are not so deep that they cannot be dredged, and those on the benches can be worked by hydraulic. On many of the rivers the gold also can be recovered by dredging.

Klondike's output is actually increasing, whereas some of the other camps are experiencing a falling off in yield. The output of this camp last year was $4,000,000 and this year it is expected to reach $5,000,000. Possibly the pace will be maintained for years. The extensive operations of the Yukon gold are to be rivaled by those of a giant new company now entering the field headed by A. N. C. Treadgold. Two or three other big companies are in the field with dredge companies, and two or three others are investigating this season with prospects of coming.

The hundred and fifty millions mentioned as produced to date has come chiefly from Bonanza, Eldorado, Hunker, Dominion, Sulphur, Gold Run, Quartz and other such well-known creeks and tributaries within fifty miles of Dawson. In striking this total about $16,000,000 is allowed for at the conclusion of the statistical total to cover the random creeks of the Forty-Mile, Eagle, Woodchopper and Circle, and such streams which in early days were opened by men toiling in this region. Aside from this general summary the handsome sum of one hundred and twenty-five millions has been produced within the borders of the Yukon Territory proper—that is, the British Yukon—and the greater part has been turned out within the last ten years.

The official figures of the returns secured for the British Yukon are based chiefly on the royalty returns, which were collected in early days by crude methods, and dependent largely on the affidavits of claim owners as to their yield. Even then the gold was estimated at the low valuation of $15 an ounce, which probably was a dollar per ounce under the real average value.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

London.—In 1909 there were 1,659 coal-cutting machines in use in Great Britain, as against 1,493 in 1907, the quantity of coal obtained by the aid of machines being 13,590,359 tons, or 8,142 tons per machine. This represents one ton in twenty of the total coal output, as compared with one in fifty in 1902. In 922 machines compressed air was employed as the driving power, the remaining 737 machines being driven by electricity. These figures indicate that Mr. W. H. Pickering's (The Yorkshire mines inspector) statement that the use of coal-cutting machines in British mines will beat hand work at the coal faces will be borne out. Another government expert has expressed the opinion that coal-cutting machinery under the Act limiting the working hours of collieries in British mines to eight

hours a day will prove a powerful factor in the maintenance of coal output. The probability is that there will be a much larger number of coal cutters at work in British collieries within the next few years.

SPAIN.

San Sebastian, Aug. 17.—Serious troubles are expected in Bilbao Tuesday, since the strikers have refused to accept the half-hour a day reduction granted by the employers. The latter have informed the government that they will begin work in the mines immediately, as other miners not belonging to unions have agreed to accept their proposition.

This announcement disclosed the fact that the employers are holding strike breakers in reserve. The employment of such men, the strikers say, will cause them to resort to violence in spite of the army or police.

Premier Canalejas still hopes for settlement. The strikers are prepared to storm the building of the Provincial Deputation, which is, according to them, the stronghold of enemies of the people.

SERVIA.

A Belgrade despatch to the "Kolnische Zeitung" reports the formation as an English company of the Danube Mining Concession, Limited, which is said to be a mining bank constituted with the co-operation of the Commercial Bank of Scotland. The company has acquired land on the right bank of the Danube in Servia to the extent of nearly 500,000 acres, has established a branch in Vienna and also proposes to found a branch bank at Buda Pesth. Mr. John Allan and Mr. W. Carlyle, formerly general manager of the Rio Tinto Company, will, it is stated, assume control in September.

RUSSIA.

The latest decree issued by the Russian Minister of Commerce will be of great importance to speculation in petroleum, which has immensely increased since the announcement of the naphtha deposits in the Kuban district. It is stated in the decree that until further notice—which is said to mean until confirmation by the Ministerial Council—concessions for the acquisition of land by foreigners in the Caucasus are only to be granted in case they are ready to undertake borings there at their own risk, but the purchase by foreigners of lands already known as petroliferous shall not be permitted as being opposed to Russian interests. It is assumed in St. Petersburg that the decree aims at putting a speedy termination to the unsound promoting period in the Caucasus. The government obviously wishes that foreign interests which have completely turned away from the Baku naphtha region should again devote themselves to it; and, therefore, the entrance of foreigners into the Maikop district is rendered difficult. According to a declaration made by the Minister of Commerce, it appears desirable that foreign interests should be active in the granting of loans, which are to be made to Russian firms for boring purposes, and this could be accomplished by the taking up of obligations or shares. Nevertheless, the correspondent remarks that foreigners would do well to exercise great caution in the matter, as the naphtha content of the lands of most newly-formed companies has not been determined at all with certainty, and it is very doubtful whether the results will only approximately correspond with the expectations.

AUSTRALIA.

The aid afforded by the Victorian Government to mining prospecting operations within its territory might be followed with advantage elsewhere. The discovery of a new mining field is of such value to any young country that money expended with that object cannot be considered really wasted even if it prove only moderately successful. A little over two years ago a Mines Development Act was passed in Victoria, which provided £100,000 for grants to assist mining. Of that sum all the money set aside for gold mining—£75,000—has been allot ted. Under the terms of the Act the remaining £25,000 coul only be expended in developing mining for other minerals tha gold. Of that £25,000 only £1,100 has been allotted, but the balance cannot be utilized for assisting gold mines. The posi tion therefore may be easily summed up. All the money voted for developing gold mining has been exhausted, and, ac cording to a statement made by the Minister for Mines, ther is little likelihood of another Mines Development Bill—provid ing for further grants for mining—being introduced durin the coming season. Mr. McBride, Minister for Mines, however has decided to recommend to the Cabinet that £5,000 be give to assist co-operative mining parties. An examination of th records of transactions between the government and minin companies discloses that a remarkably small proportion of th money advanced has been repaid. Since the inception of th Mines Development Act in 1897, about £380,000 has been ad vanced, and of that sum the State has received back approxi mately only £35,000. Of course, it is not expected that all th money advanced for mining will be repaid. A great deal of i is necessarily expended in testing ground which proves un payable. Mr. McBride states that numerous applications b companies and parties for assistance continue to reach the de partment. His recent visit to some of the mining districts ha confirmed his belief that in the vast majority of cases the ad vances have been judiciously made, and he admits that if th money were available a great deal more could be expended wit advantage to the industry.

Sydney.—The gold yield of New South Wales for Jul was 26,772 ounces, valued at £85,341. For the first seven month of the year the yield has been 126,901 ounces, valued at £445 979.

INDIA.

The gold production of the mines of the Kolar Goldfiel (Mysore) and one outside mine (the Hutti Nizam's), for Jul was 47,006 ounces, an increase of 252 ounces compared with th return of the previous month.

CHINA.

The Pekin Syndicate announces that the output and sales o coal for last month were as follows: Output, 23,000 tons; sale 17,500 tons; boiler consumption, 2,500 tons.

SOUTH AFRICA.

Pretoria.—The report of the Mines Commission, which wa appointed in 1907, is issued. It shows that the death rat among underground workers is 60 per cent. higher than amon those working above ground, ignoring those dying elsewher The average term of employment underground is seven to nin years, and the average age at death 35, as compared with 5 on the Bendigo mines. The report advocates rigorous measure in regard to health, housing and ventilation. No objection i made to the natives being supplied with a moderate and regu lated quantity of beer.

GOLD COAST.

The report of the government of the Gold Coast on the gol mining industry of the colony for 1909 is a rather belate document, but from its official character has, of course, a cer tain interest. The amount of gold produced during 1909 show ed a decrease of 50,763 ounces, as compared with the amoun produced during the previous year. This decrease, the repor reminds us, was nearly totally due to the fact that mines whic were producing in 1908 ceased to produce during the year wit a view to increasing their ore reserves so as to enable large tonnages to be treated. On the quartz and conglomerate mine in Ashanti and the Gold Coast Colony 404,853 tons were treate and produced 210,391 ounces, being an extraction of 10.40 dwts. per ton of 2,000 pounds.

UNITED STATES.

Spokane, Wash., Aug. 16.—When Judge Dietrich, in the fed-al court at Moscow, Idaho, ruled that mining companies oper-ting in the Coeur d'Alene district have the right to dump ailings into streams, a decision of prime importance became a atter of record in northern Idaho. Unless reversed by the ourt of appeals, the decision removes one of the most vexing ituations which the mining companies have had to face. These ases have been pending six years. The suit upon which the ecision was rendered was instituted by Elmer Doty, a rancher n the Coeur d'Alene River. There were 65 cases, but all of hem involved the same principle, the damages claimed amount-ng to $1,223,000. Mr. Doty alleged that by dumping the tail-ngs in the river the mining companies caused the river to rise nd overflow the lands along the river.

Joplin.—The Joplin district, including contiguous parts of Missouri, Kansas, Arkansas and Oklahoma, produced 147,310 hort tons of zinc in 1894. From this figure the output increased o 286,538 in 1907, dropping with lower prices to 258,628 in 908. In the meantime, and particularly since 1904, produc-ion elsewhere in the United States grew rapidly, though it was mall as compared with Joplin. This outside production is specially small if the higher content of the Missouri ore be aken into account. It was early determined that a tariff on inc ore would be laid; and on August 1st, 1909, the new duties ook effect. They are arranged on a sliding scale, the tax vary-ng with the percentage of metal in the ore; up to and includ-ng 10 per cent. the ore is free; from 15 to 20 per cent. the tax s ¼ cent; from 20 to 25 per cent., ½ cent; over 25 per cent., . cent per pound of metal contained in the ore. Since no ore nder 25 per cent. can be imported economically, the practical ffect is to levy the maximum tax. This, on the ores actually mported, which assay about 36 per cent. zinc, amounts to $7.20 a ton. On this basis, making due allowance for freight rate nd difference in grade, Mexican ore is as cheap at the Kansas urnaces equipped to smelt it, as is the near-by Joplin ore. If he amount paid as duty be deducted from the price paid the Mexican miner, which is largely done, the foreign ore may be reated at higher profit than the domestic. That this is true s shown by the fact that foreign ore has continued to be im-ported, though in somewhat reduced amount. In the seven months of 1909, before the new law went into effect, importa-ions averaged 10,338 tons per month. In the first seven months following, they averaged 7,627. For January and February they were equivalent to a little more than 28 per cent. of the Joplin production.

New York.—Utah's report for the second quarter ended June 30th, of its calendar and fiscal year, shows what the com-pany can do on an average selling price for copper at 12½ cents a pound. It shows the net profits for the quarter of $1,-548,979, equal to 10.05 per cent. on the 1,540,000 shares out-standing. After dividends of $1,155,243, the surplus balance for the quarter of $393,735 is equivalent to 2.55 per cent. on the total par value of the company's stock. At this rate earn-ings for the year would show 40.2 per cent., or 10.2 per cent. in excess of dividend requirements.

Combining the reports for the first two quarters of the year, gives a half-year's showing as follows:

Net profits from mining and milling operations, $2,042,981; additional income, $21,525; income from Nevada Consolidated dividend, $712,856; total, $2,777,362. Dividends, $2,310,486; net surplus for six months, $466,876.

For some unexplained reason the Nevada Consolidated divi-dend was not included in the first quarter's report, but is taken into consideration in the above table.

The foregoing six months' surplus of $466,876 is at the rate of $933,752, or 6.6 per cent. for the year on the stock outstand-ing. Production for the second quarter totalled 25,124,052 pounds, or at the rate of 100,496,208 pounds for the year, which probably represents the maximum rate of production which the Utah will attain for some time, or at least until the price of copper improves. Following is the record production by months (in pounds):

January	4,745,066
February	5,913,465
March	7,853,288
April	7,902,643
May	8,862,913
June	8,358,496
Total	43,635,871

Production was retarded in the first quarter by bad weather, and the output from the Boston Consolidated plant, which was taken over about February 1st, did not begin to show fully until the second quarter arrived. In 1909 the Utah Copper Company produced 51,749,000 pounds of copper at an average cost of 7.787 cents a pound. During the first quarter of 1910 the net cost per pound was 8.43 cents and 7.53 cents in the second quarter, making an average for the half year of 7.88 cents. This is exceeded among the porphyry mines by only the 6.34-cent record by the Nevada Consolidated for the quarter ended June 30th last. During May, the Utah cost per pound was 7.17 cents and the cost at the Magna plant was 7.06 cents, not taking into consideration in either instance outside earn-ings.

MEXICO.

Commencing with the present fiscal year, which began July 1st, mining concerns in the producing stage in the State of Jalisco will be taxed 1 per cent. on the value of ore or mill products sold the smelters and ore and metal buyers. This tax is something new in Jalisco, although a number of other Mexican states collect a similar tax. It constitutes the third direct tax on values of mining products, computed on their market value. The two others are the federal impost at the smelter and the federal stamp tax on the "factura," or bill of sale to the buyer. The combined direct taxes based on each bill of sale are about 3 per cent. of the total.

The metals mentioned as taxable under the new Jalisco law, which was passed by the state legislature in May and put into effect by a decree of Governor Ahumada, are gold, silver, cop-per and lead. Monthly the state treasurer will advise local col-lectors the market prices of these metals for the following month, which will be calculated from the average prices in for-eign market during the first 20 days of each month.

COMPANY NOTES.

TEMISKAMING'S QUARTERLY STATEMENT.

Following is a statement issued by the Temiskaming directors for the second quarter of the current year. The great improve-ment in the company's finances since the annual meeting no doubt accounts for the strength of Temiskaming stock in the mining market.

During the first six months of our fiscal year we have pro-duced and shipped 851,725 ounces of silver as against 670,930 for the whole of last year. Of this amount 635,889 were pro-duced by hand picking, and 215,906 were recovered at the mill from 9,177 tons of ore during 92 working days.

The mill feed consisted in the main part of the discard from the hand sorting tables, and ore from the development faces. The remainder, or about one-third of the whole, was made from the dump reserves.

The milling reserves as blocked out in the mine, as shown in

our last annual report, remain untouched, while the dump reserve has been reduced by but 860 tons.

The main shaft has been carried to a depth of 520 feet. Crosscutting to No. 2 vein has now commenced from the 500-foot station, and there is still some 50 feet to drive before we encounter it.

The formation to this depth remains the same, so we look with confidence to equally good results here as obtained on the 400-foot level.

At the latter depth considerable development work has already been done in opening up veins Nos. 1, 2 and 4, with results that are most gratifying. No. 4 is most spectacular, varying up to 26 inches of bonanza ore. No. 2 varies from 6 to 10 inches wide from three to four hundred-ounce ore, and No. 1, which we have just encountered on this level, is some 6 inches wide and equally high grade.

The high-grade reserves have more than trebled during this period, and our condition is such that we can easily maintain our present heavy output for a considerable length of time.

We think the stockholders are to be congratulated on the fact that whereas on February 1st we were in debt to the extent of some $97,000; this has now been liquidated, and after paying all indebtedness, we show a balance of $179,496.45.

The statement summarized is as follows:—

Assets.

Capital assets	$2,628,579.60
Cash assets	266,684.84
Treasury stock	829.00
	$2,896,093.44

Liabilities.

Cash liabilities	$ 87,188.39
Capital stock	2,500,000.00
Balance brought down and profits for 6 months	308,905.05
	$2,896,093.44

A statement issued by the Temiskaming directors states that the mine during the first six months of its fiscal year has produced and shipped 851,725 ounces of silver, as against 65,670,930 ounces for the whole of last year.

The Intercolonial Coal Company has declared a dividend for the half year of 3 per cent. In the second half of the year the company pays 4 per cent., or a total of 7 per cent.

A meeting in London on August 18th of the shareholders of the Le Roi Mining Company unanimously agreed on liquidation. A. J. McMillan was appointed liquidator. The property will probably continue to be operated.

McKinley-Darragh-Savage Company has declared the regular quarterly dividend of 3 per cent., and an extra dividend of 2 per cent. payable October 1st. Books close from September 10th to October 1st, inclusive.

STATISTICS AND RETURNS

CROW'S NEST OUTPUT.

The output of the Crow's Nest Pass Coal Company's collieries for the last three months follows:

	May.	June.	July.	Total.
1910	92,900	116,450	104,000	313,350
1909	54,000	83,400	72,000	209,400
Increase	38,900	33,050	32,000	103,950

COBALT ORE SHIPMENTS.

The shipments in tons from Cobalt for the first seven months of the year 1910, by months, are as follows:

January	2,025.06
February	2,248.99
March	2,594.78
April	2,814.08
May	2,243.17
June	2,917.00
July	3,014.92
Total	17,858.00

Bullion Shipments.

	Ounces.	Value.
O'Brien	136,666	$78,775
Buffalo	68,500	34,250
Crown Reserve	15,931	8,623
Nova Scotia	26,700	14,685
	247,797	$136,333

COBALT ORE AND BULLION SHIPMENTS.

Week Ending August 12th.

The shipments of bullion in 1910, in ounces and approximate values follow:

	Ounces.	Value.
O'Brien	178,246	$97,128
Buffalo	78,337	40,735
Nova Scotia	49,211	25,352
Temiskaming	43,438	19,000
Crown Reserve	15,931	8,623
Cobalt Gem	10,800	5,800
	353,963	$195,638

Cobalt shipments for the week ending August 12th and for the year to date in tons are as follows

	Week ending August 12.	Year. 1910.
La Rose	129.29	3,918.71
Nipissing	214.08	3,566.76
Kerr Lake	89.97	3,233.36
Crown Reserve	74.00	2,103.80
McKinley-Darragh	78.60	1,127.87
Buffalo	28.56	679.17
Temiskaming	32.01	654.28
Chambers-Ferland	32.00	547.98
Right of Way	.....	524.72
Coniagas	.....	499.70
Drummond	.....	330.76
O'Brien	.....	306.91
Trethewey	.....	335.95
City of Cobalt	.....	206.87
Little Nipissing	.....	213.92
Hudson Bay	31.49	172.67
Cobalt Central	.....	219.68
Cobalt Lake	.....	117.30
King Edward	.....	111.12
Hargraves	.....	140.63
Townsite	.....	83.68

Colonial		83.10
Silver Cliff		106.28
Beaver		57.53
Provincial		32.05
Waldman		31.99
Rochester		30.37
Casey Cobalt		17.90
Wyandoh		24.15
Total, in tons	740.02	19,370.94

The shipments from the Gowganda camp to date read:—

	Tons.
Millerett	304
Reeves-Dobie	62
Boyd-Gordon	30
Miller Lake, O'Brien	14
Gates	2
Lucky Godfrey	20
Welch	1.25
Burke Remey	2
Total	435.25

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending August 12th, and those from January 1st, 1910, to date:

	August 19. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver		180,617
Buffalo	63,370	1,424,958
City of Cobalt		422,735
Chambers-Ferland	60,500	1,149,100
Cobalt Central		293,286
Cobalt Lake		260,900
Cobalt Townsite	55,980	236,840
Colonial		148,900
Coniagas	120,570	1,119,616
Crown Reserve	84,000	4,364,020
Drummond		664,200
Hargraves		281,170
Hudson Bay		360,825
Kerr Lake	300,100	6,464,640
King Edward		221,296
La Rose	203,000	8,023,021
McKinley-Darragh	52,300	2,303,929
Nipissing	255,760	7,476,707
O'Brien	64,060	822,143
Peterson Lake		432,420
Provincial		65,000
Right of Way		1,080,217
Rochester		60,750
Silver Cliff		212,770
Standard Cobalt		147,992
Temiskaming		1,308,080
Trethewey	42,970	725,380
Waldman		63,992
Wyandoh		48,300

Ore shipments for the week ending August 19th were 1,302,610 pounds, or 651 tons.

Total shipments from January 1st to August 19th were 40,363,807 pounds, or 20,181 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

Week Ending August 13th.

The following are the returns for the ore production and movement for past week:

Rossland Shipments.

	Week.	Year.
Centre Star	2,980	120,267
Le Roi No. 2	687	20,374
Le Roil No. 2, milled	300	9,600
Le Roi	291	10,090
Velvet	32	359
I. X. L.	7	146
Other mines	...	38
Total	4,297	160,874

Slocan-Kootenay Shipments.

	Week.	Year.
St. Eugene, milled	2,775	88,800
Van Roi, milled	800	25,600
Queen, milled	420	13,440
Granite-Poorman, milled	250	8,000
Nugget, milled	110	3,520
Richmond-Eureka	154	2,747
Emerald	77	1,234
Yankee Girl	99	3,432
Sullivan	732	9,119
Queen Victoria	92	2,577
Turk	3	3
Panama	18	18
Emerald Hill	7	7
Other mines	...	34,202
Total	5,537	192,699

Consolidated Company's Receipts.

Trail, B.C.

	Week.	Year.
St. Eugene, concentrates	223	10,515
Le Roi No. 2, part concentrates.	687	20,374
Queen, concentrates	42	425
Centre Star	2,980	120,267
Le Roi	291	10,090
Snowshoe	2,287	101,173
Richmond-Eureka	154	2,747
Yankee Girl	99	3,432
Emerald	77	1,234
Velvet	32	359
Sullivan	732	9,119
I. X. L.	7	146
Nickle Plate	34	458
Queen Victoria	92	2,577
Turk	3	3
Panama	18	18
Emerald Hill	7	7
Other mines	...	16,037
Total	7,765	298,981

Owing to the disturbed condition of affairs at Phoenix, following the fire of Friday, this week's returns of the Boundary shipments were not issued. On the basis, however, of the figures for the last four weeks, the following estimates for the time being may be accepted:

Boundary shipments	30,825	1,074,146
B. C. Copper Co.'s receipts, Greenwood	8,068	218,084
Granby Co.'s receipts, Grand Forks	20,597	733,941

On the basis of the above calculation, the total shipments for the week should approximate 40,650 tons, and for the year to date, 1,427,700 tons. The total receipts for the week, on the same basis, should be 36,330 tons, and for the year to date, 1,251,000 tons.

TORONTO MARKETS.

Aug. 24th.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 36 cents per lb.
Copper, casting, 13.10 cents per lb.
Electrolytic, 13.10 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

Aug. 24th.—Pig Iron. (Quotations from Drummond McCall Co., Toronto.)
Summerlee No. 1, $22.50 (f.o.b. Toronto).
Summerlee No. 2, $22.00 (f.o.b. Toronto).
Midland No. 1, off the market.
Hamilton No. 1, $20.50 (f.o.b. Hamilton).
Hamilton No. 2, $20.00 (f.o.b. Hamilton).
Clark's, $20.00 (f.o.b. Toronto).
Cleveland, $20.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75 per ton.
Coal, bituminous, $3.50 to $ 4.50 for 1¼-inch lump.

Coke.

Aug. 22nd.—Connellsville Coke (f.o.b. ovens).
Furnace Coke, prompt, $1.65 to $1.70 per ton.
Foundry Coke, prompt, $2.10 to $2.25 per ton.

Aug. 22nd.—Tin (Straits), 34.25 cents.
Copper, Prime Lake, 12.75 to 12.87½ cents.
Electrolytic copper, 12.50 to 12.60 cents.
Copper wire, 14.00 cents.
Lead, 4.47½ cents.
Spelter, 5.45 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.15 cents.
Aluminium, 22.000 to 22.50 cents.
Nickel, 40.00 to 47.00 cents.
Platinum, ordinary, $34.00 per ounce.
Platinum, hard, $36.00 per ounce.
Bismuth, $1.85 per lb.
Quicksilver, $46.00 per 75-lb. flask.

SILVER PRICES.

	New York cents.	London pence.
August 9	52⅞	24 7/16
" 10	52⅞	24 7/16
" 11	53	24½
" 12	53⅛	24 9/16
" 13	53¼	24⅝
" 15	53¼	24⅝
" 16	53⅛	24 9/16
" 17	53	24½
" 18	53	24½
" 19	53	24 7/16
" 20	52½	24⅜
" 22	52½	24⅜

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—August 23rd, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	..
Dominion Coal Company	..	..
Dominion Steel Company	62⅜	62½
Nova Scotia Steel	84	85
Granby	35	36
Consolidated Smelting	..	..
Crow's Nest Pass	..	..
Dominion Steel Coal Corporation	62¼	63

New York Curb—August 23rd, 1910.

Boston Copper	14¼	14¾
British Columbia Copper	4¾	5
Butte Coalition	18½	19½
Canadian Mines	6¼	6½
Chino Copper	14⅝	14¾
Davis-Daly Cop.	1½	1¾
Ely Consolidated	.28	.33
Gila Copper	No market.	
Giroux Mining	6⅝	7 1/16
Goldfields Consolidated	8 3/16	8¼
Greene-Canadian	7⅜	7⅝
Harcuvar Copper	No market.	
Inspiration Copper	8⅛	8⅝
Miami	19⅜	19¾
New Baltic	3	7
Nevada Cons. Cop.	20¼	20½
Ohio Copper	2	2 1/16
Rawhide Coalition	.11½	.12½
Ray Central	2¼	2⅜
Ray Consolidated	18⅛	18½
Union Mines	1 1/16	1⅛
Yukon Gold	3⅞	3 15/16

Cobalt Stocks—August 23rd, 1910.

Amalgamated	.03	.05
Bailey	.07⅜	.07¾
Beaver Consolidated	.21¼	.21½
Big Six	.01	.03½
Buffalo	1.75	2.20
Chambers-Ferland	.16½	.17¼
City of Cobalt	.22¾	.23½
Cobalt Central	.09	.10
Cobalt Lake	.13⅞	.14
Coniagas	4.00	5.00
Crown Reserve	2.85	2.90
Foster	.12¾	.13¼
Gifford	.07	.08
Great Northern	.07	.07⅛
Green Meehan	.01⅝	.02
Hargraves	.23	.24
Hudson Bay	98.00	100.00
John Black	.01	.04½
Kerr Lake	6.50	6.60
La Rose	3.94	4.00
Little Nipissing	.16¾	16⅞
McKinley	100.00	100.50
Nancy Helen	.4½	.05½
Nipissing	10.60	11.00
Nova Scotia	.29	.30
Ophir	.25	.33
Otisse	.02⅞	.03
Peterson Lake	.20	.20¾
Right of Way	.25	.26
Rochester	.16¼	.16½
Silver Leaf	.06½	.07
Silver Bar	.05	.07
Silver Queen	.07	.11
Temiskaming	.72¼	.72½
Trethewey	130.50	131.50
Watts	.02	.10
Wettlaufer	.56	.60

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto

MEN OF WEALTH



Are almost invariably the greatest believers in Life Insurance because they recognize the value of a "Cash" estate absolutely secured, and therefore they aim to maintain a considerable portion of their estate in the form of Life Insurance.

The North American Life Assurance Company appeals to business men because of its long record of success and its able and progressive management.

Assets, over $10,500,000. Net Surplus, over $1,000,000.
Good Agency openings for energetic men.

HOME OFFICE, TORONTO ONTARIO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" **"EMPRESS OF IRELAND"**

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters **LESS THAN FOUR DAYS AT SEA**

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent
Board of Trade Bldg.
Montreal

J. S. CARTER, Gen. Agent,
217 McDermott Ave.
Winnipeg, Man.

I. E. SUCKLING, Gen. Agent,
S. E. Corner King & Yonge Sts.,
Toronto, Ont.

The Nissen Stamp Mill

Will Save 50% of Your Power

Owing to the maximum crushing efficiency secured, the power required to operate Nissen Stamp Mills is about half that of other mills of the same capacity output.

READ THESE LETTERS

NORTHERN CUSTOMS CONCENTRATORS, LIMITED.
COBALT, ONT., December 31st, 1909.

The Canadian Fairbanks Co., Toronto, Ont.

Dear Sirs:—

In answer to your inquiry regarding the Nissen Stamps supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one inch hole.

The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening .018. With a coarser screen the tonnage would of coarse be larger.

The shoes and dies wear even, and the splash is well distributed over the screen. The arrangements for keeping up the weight of the stamps are very good.

I can recommend the stamps. Yours truly,

(Sgd.) F. J. Bourne, Superintendent.

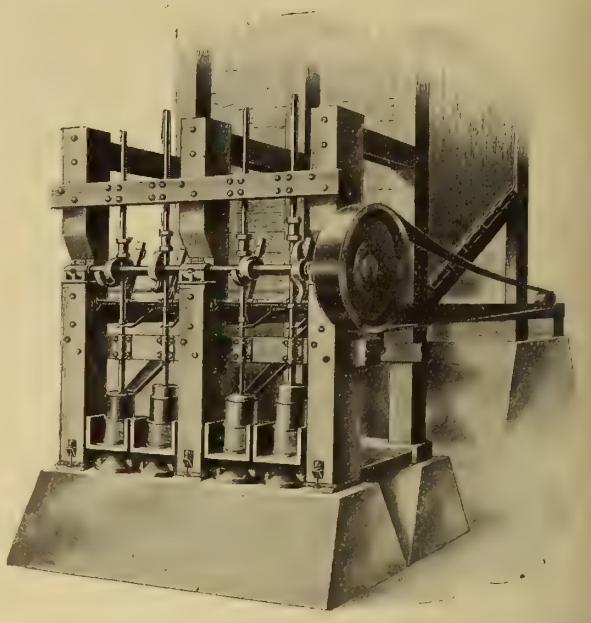
COBALT, ONT., July 11th, 1910.

The Canadian Fairbanks Co., Toronto, Ont.

Gentlemen:— Re Nissen Stamps

The two stamps installed in our mill by you last winter have given excellent satisfaction, so much so that having to increase our tonnage output, we have decided to place an order with you for two additional stamps. Details of this will be sent and we would ask you to rush delivery.

Yours truly,
NORTHERN CUSTOMS CONCENTRATORS, LIMITED.
(Sgd.) A. J. Young, President.



The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

Montreal, Toronto, St. John, N.B. Winnipeg, Saskatoon, Calgary, Vancouver.

CONSTANT-HERZIG COMPANY

SUCCESSOR TO

C. L. CONSTANT COMPANY

MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS

42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management

Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,
Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont.

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

LONGYEAR & HODGE
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

RALPH A. MEYERS, E.M., B. SC.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address : OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc., and any work connected with the mining profession.

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

SUTCLIFFE & NEELANDS,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

WILLMOTT, A. B., M. A., B. SC.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

S. F. KAVANAGH
Assayer
Minning Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors.
Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Goristine Bldg., Montreal.
Phone M-7515

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

G. W. DIXON,
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building, Montreal

CAPITAL SECURED FOR
GOLD, SILVER, IRON
and other Mining Properties
Address F. C. SCHULTE
Sault Ste. Marie, Ont

ORE BUYERS

FOR SALE
A few very good gold, silver and copper properties, on working options—Easy terms. Address
P.O. Box 973, Sault Ste. Marie, Ont.

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1075. Report on the Gowganda Mining Division 1908, accompanied by a map, by W. H. Collins.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

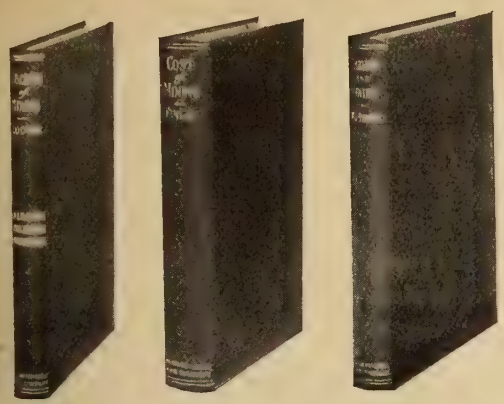
1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology* as *applied to practical mining*. It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL
The Canadian Copper Company

Nickel for Nickel Steel
The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

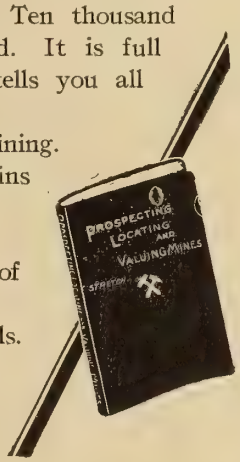


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,
TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....
Orford Copper Company xx
Ontario, Province of x

P

Peacock Bros .....vi, vii, x
Paterson Mfg. Co, ...
Perkins, F. C.....

Q

Quebec, Province of xx

R

Robb Engineering Co. .....

S

Spencer, W. H.....
Sullivan Machinery Co .....
Standard Diamond Drill Co....x
Stanley, W. F. & Co., Ltd.....
Smart-Turner Machine Co., Ltd..... x
Scott, O. N. .....
School of Mining xx
Simpson, Robert Co., Ltd,, Inside Back Cov
Standard Explosives, Ltd., Back Cov
Smith Premier Typewriter Co...
Smith, Thos. & Wm., Ltd...xx
Segsworth, W. E.....
Smith, A. H.....
Smith, W, H.....

T

Tyrrell, J. B.....
Toronto University xx
Turner, J. J. & Sons xv

U

United Typewriter Co., Ltd.....

V

Vandeleur & Nichols x

W

Waterous Engine Works Co....
Walker Bros. .....
Willmott, A. B. .....
Wetherill Separating Co.....x
Woolsey, W. J.....

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silve $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Mineral or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,0 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land h been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in t Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatc If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,

Condensers—
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co. Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS


STEEL CASTINGS

AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

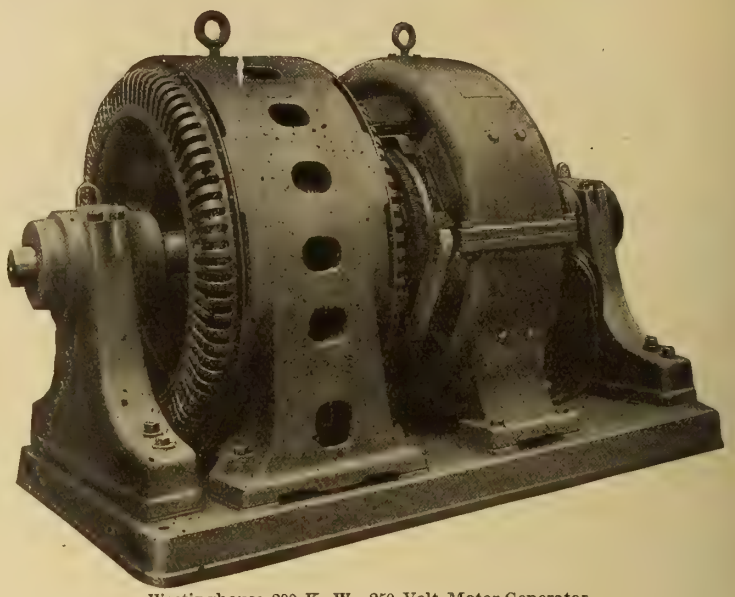
General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse Motor-Generators

Westinghouse Standard Motor-Generators are built for both 25 cycle and 60 cycle circuits, in sizes up to and including 2,000 kilowatts, utilizing either synchronous or induction motors. Synchronous motor-generators are arranged for self-starting from the alternating-current end, and all sets may be started from the direct-current end.

In general, Westinghouse Motor-Generators may be used without step-down transformers on alternating-current voltages up to 6,600 volts. Direct-current voltages are 250 and 600 volts.



Westinghouse 200 K. W., 250 Volt Motor-Generator.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

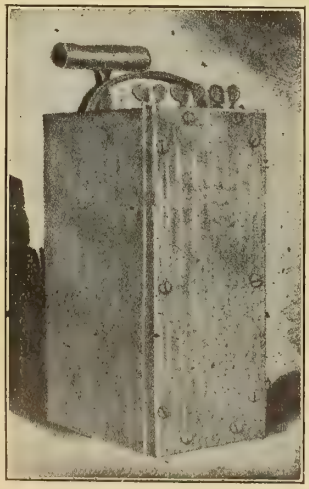
HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appear ance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines

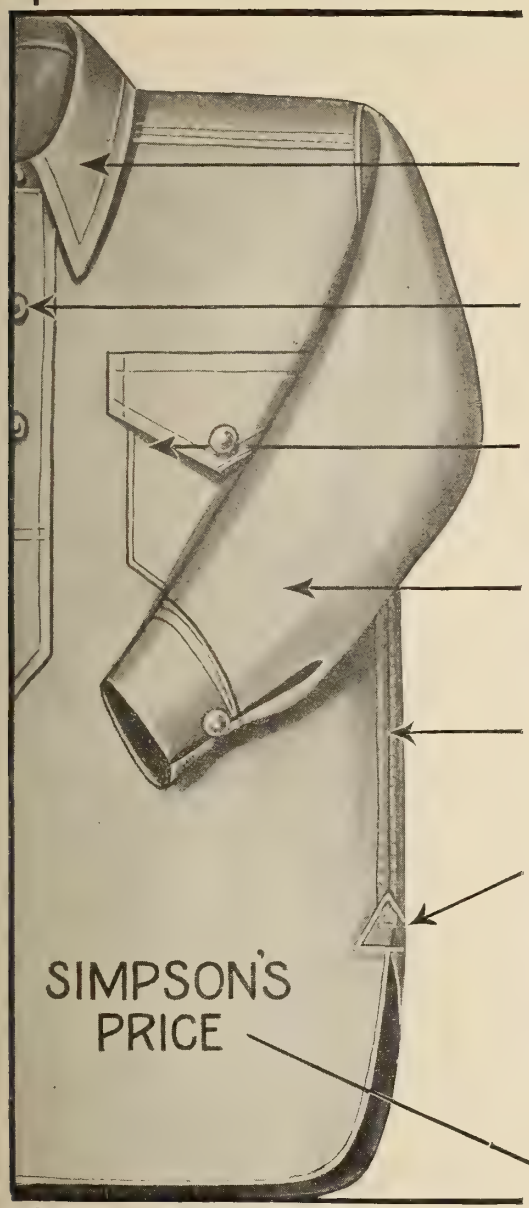
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

KHAKI DUCK SHIRT

For Miners, Lumbermen, Prospectors, Surveyors



MADE THE SIMPSON WAY

NOTE THE DIFFERENCE FROM THE ORDINARY WAY:—

COLLAR will fit neatly, all ways, all the time. Is well interlined to retain its shape. Steels inserted to prevent curling points.

DOME FASTENERS of brass used throughout. No buttons to come off. No occasion to swear. A feature that will be appreciated by every man.

POCKET Two pockets, one on each side, with dome fastened flap. A splendid idea. Plenty of *pocket space* is a Simpson improvement.

SLEEVES are made large. Plenty of elbow room. Inter-lined wrist-band, dome-fastened. One of the strong points not to be overlooked, viz.—roomy sleeves.

DOUBLE STITCHED seams throughout, with extra strong thread insuring strong wear. This Simpson shirt is made stronger to wear where the most wear comes.

GUSSETS are made strong and double stitched, adding extra strength. You can be absolutely sure the seams will not rip at this point.

FABRIC extra heavy khaki duck. Wind-proof and shower-proof. Will stand the hardest kind of wear. Try it. Almost indestructible.

KG522 IS THE ORDER NUMBER
Sizes 14½ to 18

$1.00

THE POSTAGE IS 20c EACH
Order at Once

A SHIRT OF EQUAL VALUE WOULD SELL IN MOST STORES AT FROM $1.50 to $2.00

THE ROBERT SIMPSON COMPANY LIMITED

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

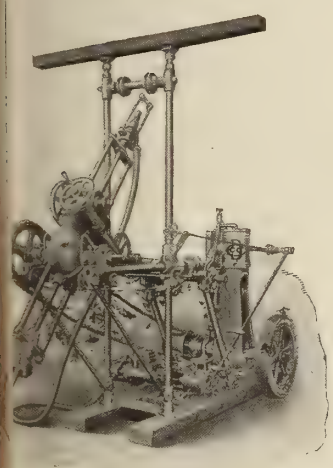
The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

TORONTO No. 18

CYCLONE CORE DRILLS



Are the Biggest Money Savers for the Prospector and Miner.

From the range which we offer, you can be sure of selecting a suitable outfit for your work.

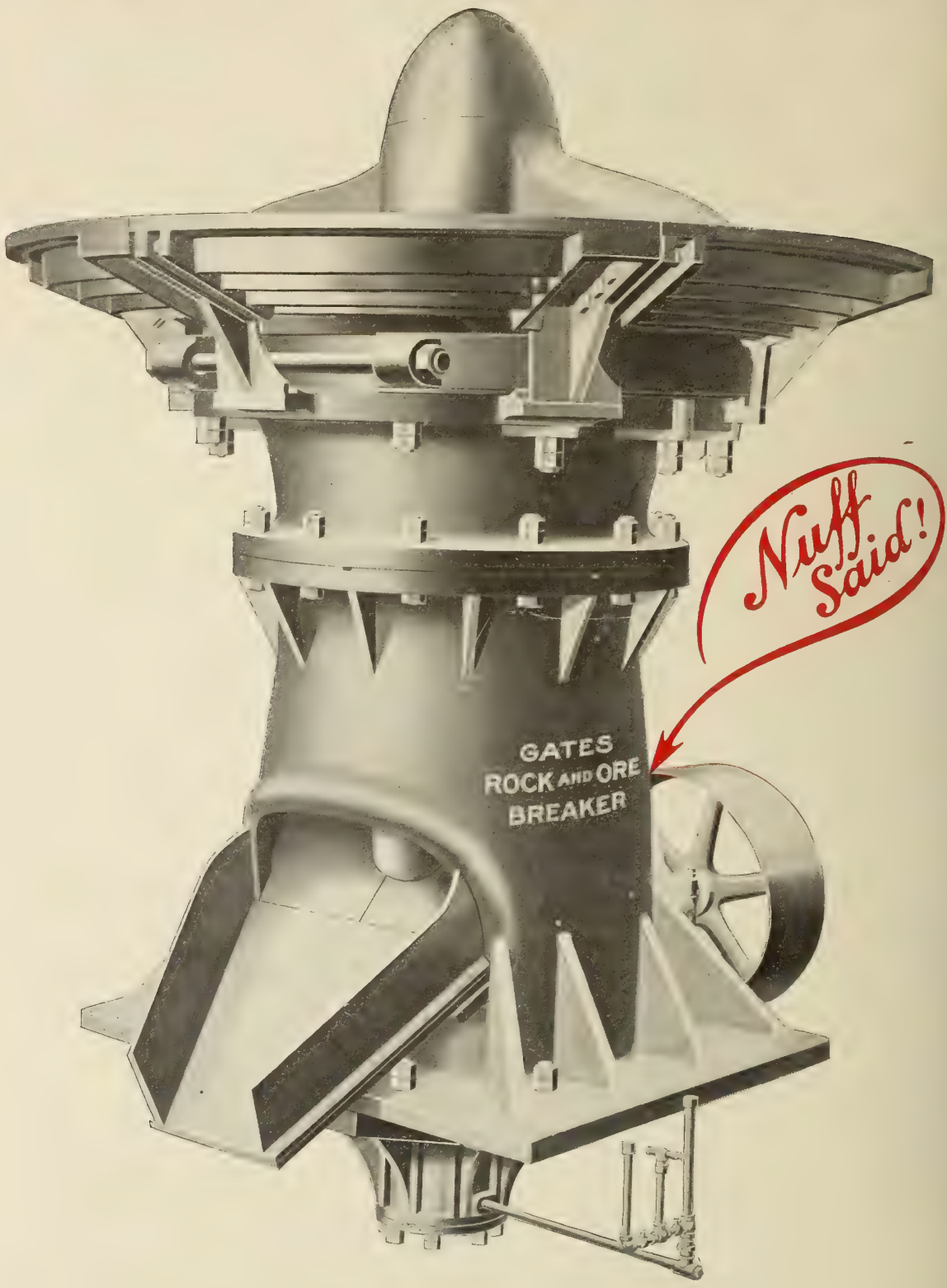
Well Drilling Outfits a Specialty.

Let us send you our fully Illustrated Catalogue.

MUSSENS LIMITED

MONTREAL,	TORONTO,	COBALT,	WINNIPEG,	CALGARY,	VANCOUVER.
38 St. James St.	73 Victoria St.	opp. Right of Way Mine	259-261 Stanley St.	Crown Bldg.	Mercantile Bldg.

MINING MACHINERY



ALLIS-CHALMERS-BULLOCK

LIMITED

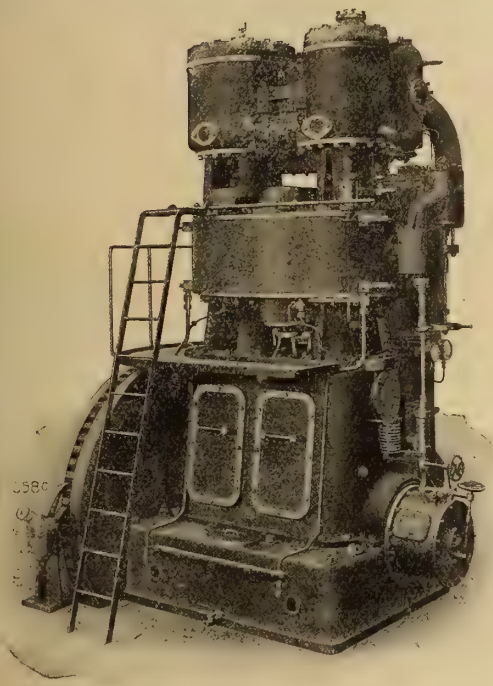
WORKS - - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

Belliss Air Compressors



Have earned their reputation

By Their :

EXTREME SIMPLICITY,
NOISELESS RUNNING,
COMPACT DESIGN,
LOW OIL CONSUMPTION,
CONTINUOUS OPERATION,
OVERALL EFFICIENCY,

Used By :

East Rand Proprietary Mines, South Africa.

Mount Morgan Gold Mining Company, Australia.

Oakdale Colliery, South Wales.

Three units on order for National Transcontinental Railway, Canada.

Builders : BELLISS & MORCOM, Limited. Birmingham, England.

Canadian Agents LAURIE & LAMB

211 and 212 Board of Trade Building, Montreal.

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line. As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO. LIMITED

COBALT, ONT.
P. O. Box 310

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

Smith Premier Typewriter

Model No. 10

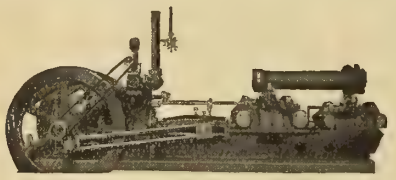
A single motion is quicker to make than two. Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of this easy action, light-running typewriter.

The Smith Premier Typewriter Co., Inc.
Syracuse, N.Y.

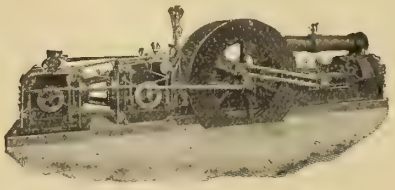
CANADIAN REPRESENTATIVES:
National Typewriter Co., 78 Victoria St., Toronto
Wm. H. Hall & Co., 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 157 Hollis St., Halifax, N.S.
David Philip, 291½ Portage Ave., Winnipeg



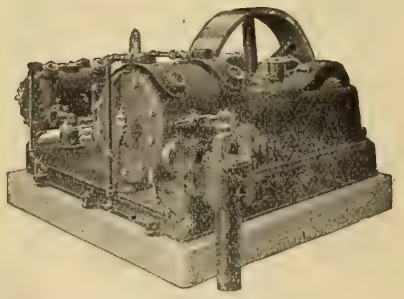
DO YOU NEED AIR?



Two-Stage, Straight Line.



Corliss Tandem

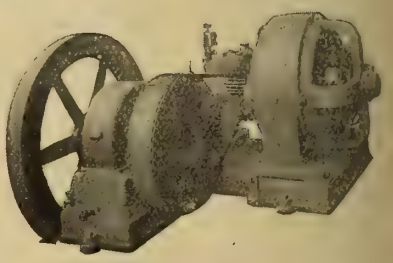


Two-Stage, Belt Driven.

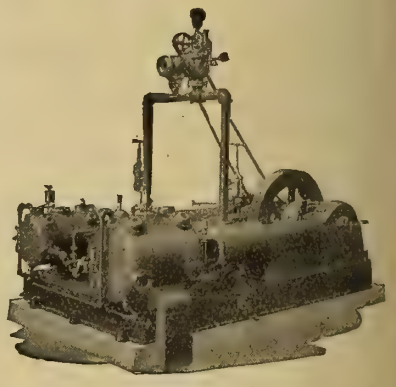
THERE is a Sullivan Compressor of just the type and size to meet **your** working conditions most efficiently and economically. Sullivan Compressors unite the most approved features of modern design, with a conservatism in ratings, an honesty in materials, and a thoroughness in details of construction which enables users to place full confidence in them for every-day service or for emergencies.

Ask for Catalogue 658.

Coal Cutters
Rock Drills
Diamond Drills



Electric Driven.



Two-Stage Duplex.

150 Michigan Ave., CHICAGO **SULLIVAN MACHINERY COMPANY** **CLAREMONT, N. H.**

BIRMINGHAM BUTTE COBALT, ONT. DENVER EL PASO JOPLIN KNOXVILLE NELSON, B.C.
NEW YORK PITTSBURG PARIS FRANCE SALT LAKE SAN FRANCISCO SEATTLE SPOKANE ST. LOUIS SYDNEY, AUS.

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

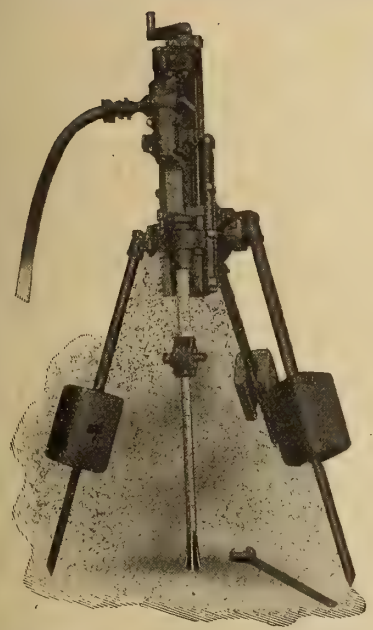


BEST FOR MINE BUILDINGS

Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.



Rock Drills of Quality

The magnitude of our business proves that the vast majority of buyers buy on the basis of quality and not of price.

High-grade materials, special treatment of steel parts, limit-gauge test to assure interchangeability, inspection of parts and rejection of defective materials, are essential elements of quality which help to make **RAND ROCK DRILLS** the best investment.

Sole Agency for B. C. Steel in Cobalt Territory.

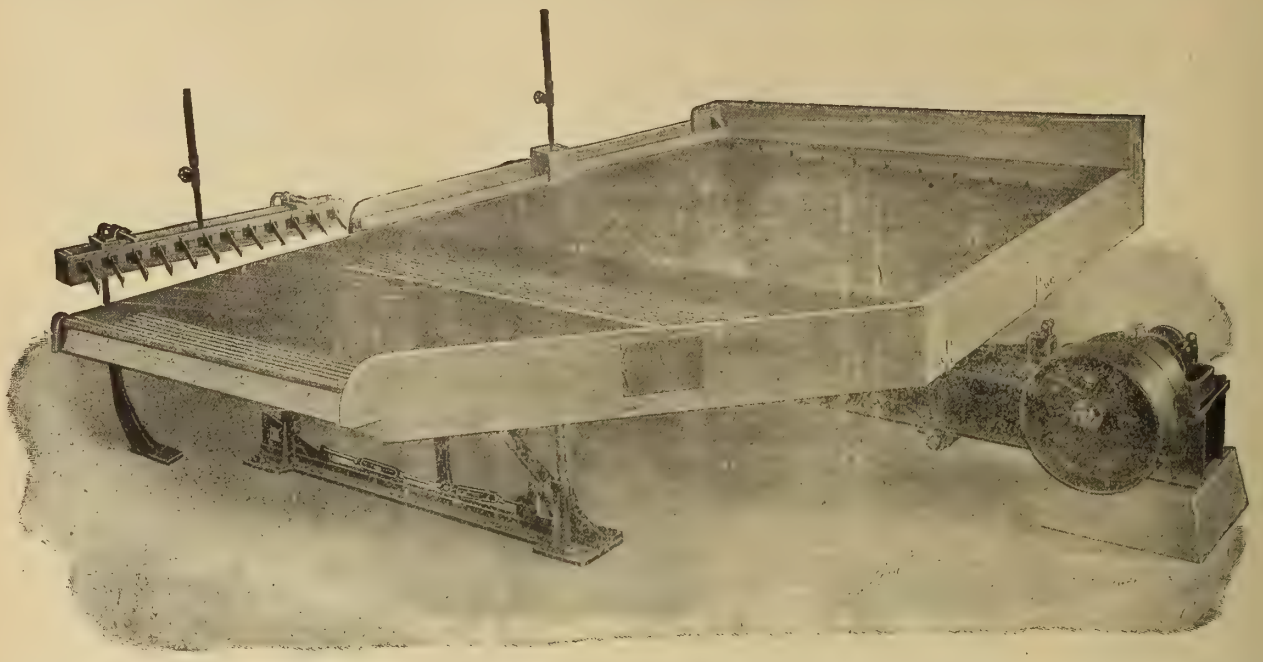
AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

EMIL DEISTER, Fort Wayne, Ind., U. S. A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE, - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

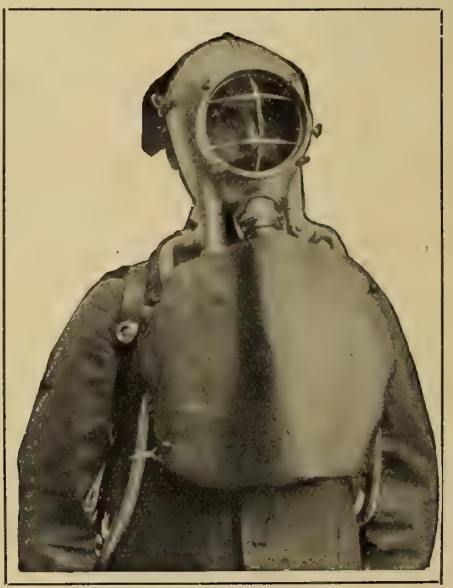
Arrangements have been completed under which the branches of this Bank are able to issue Drafts on the principal points in the following countries:

	French Cochin-China	
Austria-Hungary	Germany	Persia
Belgium	Great Britain	Phillippine Islands
Brazil	Greece	Roumania
Bulgaria	Holland	Russia
Ceylon	Iceland	Servia
China	India	Siam
Crete	Ireland	South Africa
Denmark	Italy	Straits Settlements
Egypt	Japan	Sweden
Faroe Islands	Java	Switzerland
Finland	Manchuria	Turkey
Formosa	Mexico	West Indies
France	Norway	and elsewhere

NO DELAY IN ISSUING **FULL PARTICULARS ON APPLICATION**

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON

70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd. Nova Scotia Iron & Steel Co. and all the leading English American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

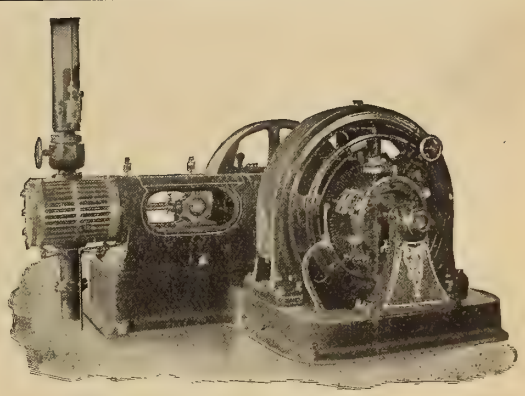
For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

An Engine that is built for Mine Haulage Work.



THE McEWEN

The simplicity, accessibility, close regulation and general reliability of these engines make them ideal for Mine work.

They are smooth running, require little attention and are quick and sensitive in regulation under full load or when running light.

A heavy rigid bed. Cross head guides, main bearings, and face for cylinder attachment machined at one operation. All parts are in perfect line and will stay so. Piston type valve, double ported, frictionless. Balancing pressure plate slotted to correspond with valve seat. A quicker more powerful stroke by providing double admission and exhaust edges. Automatic Begthrup Inertia Governor.

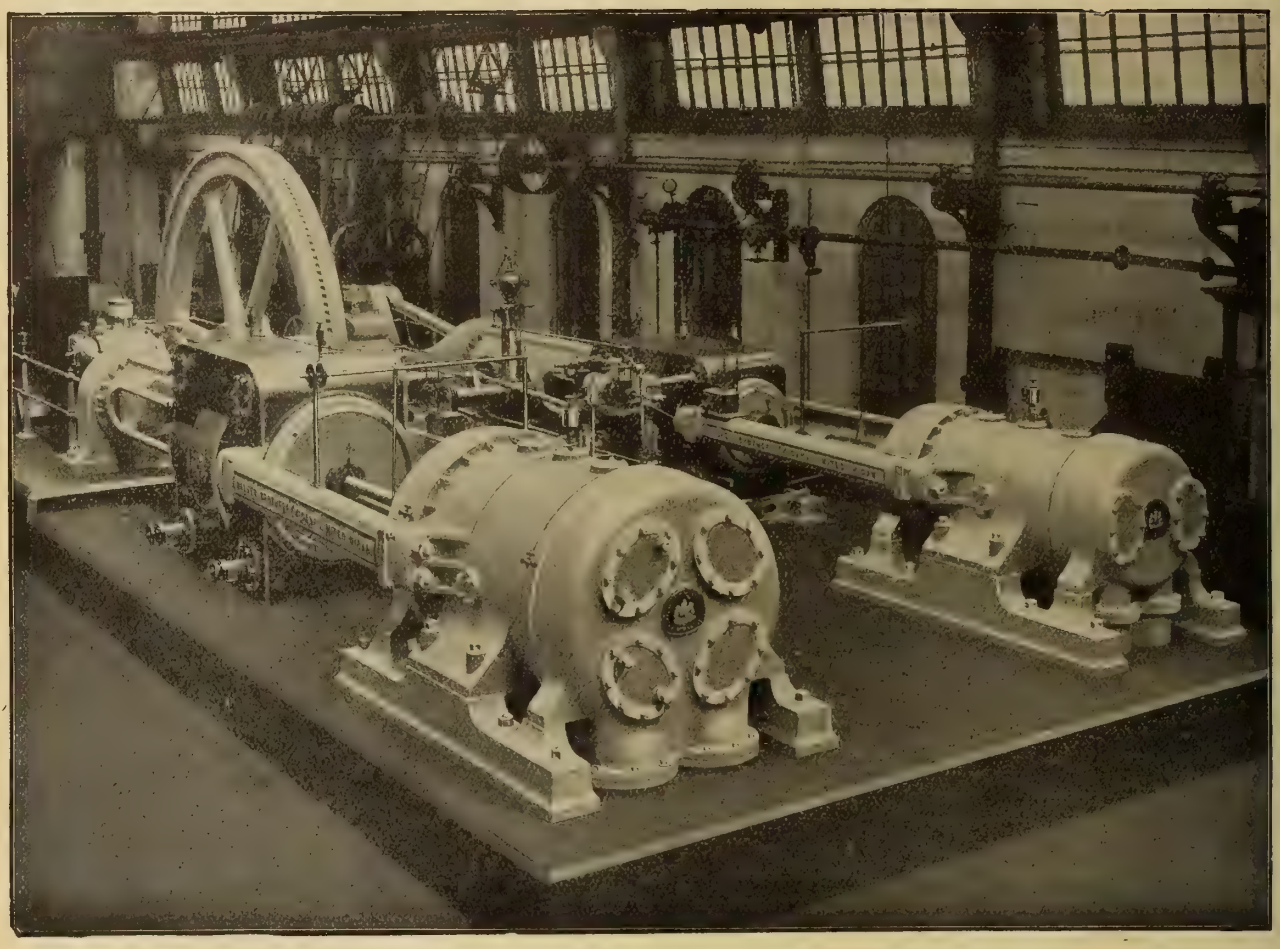
Built in simple or compound units of from 10 to 700 H. P.

Get our McEwen Engine Catalogue.

The Waterous Engine Works Co., Ltd. Brantford Canada

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

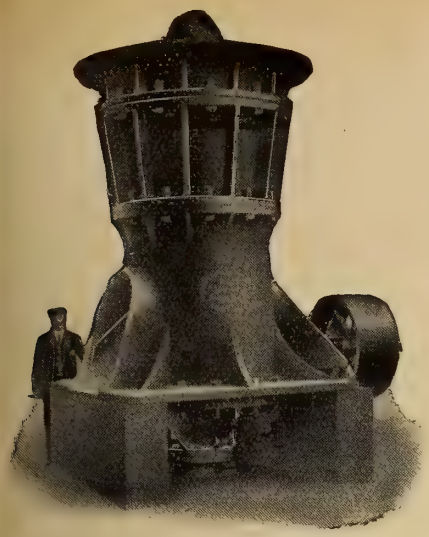
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF
AND ALL KINDS OF
BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President

C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

CORRESPONDENCE SOLICITED

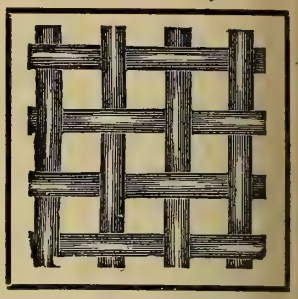
THE BROWN MACHINE COMPANY, LIMITED

ENGINEERS

NEW GLASGOW NOVA SCOTIA

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalogue 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: **NEW GLASGOW, NOVA SCOTIA**

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

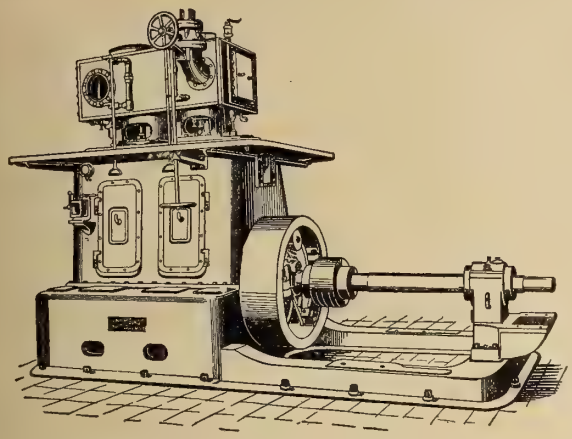
Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Cost Nothing For Repairs



A customer says :—"We have used one of your vertical high speed engines, English type, forced lubrication, since 1907. The engine runs at 425 revolutions per minute almost night and day. It has given us every satisfaction and so far has cost us nothing for repairs."

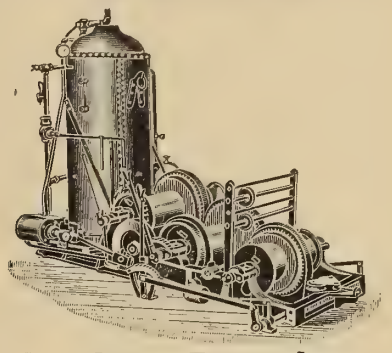
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



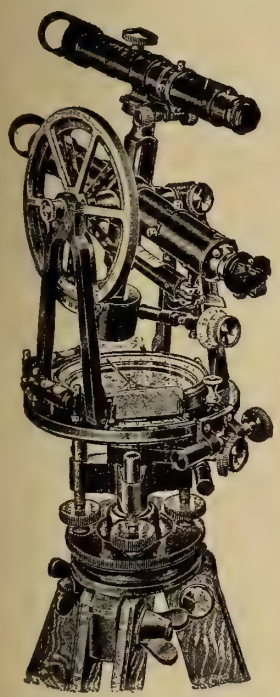
Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments
FOR
Civil, Mining Engineers & Surveyors



Maufacturers
Instruments of
Precision

also

Engineers and
Draftsmens
Supplies

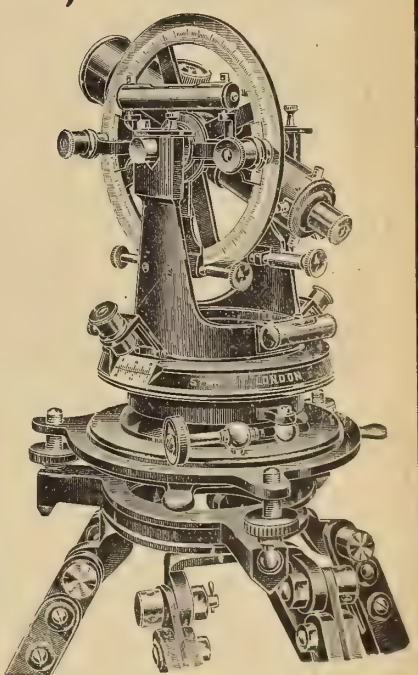
Eugene Dietzgen
Co., Limited
TORONTO

STANLEY, LONDON

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our H 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK



Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

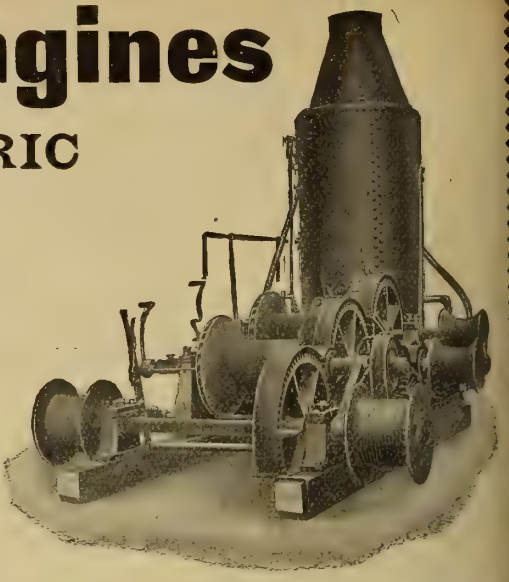
W. F. Stanley & Co., Limited
Great Turnstile, London, England

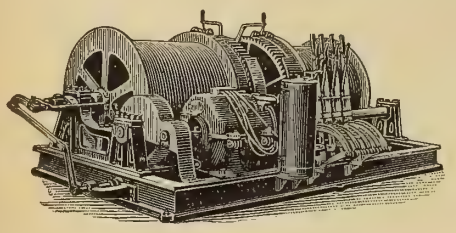
Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market





Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.

MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

50 SWITZERLANDS IN ONE



Write for copy of "Challenge of the Mountains."

The Canadian Rocky Mountain National Park

The Largest Park in the World. 5,732 miles in extent.

Pre-eminent Natural Grandeur. Splendid Hotel Accommodation. Luxurious Train Service. Most delightful place in the world for a vacation. A paradise for Mountaineers, Naturalists, Geologists and Mineralogists.

Reached by the

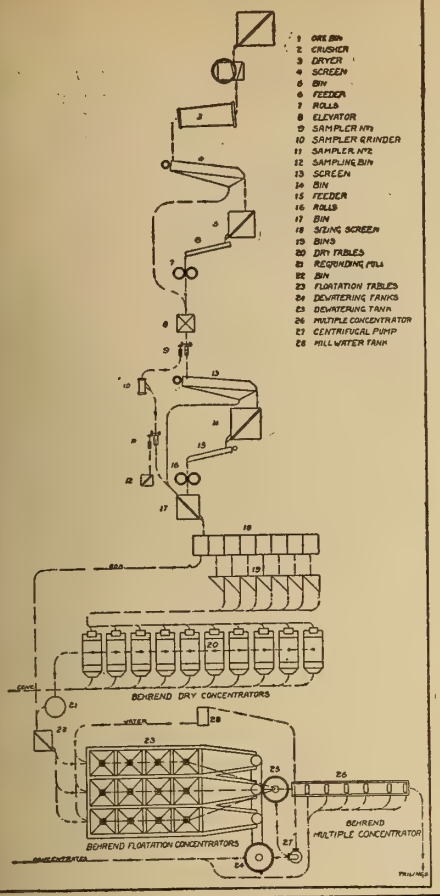
Canadian Pacific Railway

ROBERT KERR, Passenger Traffic Manager, MONTREAL.

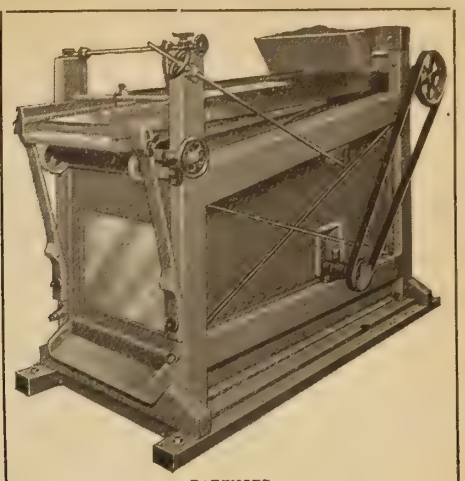
OR

R. L. THOMPSON, Dist. Pas. Agent

TORONTO, - CANADA



FLOW SHEET
OF A
MODEL PLANT
FOR THE
BEHREND SYSTEM
OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED
32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

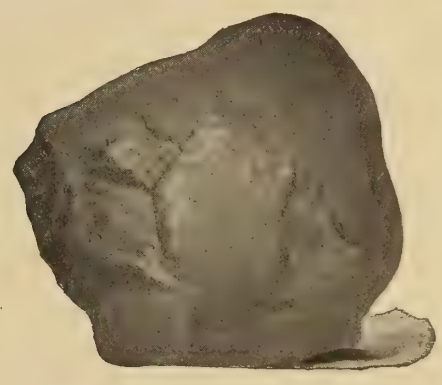
NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,
108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

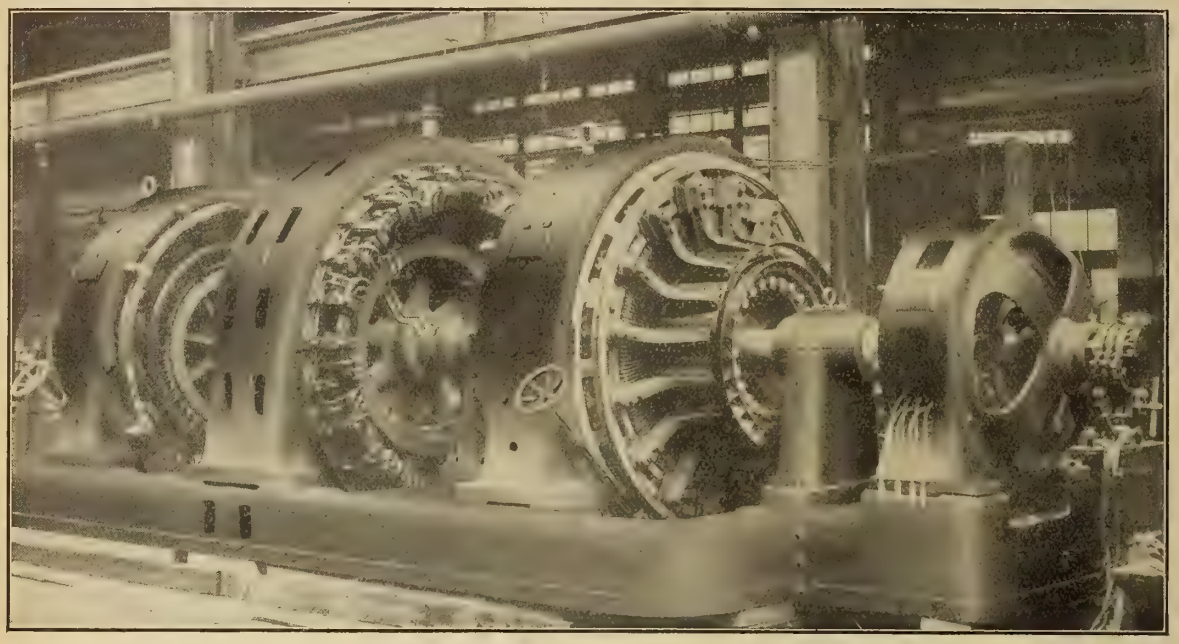
Scranton, Pa. - -	314 Peoples Nat. Bank Bldg.
Duluth, Minn. - -	710 Torrey Bldg.
Denver, Col. - -	225 E. Maple St.

When wanting goods write nearest office.

Bruce Peebles & Company, Ltd.

EDINBURGH, SCOTLAND.

Contractors to the Admiralty War Office, etc. Manufacturing and Contracting Electrical Engineers.



One of two 1 500 H. P. Motors supplied to the Newcastle on Tyne Electric Supply Company.

Watertight Motors for Mines.

Slow Speed Haulage Motors.

A.C. & D.C. Dynamos & Motors.

Traction Motors.

La Cour Convertors.

VANDELEUR & NICHOLS

Cables "Vandeleur." Sole Canadian Representatives, Dineen Building, Toronto.

The Davis Handbook of the Cobalt Silver District

Illustrated with Photographs

PRICE

Paper Cover = = *$1.50*

Stiff " = = = *$2.00*

by H. P. Davis

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general infromation necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = **Canadian Mining Journal** = *Toronto*

ACKROYD & BEST, LTD.

MORLEY, LEEDS, ENGLAND.



CANADIAN AGENTS:

Messrs. G. M. GRAHAM & CO.

NORTH SYDNEY, C.B.

We specialize in all kinds of Miners Safety Lamps and Electric, Magnetic and Mechanical Apparatus for same.

We have over 200,000. Lamps in use in Great Britain.

Dominion Coal Co., have 6,600.

We supply complete cabin outfits, all of the Latest and Best Quality.

Catalogue of Braun's Laboratory Appliances is interesting reading to the Assayer and Chemist, and is yours for the asking.

What is Your Address?

LYMANS, Limited,
MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

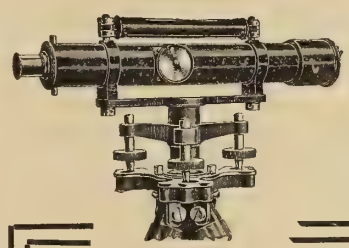
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



DUMPY (SURVEYING) LEVELS

BEST DUMPY LEVELS, with powerful telescope, having large object glass, three levelling screws, and improved locking plate. In mahogany case, and with round Tripod Stand.

The first level to be made with stage and parallel plates in one piece. Extra large centres carefully ground ensure accuracy and resist wear. This is "The Level that will last the longest."

Catalogue F. on request.

Joseph Casartelli & Son,

Scientific Instrument Makers,
43 Market Street,
Manchester, Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co , Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire-threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.
And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.
Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

Specify Distinctly  Allen's Stag Brand

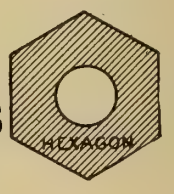


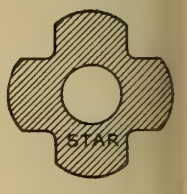


SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock





SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

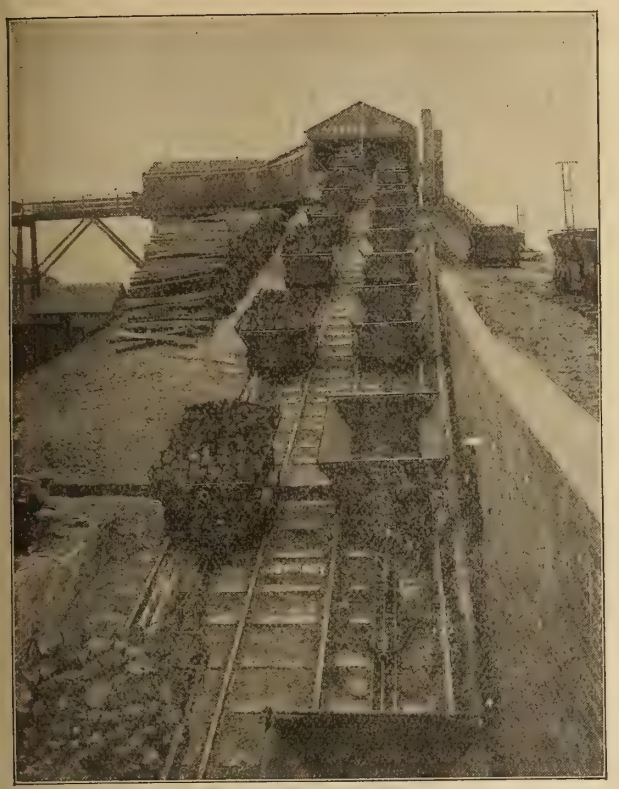
Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL

Jeffrey Wire Cable Car Hauls

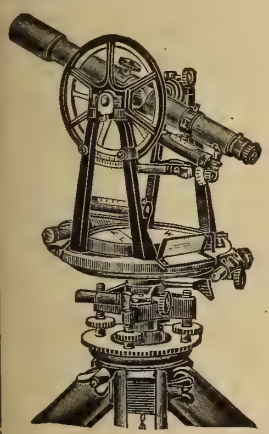


are the most dependable medium obtainable for the continuous haulage of Mine Cars. They have unusual strength in proportion to their weight—are extremely flexible and the absence of wearing joints gives them preference over other makes of Car Hauls.

We solicit an opportunity to figure on your Car Haul propositions and will gladly mail our Bulletin X21 to interested parties.

The Jeffrey Mfg. Co.,

Canadian Office and Works
Cote and Lagauchetiere Streets, MONTREAL
Toronto Office, 174 King Street East.



C. L. Berger & Sons

37 WILLIAMS STREET
BOSTON, - MASS.

SPECIALTIES :
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

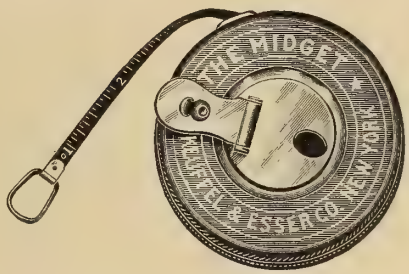
Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196

Measuring Tapes



The durability of **K & E** Measuring Tapes, the accuracy of their graduations, and the superior workmanship which they exhibit, account for their wide popularity and recognized position as the standard of excellence.

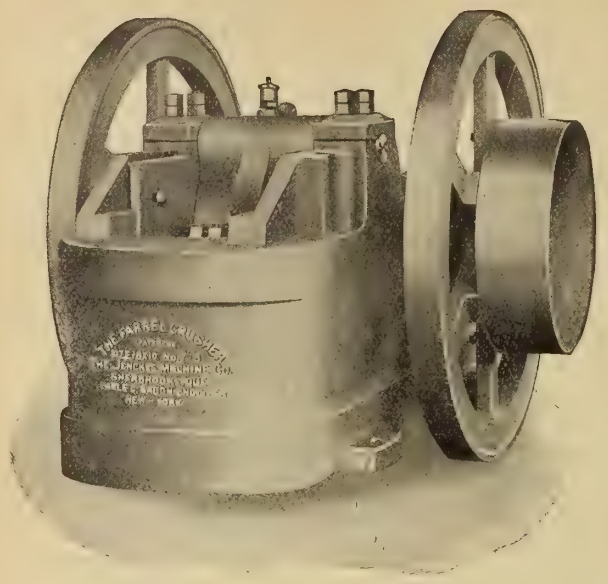
All **K & E** Steel Tapes have the KECO finish, which produces an even black tape line with brilliant, bright steel graduations and figures. The KECO finish guards against rusting and obviates the necessity of greasing the line to protect it.

Send for Complete Catalogue.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.
General Office and Factories,
HOBOKEN, N.J.

New York Chicago St. Louis San Francisco
Mathematical and Surveying Instruments
Drawing Materials Measuring Tapes



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

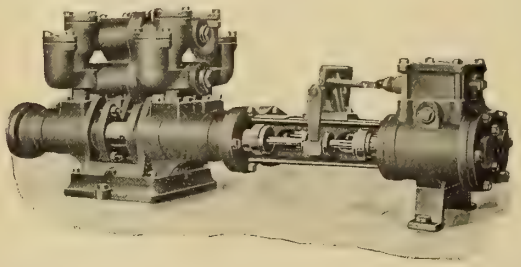
Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices:

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver

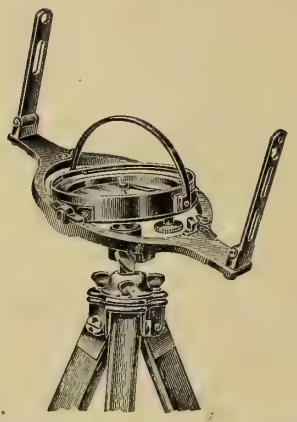
Power & Steam Pumps, Condensers, Travelling Cranes, Etc.

Write for Catalogue



THE SMART-TURNER MACHINE COMPANY, Limited

HAMILTON C NA A



DAVIS DERBY.

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 BEAVER HALL HILL, - MONTREAL

Write for pamphlet No. 42 M.

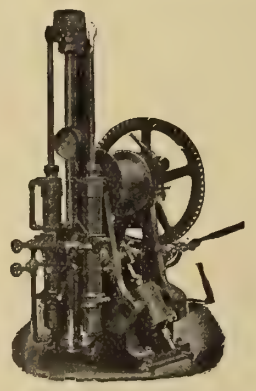
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

OL. XXXI. TORONTO, Sept. 15, 1910 No. 18

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

ead Office - - Confederation Life Building, Toronto
ranch Offices Montreal, Halifax, Victoria, and London, Eng.
ondon Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 545
(a) East and West 545
(b) Nova Scotia Tungsten Mining 546
(c) Publicity 546
(d) The Explosibility of Coal Dust 546
(e) Technical Literature Once Again 547
(f) The Quick and The Dead 547
(g) Porcupine and Cobalt 547
(h) Editorial Notes 547
Book Reviews 548
Scheelite 549
Mining and Metallurgical Opportunities in Canada, by A. B. Willmott 552
Experimental Work in Treatment of Zinc Ores, by E. Jacobs 553
Our European Letter 555
Suction Gas Plants in South Africa 556
Estimation of Nickel and Cobalt, by C. W. Badgley 558
Precipitation 559
Electrical Transport on the Rand 560
Preliminary Notes on Geology of the Porcupine District of Canada, by A. A. Hassan 561
Standardization of English in Technical Literature 563
The Prevention of Mine Explosions 566
Personal and General 568
Special Correspondence 568

EAST AND WEST.

Mr. Kipling, the chanticler of Empire, once wrote to the effect that East is East, and West is West. He added some remarks upon the entire improbability of a meeting between the two. Indeed he went so far as to asseverate that that meeting would not take place until Judgment Day.

Several historic assertions are on record as to the precise date of Judgment Day. None of these assertions has been proved correct. Thus we have no means of judging the accuracy of Mr. Kipling's statement. Yet we are confronted with the fact that a meeting must soon take place between Canada West and Canada East. And this is why.

Nova Scotian coal operators are traditionally opposed to anything resembling reciprocity in coal as between Canada and the United States. Their reasons are obvious, numerous, and well set forth. Albertan and British Columbian coal operators are strongly in favour of reciprocity for reasons equally cogent. Heretofore Nova Scotia has had the stronger voice at Ottawa. But now the West is vocal.

Our honoured Premier, Sir Wilfrid Laurier, has but now completed an official tour of Western Canada. On not one, but on many occasions, good citizens made opportunities to pour into his ear their complaints on matters pertaining to tariff and trade. At Lethbridge, particularly, he listened to the sorrows of local coal-mine operators. The substance of their plaint was that they have reached the present limit of the domestic market and that the tariff barrier precludes them from exploiting the United States market adequately. One manager stated with great frankness that they needed the market, needed it badly, and were shut out of it because Nova Scotia desired protection from Pennsylvania and Virginia. Free trade, he claimed, would develop enormously the Western field and would reduce the price to consumers. And he added a suggestion that, if necessary, a tariff zone be established in Nova Scotia, the West being left free from restrictions.

Whilst without question it is useful to hear both sides of every debate, we fear that Sir Wilfrid will not find that the problem is as simple as it seems. In fact, it is far from being simple. Each side has a right to be heard. Neither side can be dealt with at the expense of the other. The chief difficulty lies in so adjusting matters as to do fairly by both.

A struggle at Ottawa between Eastern and Western interests would be neither expedient nor profitable. We suggest that accredited representatives of both meet on neutral ground and discuss matters fully. This has long been needed. The issues to be considered are

clear. The steps to be taken can, we believe, be made not unfair to either East or West.

Meanwhile there would be no harm in a public investigation of railway freight rates.

NOVA SCOTIAN TUNGSTEN MINING.

In this number of the CANADIAN MINING JOURNAL will be found a brief description of the tungsten deposits that are now being opened at Scheelite, Halifax County, Nova Scotia. The article referred to is meant to be as general as possible. At this stage it is unwise to be too specific.

A visit to Scheelite is instructive. Here is the first recent instance of an enterprise entirely Nova Scotian in discovery, exploitation, and organization. The discovery was made by two local prospectors, Messrs. Reynolds and Currie, aided by Mr. A. L. McCallum. The financial organization was undertaken by Mr. H. C. Borden, a brother of Mr. R. L. Borden, leader of the Federal Opposition. If present indications may be taken at their face value, the enterprise will be successfully conducted by the present operators. It is most gratifying, in any case, to witness the rare sight of Nova Scotians giving tangible evidence of their confidence in themselves and in their country. It is also gratifying to learn that the intimate knowledge of the mineral deposits of Nova Scotia possessed by local prospectors has been recognized. The Nova Scotian prospector may not be able to write technical papers, but he has a remarkable nose for ore.

That Mr. Faribault's diagnosis of the field is correct constitutes another feather in his already well decorated cap. Mr. Faribault's advice gave direction to the work from the first. Without the counsel of this distinguished official of the Geological Survey the mining problems might not yet have been solved.

We note with pleasure that the mine is not being over-equipped. Thus costly errors are to be avoided. The positive advantages of cheap mining, cheap and efficient labour, easy access, and ample territory wherein to work and prospect, are all evident. All in all, the mining camp of Scheelite has had an auspicious beginning and promises good things. When it is remembered that the concentrates will be the equivalent of high grade Cobalt silver ore, and that the ore itself is ideally susceptible of treatment, a standard of comparison is gained.

We shall watch with keen interest the development of Scheelite. If it lives up to our expectations, Nova Scotia will possess an industry that will attract much more than local attention.

PUBLICITY.

We are often filled with shame because of the paucity of general mining news in the Canadian press. It is quite true that columns will often be devoted to spectacular finds or to special promotions. But regular mining news service there is none.

Coal, iron, and steel outputs are reported sporadically from the east. Shipments from Cobalt and Gowganda are published weekly. Southwestern British Columbia ore shipments are likewise reported, and the statements of ore received at the smelters of these districts are made public. Apart from a few coal mines, the above mentioned branches of the industry are about all from which the public hear with any degree of regularity.

For instance, from the asbestos concerns of Quebec only annual statements are issued, and these are by no means complete. From the large copper-nickel enterprises of Ontario no regular statements or reports are forthcoming. And so on through the list. Numberless small concerns are hidden in perpetual obscurity.

This is decidedly not as it should be, and it behooves the powers that be to bring about a change. Statistics, provided they are timely, complete, and accurate, have a distinct commercial value. If belated, incomplete, and inaccurate, they are worse than useless. The one means of securing accuracy and completeness is to insist upon weekly returns from each and every considerable producer of coal, of ore, and of metallurgical products. Any attempt to collect figures merely from year to year is wrong in principle and uncertain in results.

The remedy for this condition in Canada lies in the hands of each province. The Mining Department of each is capable of bringing pressure to bear upon companies operating under its jurisdiction. Pressure, however, may not and should not be necessary. At worst, a system of weekly open returns may not be welcome by mine operators, but we are confident that their objections will not be long-lived.

When one examines the analytical returns made public by the Rand, one has no difficulty in perceiving their value. The public, kept fully informed as to the capacity of each plant, the value of ore mined and of reserves, has its interest constantly inspired. The direct effects of this publicity are to guide investors, to improve mining practice, and to localize and minimize waste. The operator whose reports and returns are read by thousands is not prone to careless work. He is stimulated to his highest and best.

We have spoken before of the splendid isolation of the mining industry. That isolation costs money. That isolation, also, would disappear if the public were taken into the confidence of the operator. If in nothing else, surely in the item of outputs bona fide mining companies gain nothing and lose much by the unjustifiable policy of silence.

THE EXPLOSIBILITY OF COAL DUST.

It is not our intention here to discuss the question of the explosibility of coal dust. What we wish to point out is that some of the factors in the case have not yet been determined, and that, therefore, final pronouncements are not in order.

At the Pittsburg Testing Station, erected by the Technologic Branch of the United States Geological Survey,

and now under the control of the newly created Bureau of Mines, experiments have been carried on for the purpose of investigating the nature of coal dust, with especial reference to its explosibility. The chief mining engineer of the Bureau, Mr. George S. Rice, has recently written a bulletin describing these experiments. Certain conclusions are outlined by Mr. Rice. Whilst the reader is informed that these conclusions are tentative, yet as they are expressed in definitive language they are fairly to be criticized. And on two points, at least, we fear that Mr. Rice has erred.

The conclusion that in ordinary conditions the dust must have originated from coal carrying at least 10 per cent. of volatile combustible matter has not sufficient basis in fact or, rather, in experiment. British experiments have proved that explosions can be obtained with charcoal dust. Mr. Rice mentions this latter fact, but apparently does not accept it.

Again, the preliminary statement that the force of the explosion of firedamp is terrific, is quite wrong. Firedamp explosions develop no terrific force.

It is not wise to overlook the fact that the British experiments have covered a much longer period of time than have those conducted in the United States. Long and unsparing study is a pre-requisite. This has not been absent in Great Britain. But we must express a candid doubt as to the fitness of the United States Bureau of Mines to rush into print concerning a subject so involved and so highly technical. It were better far to defer official reference to controversial phases until such time as the Bureau may have become more firmly established.

It is generally admitted that much is to be learned concerning coal dust. When the United States Bureau of Mines has a serious contribution to make we shall welcome it.

TECHNICAL LITERATURE ONCE AGAIN.

Laterly we gave utterance to the hope that the tilt between Mr. T. A. Rickard and his critics would be lively. It is. In Bulletin No. 71 of the Institution of Mining and Metallurgy, two new contributions appear. Both contributors, after a brief bow, proceed to carve Mr. Rickard and to place salt on the wounds. In an entertaining ten pages Mr. Rickard replies to each and all who have entered the lists against him.

In our opinion, Mr. Rickard has escaped with surprisingly few marks. He seems fairly to have established his position in objecting to the use of such localisms as "mullock." His objection to the misuse of the word "partially" is also sustained. But in the matter of preposition-verbs, the critics have worsted him. All this by the way. The outstanding fact is that Mr. Rickard has single-handed resisted the onslaught of many tall and fiery knights. His pen arm yet is free. A bloody wound or two can be detected. But he has emerged, if not victorious, yet by no means defeated. And his agility has been beautiful. We had truly believed him at least temporarily disabled.

The discussion that has now been closed has indisputably aroused more and keener interest than any of recent years. To our resolute brother the profession owes a hearty vote of thanks.

THE QUICK AND THE DEAD.

A change is coming over general mining activities in Canada. It is not uncommon to hear of independent Canadian investors taking up abandoned mines. This is probably more the case in Ontario than elsewhere, but evidence of revival is not lacking in Nova Scotia, New Brunswick, Quebec, or British Columbia.

In Nova Scotia, for instance, old gold mines are being re-opened; gypsum and infusorial earth deposits are being again taken up; and generally there is a great deal of quiet work being done. In New Brunswick, copper is being investigated, despite the record of the past. Copper and alluvial gold are subjects of revived interest in Quebec. Ontario's western gold mines show signs of life. Of British Columbia's lead and zinc the same thing is true.

These facts, considered in conjunction with the many new activities in coal, iron, gold, oil, feldspar and so on, surely mean that the mining industry of Canada is on the eve of expansion to limits not heretofore hoped for. Statistics may not show the measure of this expansion. But, before long, even statistical statements will be affected.

PORCUPINE AND COBALT.

He who denies that experience teaches need only glance over the histories of Cobalt and of Porcupine. Porcupine has learned wisdom from Cobalt. The pioneers of Porcupine were in the main strong, clean men who frowned upon crookedness. So far as is humanly possible Porcupine has been developed on its own merits. Cobalt was sadly afflicted for years with bad men and bad methods. The process of weeding out was long. Porcupine has commenced weeding early. That it may be continued is our earnest prayer!

EDITORIAL NOTES.

Diamond drilling has brought satisfactory results in Porcupine ore bodies.

Rhodesia has established a Geological Survey. As the gold output of the colony is now about $13,000,000 per annum, this step is not rash.

The rise in the price of tin has been phenomenal. Lately in London the spot price has reached £164 10s., whereas a week before it stood at £159.

An exceedingly rich ore shoot was recently struck at a gold mine at Renfrew, Nova Scotia. Specimens of the ore, filling a small pan, contained more than 50 ounces.

The Nugget gold mine has attracted much attention to the Sheep Creek district, B.C. It has been producing steadily for a considerable time. It was exploited by Mr. A. H. Gracey, a former student at Kingston School of Mines.

In the United Kingdom the proporition of workpeople affected by changes in wages during 1909, was largest in the coal mining industry. The gain in wages in the industry was larger absolutely and proportionately than in any other industry.

A new detonator is being manufactured by a French firm. It consists of a metallic tube which is filled with tri-nitro-toluol and drawn out thin. This detonates frozen nitro compounds, and, it is claimed, reduces by 30 per cent. the amount of explosive used.

The gas wells of the Maritime Oilfields, Limited, near Moncton, New Brunswick, are yielding handsomely. One well has a flow of 5,000,000 cubic feet per day. Oil, also, has been struck in commercial quantities. A scheme is being formulated whereby Moncton and other towns will be supplied with light, heat, and power from the gas.

The Porcupine Mine Owners' Association is a recent organization formed to give clean publicity to the Porcupine camp. From the New York office news bulletins will be distributed. The object is to discredit irresponsible rumours and to circulate authentic information. Mr. C. A. Foster is president and Mr. H. P. Davis secretary.

BOOK REVIEWS.

FROM PROSPECT TO MINE—BY ETIENNE A. RITTER, MINING ENGINEER,—166 PAGES—ILLUSTRATED WITH HALF-TONES AND DIAGRAMS—THE MINING SCIENCE PUBLISHING COMPANY, DENVER, COLORADO, 1910.

A consecutive discussion of the life history of a mine and of the successive steps by which a prospect becomes a dividend-paying mine, are here set forth. Dr. Ritter has attempted with a large measure of success to clothe his thoughts in language simple, direct, and instructive. He writes especially for the investor; but his book also serves as a review for the engineer.

To the layman the perusal of Dr. Ritter's modest little book should prove alike refreshing and informing.

ORE MINING METHODS — COMPRISING DESCRIPTIONS OF METHODS OF STOPING AND MINING IN NARROW AND WIDE VEINS AND BEDDED AND MASSIVE DEPOSITS, INCLUDING STULL AND SQUARE-SET MINING, FILLING AND CAVING METHODS, OPEN-CUT WORK, AND A DISCUSSION OF COSTS OF STOPING — BY WALTER R. CRANE, PH.D. — 219 PAGES. RENOUF PUBLISHING COMPANY, 25 McGILL COLLEGE AVENUE, MONTREAL, AND JOHN WILEY AND SONS, NEW YORK, 1910.

Mining methods vary with every locality. Even the same methods will change in different hands and in different circumstances. But it is generally true that some methods are unsound in principle and that others have proved sound and adaptable. To these latter Dr. Crane devotes his attention.

The sequence of treatment is as follows: Support of Workings, Methods of Stoping and Handling Ore in Stopes, Mining in Narrow Veins and Bedded Deposits, Methods of Mining in Wide Veins and Masses, Open-cut Mining, Cost of Mining.

In several respects Dr. Crane has not made his work inclusive enough, at least, to justify the title. For instance, shaft-sinking is not dealt with, nor is the relation of the shaft to other workings touched upon adequately. But these phases have been well developed in other text-books. In the main, "Ore Mining Methods" stops a gap successfully. It will serve as a useful source of reference to Canadian operators. Mine managers are all too prone either to follow local methods blindly, or to go off at a tangent. And the mine manager can afford to do neither.

In all probability the chapters on stoping will be found most suggestive. They cover a wide range, and they are well done. The last chapter, "Cost of Stoping," will give mine managers an excellent datum point.

Typographically the book is all that can be desired.

THE CANADIAN ANNUAL REVIEW OF PUBLIC AFFAIRS—1909—BY J. CASTELL HOPKINS, F.S.S. ILLUSTRATED — PRICE, $3.50 NET — THE ANNUAL REVIEW PUBLISHING COMPANY, LIMITED, TORONTO.

"The Canadian Annual Review of Public Affairs for 1909," by Mr. J. Castell Hopkins, is a volume of 660 pages packed with information regarding Canada—statistical, historical, descriptive. In this ninth year of its issue the work deals in literary and readable style with every phase of Canadian development and activity. Imperial and foreign relationships, material progress and prosperity, individual enterprise and business efforts, during the period under review.

Amongst the subjects to which sub-sections of the volume are devoted might be mentioned:

Germany, the British Navy and Canada's Position.
The Meeting of the Imperial Defence Conference.
Position and Policy of the Dominion Government.
Parliamentary Events and Discussions of the Year.
Tariff Affairs and the Canadian Manufacturers Association.
Militia Conditions, Appointments and Progress.
Dominion Labour Legislation and Conditions.
The Imperial Press Conference — Speeches and Results.
The Chambers of Commerce of the Empire at Melbourne, Australia.
The British Preference and Preferential Trade Discussions.
The Continued Increase of British Investment in Canada.
Public Affairs in all the Provinces.
Mines and Mining Interests of the Year.
Transportation Affairs and Railway Expansion.
Financial Municipal, Trade and Other Interests.
Relations with Foreign Countries.
The Question of United States Reciprocity.

Immense labour has been devoted to the compilation of this book. The sections on mining are extremely interesting.

SCHEELITE.

A New Tungsten Mining Camp in Nova Scotia.

(Written for the CANADIAN MINING JOURNAL.)

The occurrence of scheelite in small quantities in Nova Scotia has been known for some time. The first discovery of scheelite-bearing quartz veins was made two years ago (See CANADIAN MINING JOURNAL, September 15th, 1908) in the gold mining district of Moose River, Halifax County. Not until last winter were arrangements completed to commence developing the property. It is now being handled by Mr. A. A. Hayward, formerly secretary of the Nova Scotia Mining Society. The syndicate that is behind Mr. Hayward is composed of Mr. R. L. Borden, Mr. M. J. O'Brien, and other prominent citizens. It was organized by Mr. H. C. Borden.

Scheelite, as the new settlement has been christened, is situated 28 miles northeast of Halifax City, and lies 12 miles from the Atlantic coast. The most direct route is from Elmsdale, on the Intercolonial, through Middle Musquodoboit, to Moose River. Except for the last two miles connecting Moose River and Scheelite, the roads are excellent. The projected railway between Dartmouth and Antigonish will pass within a few miles of the mines.

The geology of the district has been well described by Mr. E. R. Faribault in his paper appearing in the Summary Report of the Geological Survey for 1909. The rocks are the typical, altered, grey quartzose-sandstone, interstratified with beds of dark grey slate. These are the lowest strata of the gold-bearing series. They occur along the apex of the highest and most prominent anticlinal fold which passes through the Moose River gold district.

Rock exposures are scarce. Hence prospecting is not easy. Indeed, it appears to require special aptitude and

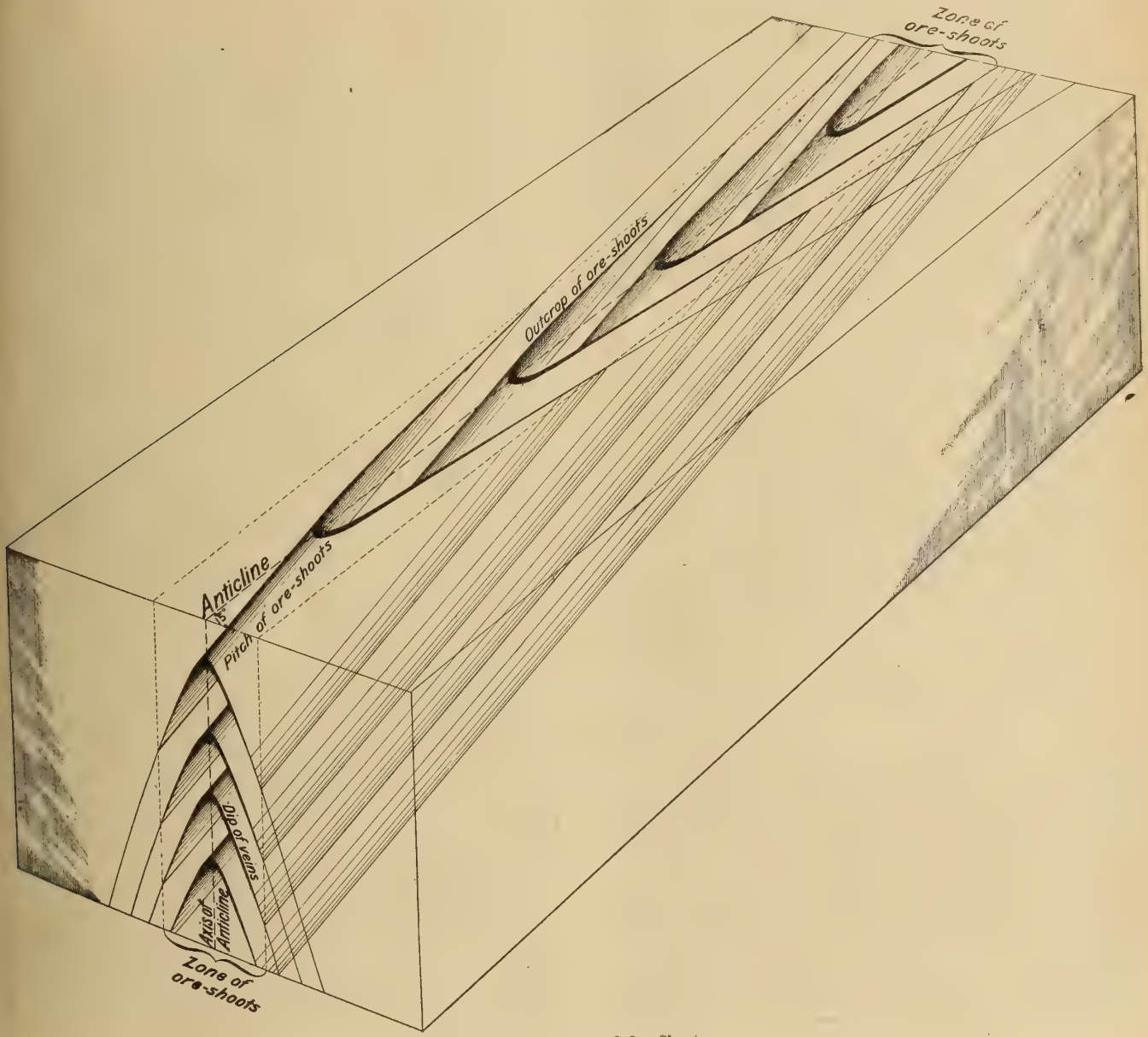


Diagram of Veins and Ore Shoots.

experience, and to the intelligent persistence of Messrs. Reynolds and Currie is due the credit of most of the discoveries so far made.

VEINS.—The accompanying diagram gives a clear idea of the geological structure. The scheelite-bearing veins, interbedded between "whin" (altered quartzite) and thin layers of slate. The profound folding to which the strata have been subjected has developed the usual system of synclines and anticlines. The veins themselves have their horizontal extension east and west.



View of Scheelite.

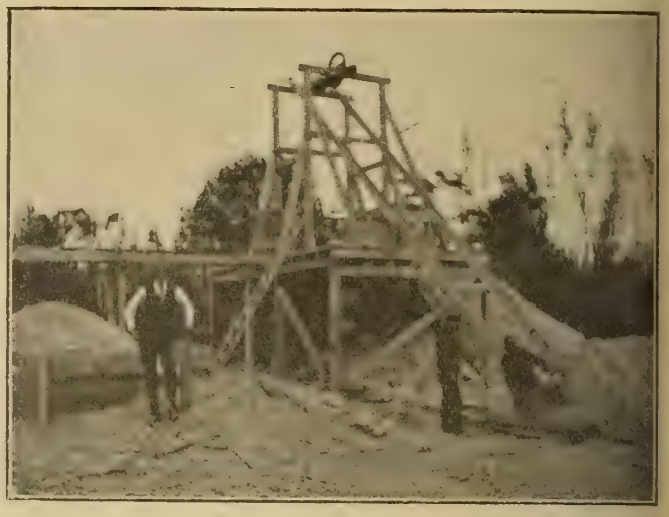
They dip either to the north or south, according as to whether the north or the south leg of the anticlinal fold is encountered. The horizontal axis of the fold pitches towards the west. Hence, successive outcrops are found of veins that overlie each other, the overlying vein being to the west of the underlying vein. Thus a vertical section from north to south would expose a series of veins, crumpled into arches and corresponding troughs,



View of Dwelling Tents.

and the whole body pitching gently to the west, and, in the section, converging gradually until successive complete anticlinal folds are visible in the centre of the series.

The veins range in width from one inch to two feet. Those richest in scheelite do not exceed 6 inches, and, in general, the average width lies between 4 and 6 inches. The richest veins are usually uniform in thickness. Distortion at the crest of an anticline or at the trough of a syncline may induce rolls or pockets that are abnormally thick. The vein matter is principally quartz, scheelite, and mispickel. The proportions in which these minerals are found vary within wide limits. In most of the veins scheelite is the more abundant, although occasionally mispickel predominates, and in one vein constitutes the whole. Occasional thin plates of calcite are found. But the three minerals mentioned above are by far the most important constituents. Other



Head-frame at Incline Shaft.

minerals commonly associated with Nova Scotian gold-bearing veins are entirely, or almost entirely, absent. As pointed out by Mr. Faribault, the presence of tourmaline and of mica, considered in connection with the intense metamorphism of the surrounding country rock, indicates that the tungsten deposits are of profound origin.



Messrs. A. A. Hayward, H. C. Borden, and R. L. Borden

Whilst the extent of the scheelite deposition is not yet known, it has been proved to be larger, more regular, and richer than was at first supposed.

Manager Hayward is now sinking an incline shaft on the outcrop of a syncline. The tram rails are exactly over the trough, and in each wall is visible one leg of the syncline. That is, on the north wall, the south leg of the anticline begins, and the crown of that anticline

as been discovered but a few feet north. Similarly on he south wall of the shaft the north leg of the syncline ext to the south is exposed. On both walls the vein natter has been allowed to remain. Examination proves these veins to be exceedingly rich. Much of he vein carries more than 50 per cent. of scheelite. All hat has been exposed will mine well over 20 per cent. The shaft is to be continued to the pitch of the synlinal trough and will make easy dry mining. The hope s entertained that the ore shoot will prove continuously to follow the pitch of the measures. Up to date here has eventuated nothing to disturb this hope.

There are, excluding the incline shaft, five prospect shafts sunk on different veins. In addition, there are eight other veins cut in trenching. Some of these are rich, some lean, but all carry scheelite.

Having glanced cursorily over the camp as a prospect, let us turn for a moment to another aspect. The work of establishing the new camp was begun on April 1st. At Moose River, two miles distant, 140,000 feet of



John Reynolds.

spruce and pine timber were sawn. 80,000 shingles were also made. The frame timbers of a 5-stamp mill were cut and are now in readiness. Next the town-site was prepared. Originally about 100 acres had been cleared of timber. This ground was now thoroughly stripped of bush, a necessary step to prevent damage from forest fires. Substantial storehouses, residence, cookhouse, and stables were built. The other necessary residences are tents erected on strong wooden platforms. Over these platforms will be built wooden houses ere the snow flies. Incidentally, though perhaps the subject deserves more than incidental mention, every building and every dwelling is kept in a condition of thorough cleanliness. The cook-house is spotless. The sleeping tents are fitted with immaculate double-deck iron beds. Nowhere is uncleanliness of any kind permitted. The sanitary arrangements are most effective. It is quite apparent that the men are encouraged to live up to a strict hygienic standard.

Steam is still being used for sinking. No costly machinery is on the ground, and none has been ordered. It is expected that a 5-stamp mill, equipped with suitable concentrating machinery, will be all that is necessary to produce dividends. It is possible that rolls and jigs may be employed instead of stamps. A mill of capacity equivalent to 5 stamps would yield at least one ton of 75 per cent. concentrates. On a great deal of the ore so far exposed the yield will be much higher. Without removing the arsenic from the concentrates they can be sold for more than $7.50 per unit. However, the arsenic, about 3 per cent. of which is contained in the concentrates, can be cheaply and expeditiously removed by roasting.

It is probable that mining can be carried on in Nova Scotia at lower figures than can be paralleled elsewhere. For instance, the incline shaft, 6 feet by 7 feet, is constructed at a cost of $9.50 per foot. This figure is inclusive of all surface expenses except fuel. A vertical shaft, 6 by 14 feet, was constructed at $14 per foot, inclusive. Drifting, it is estimated, will cost $5 per foot. In section the drift will approximate 7 feet in height and 4 feet in width. Mining costs will aggregate about $4 per ton for breaking the ore. This includes all underground charges. Can any readers of the CANADIAN MINING JOURNAL show lower costs than these?

To refresh the memories of those who have forgotten what scheelite is, it may be well to include a paragraph or two. Scheelite is calcium tungstate, a chemical combination of lime and tungsten trioxide ($CaO.WO_3$) containing when pure 80.6 per cent. of tungsten trioxide and 19.4 per cent. of lime. In some deposits copper, a very deleterious element, replaces to various extents the tungsten. In Nova Scotia, however, the only harmful element present is arsenic in the form of mispickel.

As scheelite has a specific gravity of 5.88 to 6.14, and as mispickel closely approximates this, 5.89 to 6.30, a close separation in the mill is not practicable. But it is quite practicable to roast off the arsenic.

. . . . .

It is altogether too soon to predict the future of Scheelite. The venture, however, is developing most favourably. If no interruptions are experienced, and it that bugbear of Nova Scotian mining, litigation, be avoided, the enterprise has all the earmarks of success.

MINING PROSPECTS ON UPPER FRASER RIVER, B.C.

A party of prospectors, representing a Kamloops, B.C., syndicate, after having spent the summer examining the country along the route of the Grand Trunk Pacific Railway between Fort George and the head waters of the Fraser River, lately returned to Kamloops. The "Standard," published in that town, says: "During the trip every care was taken to examine the country thoroughly both for agricultural purposes and for mineral. The country to Tete Jaune Cache contains much excellent agricultural land easily cleared, which will be along the line of railway when completed. It is, however, likely to become a mineral producing area, according to reports made by Mr. J. C. Bradley, who was in charge of operations for the syndicate, and outside of mica deposits will never produce any surprises. The mica deposits are immense, though, and the Tete Jaune Cache country may in a few years be able to control the markets of the world so far as this mineral is concerned. At Tete Jaune Cache the party met Mr. Stanley Washburn, of Minneapolis, who, with Mr. C. A. Thurston, a New York mining engineer, was examining the mica deposits at that place." (See also Geological Survey of Canada "Summary Report" for 1909, page 129.)

MINING AND METALLURGICAL OPPORTUNITIES IN CANADA.

A. B. WILLMOTT, Mining Engineer, Toronto, Ont.

Prefatory Note.—In the following brief articles attention is called to some industries connected with mining, which apparently might be profitably established in Canada at once. Where data are available the market is given, and the source of the raw material indicated. I do not pretend that I have critically examined into all the conditions that make for success, but only that the subjects mentioned are worthy of careful study by investors looking for meritorious propositions.

II.

An Alberta Iron Industry.

The provinces of Alberta and Saskatchewan, about 500,000 square miles in area, are rapidly settling up. Already the population is in the neighbourhood of 700,000 and within a few years it will have reached the vicinity of two million, which was the population of Ontario not many years ago. This population will undoubtedly require a certain amount of pig iron for local foundries. This will probably be mainly employed in repair work, though there will also be a demand in connection with local manufactures.

At present pig iron sells in the vicinity of $25.00 a ton at Winnipeg and at about the same figure at Vancouver. As one goes west from Winnipeg and east from Vancouver the price rises as distance increases. The price at such points as Calgary and Edmonton is at present practically prohibitory for any manufacturing purposes. At the same time local foundries would no doubt spring up at many centres in Saskatchewan, Alberta and Southeastern British Columbia, if the price of pig iron were reasonable. Prince Albert, Saskatoon, Regina, Moose Jaw, Edmonton, Calgary, Lethbridge, Fernie and Nelson should all be consuming points for a small amount of iron and at prices much above those secured in the east. The market would not be a large one, but would probably consume the product of a 50 or 100-ton furnace.

As to the raw materials for such a furnace, coke is, of course, abundant in the Crow's Nest Pass region and can probably be furnished north if required. This coke is of excellent quality and finds a large sale at the copper smelters.

A supply of iron ore is more uncertain and comparatively little is yet known of the ore possibilities. Near Kitchener eastern interests have drilled a deposit of hematite with results which were reported as very encouraging. On Bull River, north of Jaffrey, on the Crow's Nest division of the Canadian Pacific Railway, hematite deposits are also reported. At present there is no incentive to prospecting for iron ore as there has been no demand for properties and no sale for ore. Undoubtedly if a furnace were erected a number of deposits would be found. Moreover, the size of the furnace would not require any large amount of iron ore.

While the heading of this article implies that the furnaces should be located in Alberta it might, perhaps, be found better to locate on the British Columbia side of the boundary. The proposition to which I wish to direct attention is the possibility of furnishing from the ores and coke of the Crow's Nest district a local supply of pig iron for the prairie provinces and for the mining industry of southeastern British Columbia.

III.

Salt in the Prairie Provinces.

The prairie provinces are supplied with salt partly from the district bordering on Lake Huron in the province of Ontario, and partly from the United States salt from the latter source being subject to an income tax. The production of salt in Ontario in 1908 is given as follows: Sales, 79,975 tons value exclusive of packages $378,798, value of packages, $168,019. From these figures it can be calculated that the salt, as estimated by the producer at the point of production, is worth 23.7 cents per cwt., and the value of the packages 10.5 cents per cwt.

Freight from Windsor to Winnipeg by combined rail and lake amounts to 28.3 cents per cwt., and from Windsor to Edmonton to 63.3 cents per cwt. From this it is apparent that the cost of salt laid down in Edmonton is 97.5 cents per cwt., exclusive of the freight on the packages. At Winnipeg the cost is 62.5 cents per cwt. The actual cost of salt at Edmonton is thus a little over four times the cost of the same salt in Windsor. If salt could be produced at some central point in the west and the freight rate from Windsor to Winnipeg alone saved, the producer would have as his profit not only the profits of the producer in Ontario, but also the latter's whole cost of production.

The consumption of salt in the prairie provinces is unknown, but may be determined approximately as follows: The total consumption of salt in Canada for 1908 was 391,384,000 pounds. Assuming the population at that time to have been six million and a half, the consumption per capita was sixty-one pounds. The population of the three prairie provinces is to-day believed to be one million two hundred thousand, and the consumption of salt estimated on a basis of sixty pounds per capita would thus amount to 72,000,000 pounds per annum. If a freight rate of 25 cents per cwt. were saved on this consumption the saving would amount to $180,000 per annum.

In the west a number of salt springs are known which have furnished salt, of rather a crude character it is true, to the Hudson's Bay Company for many years. The most important of these are located along the shore of Winnipegosis Lake. James Monkman began working one of these as early as 1820. In the Geological Survey report of 1890, part E, the following springs are noted:

Salt Creek, west of Lake Dauphin.
Banks of Mossy River.
Salt Point, south of Lake Winnipegosis.
Monkmans Salt Springs, Red Deer Peninsula.
Pine Creek.
Pelican Bay, mouth of Pelican Creek.
Pelican Bay, west side.
Mouth of Bell River.
Salt Point..
Salt Point Peninsula, with salt near its base.
Salt Point Peninsula, north side of its base.
Mouth of Steep Rock River.
Lower Red Deer River, many places.
Banks of Shoal River.
Mouth of Swan River.

According to Mr. Tyrrell these springs have their sources chiefly in the Devonian rocks. The salt of the springs is thought to be derived from crystals of salt scattered through the rocks rather than from beds of pure rock salt. In Ontario the salt occurs in beds of the Upper Silurian period. Silurian and Devonian rocks extend from Lake Winnipeg northwest to the Mackenzie River. There are probabilities that actual salt beds exist as well as the springs referred to above. Boring will be required to determine this point and no definite inference can be made from geology that such beds of salt will be found. The probabilities are, however, strong. With an assured market for a large consumption and with a natural protection due to freight rates there should be sufficient encouragement to take up this enterprise.

EXPERIMENTAL WORK IN TREATMENT OF ZINC ORES.

(Contributed by E. Jacobs, Victoria, B.C.)

Last December a convention of mining men and others interested was held at Nelson, British Columbia, to consider the question of the best course to take to secure the making of experiments in the treatment of zinc ores, especially of ores in which zinc occurs in association with lead and iron. The attendance at that meeting was large and representative of the whole of the Kootenay district in particular, in which are known to exist great quantities of ore containing zinc, and this frequently with lead, in connection with which it is generally a detriment, since the shippers of such ores to lead smelteries are usually penalized when there is more than a certain percentage of zinc in the ore. The meeting unanimously adopted resolutions in effect petitioning the Dominion Government to make a sufficient appropriation to admit of experiments being carried on with a view to making the utilization of the zinc ores of British Columbia and other parts of the Dominion commercially practicable.

About a year earlier works designed to smelt lead-zinc ores by electro-thermic process, using the Snyder patented process, had been completed according to plans and a commencement had been made to smelt district lead-zinc ores, but, while a certain measure of success was achieved, working costs were high and results were not such as would bring profit to those concerned. The Provincial Government of British Columbia has already aided the undertaking by a substantial money loan ($20,000), so it was not reasonable to ask it for more. In January, 1909, a periodical general meeting of the Western Branch of the Canadian Mining Institute was held at Greenwood, and several members resident in Nelson and Slocan districts attended that meeting and secured the adoption there of the following resolution:

"Resolved—That this the Western Branch of the Canadian Mining Institute, in meeting assembled, hereby expresses its approval and appreciation of the action of the Federal Government, through its Department of Mines, in seeking a solution of the difficulties attendant on the economical smelting of eastern iron ores, by practical experiments in electro-thermic reduction, conducted at the public cost.

"In this connection this meeting recommends to the Government the desirability of aiding in and contributing to the advanced experiments which have already been made in British Columbia towards the separation and reduction of lead-zinc ores by electro-thermic energy. These experiments have demonstrated the practicability of the separation of metallic zinc from metallic lead, and its recovery as spelter from complex lead-zinc ores. Important deposits of such ores occur in this province and remain unworked through lack of economic reduction facilities. In the opinion of this meeting a solution of this problem will be of very great importance to the mining industry of the Dominion."

This resolution was duly communicated to the Dominion Government, but, so far as known to the writer of this article, no action was taken in this connection. The resolutions passed at Nelson late in 1909 were, however, persistently urged upon the Dominion Government, the entire cessation of work at the electric zinc smelter at Nelson having meanwhile taken away the hope previously existing that the difficulties in the way of continued operation of the works would be overcome. The outcome of this agitation and urgent representation to the Government was that an appropriation of $50,000 was made and the Mines Branch of the Canada Department of Mines was authorized to make enquiries into the subject and conduct such experiments as should be deemed desirable towards arriving at a solution of the difficulties of the situation. Since then little definite information had been made public in British Columbia as to what steps had been, or were being, taken in this important matter, so the occasion of the recent visit to British Columbia of the Prime Minister, Sir Wilfrid Laurier, was considered a suitable one to again press upon the attention of the Government the urgency of progress being made towards solving the problem of the reduction of zinc ores. Accordingly, the Kootenay-Boundary British Columbia Liberal Association adopted the following resolution, among others, for submission to Sir Wilfrid Laurier at the time of his visit to Nelson on August 29th:

"Resolved—Whereas the Dominion Government has appropriated for experimental work in the treatment of zinc ores, the sum of $50,000,

"And whereas in the opinion of this convention such appropriation is a wise and judicious one,

"And whereas British Columbia is the centre of the zinc industry in Canada,

"And whereas it is the opinion of this convention that such experimental work should be, as far as practicable, carried on in the country which will benefit from the results thereof;

"Resolved, that the Dominion Government be thanked for the appropriation already made,

"And further resolved, that the Government be urged to carry on the experimental work as far as possible in British Columbia."

The Nelson Daily News, from which the information relative to the adoption of the resolution, and the account of the statement afterwards made by Hon. Wm. Templeman, Dominion Minister of Mines, has been taken, did not state what the reply of Sir Wilfrid was. However, the matter was dealt with by Mr. Templeman at a public welcome to the Prime Minister and his party before they left the city on their return to Eastern Canada. The Hon. Minister of Mines is reported to have said:

"I may on this occasion make reference to a question in which the people of Nelson are, I know, all very deeply interested. Some years ago, at the request of the mining interests of the province, and particularly of this district, the Dominion Government secured the voting by Parliament of a sum of money as a bonus on the production of lead mined in Canada, which amount has not yet been exhausted. The production of lead during the years that have intervened has, I

believe, been maintained at a normal level. That bonus on lead has been of enormous benefit to the Kootenay district. I doubt whether without it the lead mining industry would have been as successful as it has been during the past five or six years. There has now come a time when the production of lead-zinc ores needs assistance. There are many mines in this part of the province producing low-grade ores of zinc and lead, and in numerous instances the zinc cannot be recovered profitably by reason of the difficulty of smelting zinc. An amount of $50,000 has been voted, and since I arrived here I have heard many enquiries as to how we propose to spend that money. This is, I think, a proper opportunity to explain what we have done and propose to do further in the matter. Our first step has been to secure the services of an eminent mining engineer in London to make a report upon all the electrical zinc-smelting processes at present known in Europe. That engineer, Mr. F. W. Harbord, is now engaged in that work. (Note by E. J.—Mr. Harbord is a prominent member of several influential mining and metallurgical institutes and other societies in England. He has large experience in iron and steel manufacture, in which he was for some years engaged in the Midlands. For 14 years he was consulting metallurgist to the Indian Government; afterwards he went into private practice, and in 1908 entered into partnership with Mr. Edward Riley, of London, an eminent metallurgist, analyst and consulting chemist. He is a well-known authority on electric smelting, has visited all the principal electric furnace works in Europe, and is the author of several papers on this subject. In 1904 he was consulting metallurgist to the Commission appointed by the Canadian Government to investigate the different electrothermic processes for the smelting of iron ores and the making of steel, in operation in Europe. In 1909 he was appointed by the Transvaal Government to report on the general metallurgical position on the Rand, especially in regard to the fuel question. He is external examiner in the Imperial College of Science and Technology, London, and examiner in metallurgical chemistry for the Institute of Chemistry. He has visited nearly all the countries of Europe; also the United States, Canada and South Africa. His firm—Riley & Harbord—makes a specialty of the examination and testing of iron and steel and other metals, fuels, iron, and manganese and other ores and minerals, copper and other alloys, cements, and the various materials used by railways and engineers generally. He is also the author of the standard book "The Metallurgy of Steel" and various technical papers read before technical societies. See the London Mining Journal's "Who's Who in Mining and Metallurgy.") We have also retained the services of Mr. Walter Renton Ingalls, New York, editor of the Engineering and Mining Journal, whose name is familiar to most mining men, I think, as the greatest zinc expert in America. We are, therefore, at the present time investigating. When we have the reports from these experts we will form a plan of procedure as to experimentation. I may say, we have received from the Canada Zinc Company, owning the zinc smeltery at Nelson, the entire record of the experiments carried on here for some months, which I believe resulted in a certain measure of success, but which were not entirely successful. This data is being considered by Mr. Ingalls, who will make a report upon it. It is proposed, as soon as we receive and consider all the information that can be obtained as to results achieved thus far in the electric smelting of zinc, to submit that evidence to the best experts we can find, the best metallurgists and chemists on the continent and to be guided by their advice as to the experiments we shall carry on. It is proposed by Dr. Eugene Haanel, director of the Canada Department of Mines, to, if possible, make the experiments in the zinc smelting process at the works at Nelson, provided, of course, the experts recommend it. I had a conversation with Mr. Ingalls, when I was in New York, and he thought in all probability it would be found expedient to take up the Snyder process and, if possible, try to bring it to success.

"Now, I want it to be distinctly understood that this is a difficult problem. We may succeed, or we may not. It may be that we shall spend all the money and not find the solution of this problem, but we know the enormous benefit that will result to this portion of British Columbia if a commercially successful process for smelting low-grade zinc ores shall be found. We are proceeding carefully; very little money has yet been expended. We shall procure the best advice obtainable and probably carry on experiments in a small way in other places where there are experts and small laboratories in which the work may be done on a small scale. Then, when we shall be in a position to attempt smelting on a commercial scale, the work will be carried on at the smelter at Nelson."

LONDONDERRY STEEL.

The five-ton basic open hearth furnace of the Steel Foundry Department, Londonderry Iron & Mining Company, Limited, Londonderry, N.S., is doing excellent work, and proving, so far as known, a world's record breaker.

The regular metallic charge is 12,000 pounds, of which 40 to 50 per cent. is local sand pig iron carrying 1.25 to 1.40 per cent. phosphorus, and occasionally as high as .2 per cent. sulphur. About 20 per cent. of limestone is used.

Heats have been made—from beginning to charge to tapping—in well under four hours, and excellent quality of castings, both chemically and physically, produced. When considered that the furnace is charged by hand, and charging alone takes about two hours, the work accomplished is all the more remarkable.

Owing to the intermittent character of operations common to steel foundry practice, only two heats per day of twenty-four hours are at present taken off; but everything points to a possibility, by continuous operation, of from thirty to forty heats per week of six days.

The furnace is built for producer gas with slag chambers underneath gas and air uptakes, and regenerator chambers under charging floor. The present fuel, however, is oil.

This is the only five-ton basic open hearth furnace in Canada and was designed and built by Mr. William Brown, the company's general superintendent, who also designed and built, assisted by Mr. Frank Smallwood, construction engineer, the entire steel foundry plant. Mr. Brown was for some years open hearth superintendent for the Dominion Iron & Steel Company, Limited, Sydney, N.S., and prior to that held similar positions with several of the leading United States manufacturers.

The death-rate among underground workers in the collieries of the United Kingdom during 1909 was 1.61 per 1,000 people employed, as against 1.46 in 1908. The death-rate of the surface workers was 0.67 per 1,000, as compared with 0.76 in the previous year.

OUR EUROPEAN LETTER.

Miners Assembled in Convention at Brussels. Important International Labour Proposals on Questions of Working Men Inspectors, Wage Agreements, Safety, Female and Child Labour, and the Eight-Hour Day. The London Mining Market. A Survey of the Position on the Rand.

(Exclusive Correspondence of CANADIAN MINING JOURNAL.)

London, August 19th, 1910.

Recently the mining engineers met in world's convention at Dusseldorf and the result was that all records were broken both of attendance and convention generally.

The working miner has just had his turn. In connection with the Brussels Exhibition the 21st International Congress of Miners opened on August 8th. Miners were the pioneers amongst trade unionists in the international organization of their craft, and British miners appear to have led the way. Sixty delegates attended on behalf of the Miners' Federation of Great Britain. The agenda prepared before the conference was a very full one. The appointment of working men inspectors with a practical knowledge of mining was the subject of two resolutions from Great Britain and Germany. The nationalization of mines was put down from French and Belgian sources. Three resolutions on the wages question came from Germany, France and Belgium, all containing indications of the influence of the international movement to secure for all mine workers those improvements in conditions which were obtained by the mine workers of any other special nation. France, Germany and Belgium had resolutions down seeking to secure wage agreements on similar lines to those ruling on the British coal fields.

The improvements of the methods of mining with a view to preventing accidents and securing the greater safety of the workmen was the subject of a resolution from the British miners. German miners were keen on the regulation and abolition of the employment of women and children in and about mines, and on these matters secured the undivided support of the British miners. Belgium, France and Germany all put forward resolutions on the eight-hour day, and there were four other resolutions relating to old age and invalidity pensions. France and Belgium both asked for the regulation of coal supplies, and other matters discussed were compensation for accidents, universal peace and annual holidays.

On the question of mining inspectors the German representative, Herr Friedrich Hooseman, described the German system of inspection, by which the workings are inspected twice a month by practical inspectors familiar with the method of working the mines. A feature of the German system is the appointment of a committee by the workmen at each pit, whose duty it is to make any complaints to the inspectors about the administration of the mines.

The method of appointing workmen inspectors in France was fully described by M. Cordier. The law under which workmen inspectors are appointed was passed in 1890, so the miners have had some twenty years' experience of the system. In the early days of workmen inspection there was stated to be a good deal of hostility on the part of the owners. The hostility was attributed to the fact that the workmen appointed as inspectors were men who had been foremost as trade union leaders, and consequently the employers regarded them as enemies. This feeling of hostility on the part of the owners has been gradually dying down. The terrible catastrophe which happened at Courriéres a few years ago was stated to be largely responsible for the improved feeling of the owners towards the system of workmen inspectors.

In Belgium there is also a law which provides for the appointment of workmen inspectors, but its operation is unsatisfactory to the workmen. M. Ballas explained to the Congress that these inspectors were appointed from a list drawn up by the Council of Industry and Labour, which consisted half of workmen and half of employers. The committee usually disagreed, with the result that the appointment had to be made by the Minister, who generally selected the owners' nominee.

For the first time in the history of the international movement Holland was represented at the Congress. Within the last few years mines have been sunk and coal has been raised in Holland near to the German frontier. The Dutch miners have formed a trade union. Another nationality new to these congresses followed in the person of M. Avramoff, of Bulgaria.

The debate on an eight-hour day was brief. No one opposed its legal enactment. Mr. Wadsworth, M.P., explained that in England this law had increased the number of miners employed, and had not reduced wages. It was too soon to know its effect on the frequency of accidents. A resolution in favour of an eight-hour law from bank to bank was carried unanimously.

In all the sections old age pensions were discussed and explanations were given concerning the position in each nation. Mr. Stanley, M.P., described the British system as an awakening of the public conscience, which promised many improvements on what already existed, particularly as the Chancellor of the Exchequer was meditating unemployment and sickness insurance.

On the subject of compensation for accidents all the speakers advocated the free choice by the patients of the doctor. A resolution was carried demanding that compensation should equal the entire loss of wages.

The miners of the Continent of Europe are eager to follow the lead of the British miners in the obtaining of wage agreements protected by a fixed minimum. The success of this method of dealing with wages in the British coal-fields has so impressed the coal miners of other countries that the Congress has discussed resolutions from Germany, France and Belgium asking for the regulation of wages by agreements containing a minimum standard.

The most interesting disclosure of the debate was the comparison of wages paid in the various coal-fields of Europe. As might be expected, Great Britain stands highest in the list. The figures given by Mr. Harvey showed wages at the present time in the British coal-fields to range between $1.48 a day in Scotland and $1.84 a day in South Wales, and the districts where wages are controlled by the English Conciliation Board. The present wage in France is $1.44 per day, in Germany $1.30 per day, in Holland from $1.14 to $1.20 per day, and in Bulgaria, which stands at the bottom of the list, the wages paid range from 28 cents to 48 cents for

12 hours, and in some cases 14 hours' work at the coal face.

Mr. Elfers, who represented the Dutch miners, frankly stated to the Congress that when they applied for a higher wage and quoted the wages paid in England, the owners told them "the economic condition of affairs in Great Britain is very different, and admits of things being done there which are not possible in Holland." The wages paid in the Belgian coal-field were not given, and though John Wilson, of Scotland, tried to obtain the figures, he failed to accomplish his purpose.

The president of the British Federation brought forward a proposal for further legislation to promote the safety of workers in mines. Mr. Edwards is a member of the Royal Commission on Mines, and with the labours of the Commission as yet incomplete he was somewhat handicapped as to what he was in a position to state publicly to the Congress, but he made so strong a case that the British resolution on the subject was unanimously accepted without discussion.

The Congress then proceeded to discuss the prohibition by-law of the employment of women in the mining industry and the raising of the age of boy labour. There is no direction in which greater strides have been made by the International Congress. When the first Congress was held at Jolimont, twenty-one years ago, large numbers of women were actually employed underground. This has been entirely prohibited while the number of surface workers has decreased.

The French representative stated that in the Calais district some 3,000 young women are employed in the loading of canal barges with coal. With a touch of gallantry he claimed that these girls were as fair and beautiful as any in Europe, but at the end of their day's work they were more like negresses than Frenchwomen. The German delegate stated that they had a law which prohibited the employment of boys underground before reaching 16 years of age, except on a medical certificate of physical fitness for the work. Some 4,000 boys were employed.

The Congress also discussed the quantitative regulation of the production of coal. The French and Belgian delegations, in agreement, demanded that in case of a general strike in a given country the Miners' Federations of the neighbouring countries should limit their production by determined abstention from work. M. Hooseman, a German delegate, remarked that the miners' organizations are not stable enough and sufficiently well organized to enable such a resolution to be put in force. He demanded that the proposal should be referred for supplementary consideration to the International Committee, and this proposal, after some discussion, was adopted. The Belgian delegation proposed then that the International Committee should allot an annual holiday of a fortnight for workers in mines in order to place a check on over-production. This proposal was adopted unanimously. Another proposal to the effect that the International Congress should meet henceforward only once in two years was rejected after long discussion.

The Congress concluded its sittings after having discussed the question of the regulation of the production of coal. The next Congress will be held in London.

* * *

Going back home it is good to see that the mining share markets have revived considerably despite the fact that the holiday period is now well with us. South Africans are slowly climbing into favour again and the more the situation is studied with respect to the Rand the sounder it appears. There is evidence on every side of steady progress being made, and in more than one direction there is probability of improved economy in working as time goes on. The latest information concerning stope drills points to the wide adoption of machines which will almost certainly effect a very considerable economy in development work. Whether this will have as wide an effect as is supposed in some quarters in the way of increased employment of whites is as yet a little dubious, but it would certainly seem that the position is full of possibilities in that direction. Providing that the training of white miners is carried on upon a sufficiently large scale, and in a rational manner as regards selection and organization, it would seem quite impossible that within a comparatively short period a far greater number of white miners will be available, well versed in the technique of stope drilling.

Again, we are unquestionably at the beginning of a period in which the Rand mines will be able to get their power supply very much cheaper than has been the case in time past. The actual cost for a given amount of energy is likely to be decidedly less, and at the same time there will be the facility for using electrical power in many positions where hitherto it has not been dreamt of. How far underground work may, with advantage, be done by electric installations is yet quite an open question, but judging from the success which has attended electrically-driven mining equipment in the United States, it is quite within the bounds of probability that revolutionary changes may come about on the Rand in this connection. The supply of colored labour, though it will always, of course, be subject to fluctuations, appears on the whole to be quite reliable as between one year and another, and the effective value of the "boy" is, beyond doubt, increasing. Slowly, but surely, his habits are getting more businesslike, and there is less difficulty in teaching him his lesson than formerly. This must be put against the fact that if there is any change in the rate of wages paid to the native underground workers, the change will be upwards, and not downwards. When taking a survey of the probabilities concerning Kaffirs, extending over, say, the next twelve months, the East Rand field is not likely to be omitted from consideration.

SUCTION GAS PLANTS IN SOUTH AFRICA.

An interesting paper on "Suction Gas Plants" was read by Mr. H. W. Miller at the last meeting of the South African Association of Engineers, Johannesburg, which may be of particular interest to those having power plants to install where there is a scarcity of water or where conditions prevail rendering the adoption of suction gas plants advisable.

The instance taken was for lighting the town of Bethlehem, in the Orange Free State, South Africa, oil engines being first adopted, three-cylinder, three-crank high-speed vertical engines direct coupled to the dynamo. Three-wire system, two generating machines of 250 volts each, driven tandem fashion, output 20 kilowatts, but the high price of paraffin oil (12s. 6d. a case) was considered a drawback, and when it became necessary to install a larger plant, suction gas engines coupled direct to the dynamos, were adopted. Single generator was decided on, a single 500-volt machine with a static transformer to give 250 volts on the outside lines, being directly coupled to a gas engine of a rated horse power of 600 h.p. The capacity of the plant is 58 kilowatts at a speed of 190 revolutions per minute. One feature was the placing of the producer in a separ-

ate room with the party wall taken up to the roof, thus keeping the engine, dynamo and switchboard as clean as possible.

Prior to the installing of the gas engine the consumption of oil by the oil engine averaged about two cases of paraffin oil per night, so that the average costs for fuel and lubricating oils was about 25s., and as the units generated per month were only from 1,500 to 1,600, the costs were extremely high.

The gas engine installed is a horizontal on the Otto cycle cylinder, 16½ inches in diameter, stroke 23 inches. Two classes of fuel were used—wood charcoal to start and afterwards a low class anthracite coal from Dundee, Natal, of the following composition: Mixture, 2.08 per cent.; volatile matter, 9.40 per cent.; fixed carbon, 72.64 per cent.; ash, 15.88 per cent.; combustible matter, 82.04 per cent.; sulphur, 3.34 per cent.; with a theoretical calorific value of 12,250 B. T. units. The cost of the anthraule coal first used was £1 6d. per ton, and of the charcoal, 50s. per ton of 2,000 pounds.

The following is a record of one week's running:

Number of hours run, 32.
Number of units generated, 368.8.
Coal consumed, 1,949 lbs.
Quantity consumed whilst engine was working, 1,742 lbs.
Quantity consumed while standing by producer, 207 lbs.
Gross amount consumed per unit generated, 5.3 lbs.
Nett amount consumed per unit generated, 4.72 lbs.
Gross cost of coal per unit, .66 pence.
Nett cost of coal per unit, .59 pence.
Average number of units generated per hour, 11.5. units.
Average cost of coal per evening, 34.82 pence.
Cost of fuel for the week's run, 19s. 11¾d.

The cost of this work with the oil engines that this plant superseded would be £7 10s., representing twelve cases of paraffin oil at 12s. 6d. per case.

Consumption of oil during the trial run was 4 pints of cylinder oil and 16 pints of machine oil, the plant being new, oil was liberally used.

The results for the four months, March, April, May and June, were as follows:

Number of units generated, 9,229.
Anthracite coal used, 35,500 lbs.
Charcoal used, 11,500 lbs.
Cost of coal, £25 6s.
Cost of charcoal, £14 7s. 6d.
Weight of fuel burned, 47,000 lbs.
Cost of fuel burned, £39 13s. 6d.
Cost of fuel per unit generated, 1.031 pence.

During these four months coal had increased in price to 23s. 6d. per ton of 2,000 lbs., and charcoal to £2 19s. 8d. per ton.

The consumption of oil and stores during the four months of March, April, May and June, were as follows:

Cylinder oil, 29 gallons at 6s.....	£8	14s.
Engine oil, 28 gallons at 2s. 6d.....	£3	10s.
Miscellaneous stores	£2	10s.
	£14	10s.

This is equivalent to .382 pence per unit generated. The total costs per unit generated for fuel and stores were thus 1.413 pence. Cost of same work with the oil engines would have been £167 16s. for the four months, as against £54 7s. 8d. for the suction gas plant, an annual saving of £340. The total cost of the suction gas plant was £2,400, of which buildings represent £900.

Another instance was given of the working of a small pumping plant at Bellbron by suction gas, where, working eight hours, 19,000 gallons of water were pumped into a reservoir from a borehole against a head of 175 feet, consumption of anthracite coal being 12½ lbs. per hour, costing 37s. per ton. Pump horse power works out at 2.12, so the consumption of coal per pump was 6 lbs. The pump was meter-driven consumption 45 units, equal to 5.625 units per hour. Quantity of electrical energy per pump horse power was thus 2,653 units or 3.56 electrical horse power. Total horse power being 60.5, the consumption of coal was 1.65 lbs. and per pump horse power, 5.88 lbs. Costs come out at one farthing per horse power hour, 81.3 pence per pump horse power hour.

Mechanical efficiency of pumping plant and motor works out at 28 per cent. Cost of pumping for fuel being only 1.16 pence per 1,000 gallons, so that the consumption of fuel per brake horse power may be calculated at 1.3 lbs. of coal.

Professor Dobson in moving a vote of thanks to the author pointed out that at Bethlehem the cost per unit for fuel, stores, wages, capital charges and water, but excluding costs of supervision and distribution was 5.6 pence per unit, a sufficient inducement for small municipalities to adopt these suction gas plants.

IMPORTANT COPPER MINES.

Messrs. Thompson, Towle & Company, of 15 Broad Street, New York, have prepared and published an elaborate table showing the production, estimated earnings, and dividend rate of most of the important copper mines of the United States, Mexico and Canada. There are 55 dealt with, and of these only two are Canadian, namely, those of the British Columbia Copper and Granby Companies, respectively. The particulars given relating to these are as follows: British Columbia Copper Company—Location of mine, near Greenwood, Boundary district; company controlled by Newman Erb; general office, New York, U.S.A.; present rate of copper production, 10,000,000 lbs. per annum; prospective rate of production within two years, 15,000,000 lbs.; estimated cost per lb. of copper, 8½ cents; number of shares issued and par value, 591,709 at $5; estimated earnings per share, with copper at 11 cents per lb. 42 cents, at 12 cents per lb. 59 cents, at 13 cents per lb. 76 cents, at 14 cents per lb. 93 cents, at 15 cents per lb. $1.10, at 16 cents per lb. $1.27; high and low quotations for stock, in 1906 $15 and $12.50, in 1907 $14.75 and $3.25, in 1908 $8.50 and $3.87, in 1909 $9.00 and $5.87, in 1910 $8.75 and $4.75; last dividend paid in September, 1907, amount 40 cents per share.

Granby Consolidated Mining, Smelting & Power Company—Location of mines, at Phoenix, Boundary district; company controlled by American Metals Company; general office, New York, U.S.A.; present rate of copper production, 24,000,000 lbs. per annum; estimated cost per lb. of copper, 10½ cents; number of shares issued and par value, 148,500 at $100; estimated earnings per share, with copper at 11 cents per lb. 81 cents, at 12 cents per lb. $2.41, at 13 cents per lb. $4.03, at 14 cents per lb. $5.63, at 15 cents per lb. $7.24, at 16 cents per lb $8.86; high and low quotations for stock, in 1906 $150 and $93, in 1907 $152 and $60, in 1908 $109.50 and $78.75, in 1909 $110.50 and $91, in 1910 $111.75 and $20; last dividend paid in December, 1907, amount $2 per share.

ESTIMATION OF NICKEL AND COBALT.*

BY C. W. BADGLEY.

Dissolve 1 gram of HCl and HNO_3 in a 250 c.c. beaker and evaporate to dryness. Take up with HCl and dilute to 150-200 c.c., make alkaline and then just slightly acid with HCl. Now pass H_2S through the solution to precipitate any Pb, Cu, As, etc., that may be present. Filter, wash and then boil the filtrate till all H_2S is expelled. Add a few crystals of $KClO_3$ to oxidize the iron and boil for few minutes. Dilute and make ammoniacal and filter. If much iron is present, as in a matte or speiss, it is best separated by the ether method—see below. If there is not much iron the precipitate of the hydroxides may be dissolved in HCl and reprecipitated repeating this three or four times till the iron no longer holds back any nickel. (Shown by evaporating the solution of ferric chloride down almost to dryness in a casserole, any nickel, if present, will show decidedly green.) Or the iron may be more cleanly separated by the basic acetate separation if zinc is not present. If zinc is present the sodium acetate prevents its separation later on.

Combine the several filtrates and make just neutral with HCl using methyl-orange, pheno-phthalein or litmus as an indicator. The solution should be concentrated to 150 c.c.

If zinc is present, add two drops of HCl to the neutral solution and 5 grams $(NH_4)_2SO_4$. Heat the solution to 50 degrees C and saturate with H_2S. If difficulty is experienced in obtaining this precipitate some of the free HCl may be neutralized by adding a few drops of a very dilute solution of sodium acetate, but not sufficient, however, to neutralize all the HCl, or nickel and cobalt will also be precipitated, shown by the formation of a grayish to blackish precipitate.

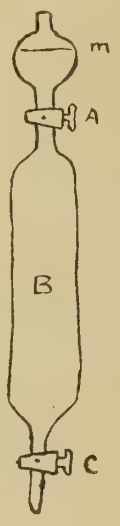
Allow the beaker to stand covered in a warm place for some time, till the ZnS settles and the upper liquid is clear.

Filter and wash the ZnS with hydrogen sulphide water which contains in every 100 c.c. 2 grams of $(NH_4)_2SO_4$ or NH_4Cl. Heat filtrate to 70°-80° C, add 10 c.c. strong solution of ammonium acetate and pass H_2S through the solution which should completely precipitate the nickel and cobalt as sulphides and leave any manganese in solution. Filter and test the filtrate by adding excess ammonia. If this darkens the filtrate repeat the precipitation with H_2S, etc., and combine the precipitates.

Dissolve the precipitated sulphides with HCl and a little HNO_3 and take carefully to dryness. Take up with water and 5 to 10 c.c. H_2SO_4. This is preferable to fuming with H_2SO_4, as in that way a basic sulphate of nickel is formed which is very slow to go into solution. Cool and then make strongly ammoniacal and if any precipitate of iron or aluminium is formed it must be filtered off. To filtrate add from three to five grams of $(NH_4)_2SO_4$ and NH_4OH in large excess and electrolyse over night with a current of 1-2 ampere.

Separation.—Dissolve the weighed nickel and cobalt from the platinum cylinder with hot HNO_3, as small amount as possible being used. Evaporate to dryness. Take up with 4—5 drops HCl and 20—30 drops water and then add 2—3 grams of pure potassium nitrate dissolved in the least possible amount of water, acidulated with acetic acid and filtered if necessary. The presence of cobalt is shown by the formation of a bright yellow precipitate. Stir the solution thoroughly and allow to stand 24 hours in a warm place with occasional stirring. Filter on a small ashless paper, wash with water containing potassium acetate and a little free acetic acid, remove the filtrate containing the nickel and wash the precipitate and filter free from potassium acetate with alcohol. Ignite the precipitate and paper carefully in a porcelain crucible, care being taken not to raise the temperature high enough to fuse the precipitate. Transfer to a small beaker, and digest in nitric acid and sulphuric and evaporate to fumes. Add 5 c.c. water and excess ammonia or ammonium sulphate and electrolyse.

Heat the filtrate from the cobalt to boiling and add a slight excess caustic potash, boil a few minutes, filter and wash with hot water. Dissolve the precipitate through the paper with HCl, make the solution neutral with ammonia, add 2 drops HCl 10 c.c. ammonium acetate, heat to 70—80 degrees C and precipitate with H_2S. Filter with H_2S water, dry and ignite. Allow to cool, add a little ammonium carbonate and heat again to dull redness to volatilize any sulphuric acid that may be present. Cool and weigh as NiS or NiO_2 which contain 78.55 per cent. Ni. This precipitate is generally pure, but may be tested for insoluble and iron which should be deducted.



Separation of Iron by Ether.

Dissolve the thoroughly washed precipitate of ferric hydroxide and included nickel and cobalt, etc., with HCl and evaporate to syrupy consistency. The solution should have specific gravity of 1.100 to 1.105 for the most satisfactory separation. The tube shown is well adapted for the treatment with ether. It consists of bulb B of 200 c.c. capacity, about 8 inches long and 1 1-2 inches diameter, with stopcocks A and C at the ends. The upper one connects with a bulb D of 100 c.c. capacity with a line at m to show when the bulb contains 30 c.c.

Close both stopcocks, pour a few drops of ether into upper bulb, open A and allow the ether to run into B. Close A and warm B with the hand. Open and close C. This will make a partial vacuum in B. Transfer the solution of the chlorides to the bulb D, washing it out of the beaker with HCl (SpG 1.10) and filling D to mark m. Stand the tube in a vessel of cold water, open A and let the solution run with B. Close A and

fill bulb D with ether. Allow the ether to run slowly in B so that it forms a separate layer over the other solution. Mix the solutions by giving the tube a circular motion keeping it cool in the meantime by a jet of water playing on it, to prevent any of the ferric chloride being reduced by the ether by a rise of temperature. Finally close A, shake the tube well, open A to relieve the pressure, return the tube to the jar of cold water and allow it to stand for some minutes to give the liquids opportunity to separate. The upper stratum is the ethereal solution of the ferric chloride and the lower the hydrochloric acid solution of the other metals with usually 1 per cent. of ferric chloride. Open C, allow the lower solution to run into a small beaker, close C, and wash the end of the tube with a little water. Introduce about 10 c.c. HCl (1.10 SpG) into D and allow it to run into B. Close A, shake apparatus and allow it to stand for a few minutes. Allow the lower liquid to run into the beaker which will now contain all the nickel and cobalt. Heat this solution to drive off the ether dissolved in it, add some HNO_3 and evaporate to dryness. Take up in HCl dilute—make slightly ammoniacal—boil, filter and wash. Redissolve the iron precipitate and repeat the operation, adding the two filtrates together. Add these filtrates to the filtrate from the original hydroxide precipitate and proceed as before described.

---

*Paper read before the Colorado Section, June meeting.—Western Chemist and Metallurgist.

PRECIPITATION.

An interesting paper on the subject of precipitation was recently read before the Chemical, Metallurgical and Mining Society of South Africa by Mr. F. D. Phillips, giving the results of samples taken of the solution entering and leaving the separate compartments in some of the extractors at the Knights Deep Gold Mine, the object of the observation being to ascertain what work was carried out by each compartment, and whether it was possible to reduce the consumption of zinc.

First experiment is shown below being the result of sampling a strong extractor two days after dressing. Rate of flow 1.54 tons of solution per cubic foot of zinc in 24 hours. Strength of solution 0.029 per cent. KCN, NaOH 0.005 per cent.

No. of Compartment.	Entering dwt. per ton.	Leaving dwt. per ton.	Extraction dwt. per ton.	Per cent. Extraction.	Per cent. Extraction of Original Value.
1	2.56	0.48	2.08	81.2	81.2
2	0.48	0.14	0.34	70.8	13.3
3	0.14	0.06	0.08	57.1	3.1
4	0.06	0.03	0.03	50.0	1.2
5	0.03	0.01	0.02	66.6	0.8
6	0.01	0.01	....	....	....
7	0.01	0.01	....	....	....

The author desires to know why precipitation falls off at the lower compartments, varying, as is seen above, from 81.2 per cent. extraction in the first compartment down to as low as 50.0 per cent in the lower.

As the result of the above experiment it was decided to dispense with the seventh compartment. Another series of samples were taken after a run of fourteen days, rate of flow 1.46 tons of solution per cubic foot of zinc per day of 24 hours, strength of solution 0.035 per cent. KCN., NaOH 0.0051 per cent. with the following results:

No. of Compartment.	Entering dwt. per ton.	Leaving dwt. per ton.	Extraction dwt. per ton.	Per cent. Extraction.	Per cent. Extraction of Original Value.
1	2.87	1.19	1.68	58.5	58.5
2	1.19	0.75	0.44	37.0	15.3
3	0.75	0.24	0.51	41.3	10.8
4	0.24	0.06	0.18	75.0	6.3
5	0.06	0.04	0.02	33.7	0.7
6	0.04	0.02	0.02	50.0	0.7

This experiment showed that although the value entering was 0.310 per cent. dwt. higher than in No. 1 experiment the extraction was 22.7 per cent. less in the first compartment, probably due to the solution not coming in contact with the zinc shavings. It may be mentioned that the five strong boxes were run a further three days before dressing, and, although it is here quoted that a tail of 0.02 dwt. was shown, the average of the five for the seventeen days was only 0.01 dwt., so that the working with six compartments in place of seven was considered as quite justified.

It was next decided to try a lighter packing of zinc, 330 pounds per compartment or 18.3 pounds per cubic foot, in place of 420 pounds or 23.3 pounds per cubic foot as formerly. The solution entered at 0.28 dwt., rate of flow was 1.88 tons per cubic foot of zinc per 24 hours, strength of solution 0.014 per cent. KCN., NaOH 0.006 per cent.

No. of Compartment.	Entering dwt. per ton.	Leaving dwt. per ton.	Extraction dwt. per ton.	Per cent. Extraction.	Per cent. Extraction of Original Value.
1	0.28	0.08	0.20	71.4	71.4
2	0.08	0.06	0.02	25.0	7.1
3	0.06	0.04	0.02	33.0	7.1
4	0.04	0.02	0.02	50.0	7.1
5	0.02	0.02	....	....	....
6	0.02	0.03	....	....	....

Here it will be seen that the first compartment did practically all the work, the following three compartments precipitated the same amount, namely, 0.02 dwt., the last two were useless. The system of lighter packing was also tried on the strong and slime extractors, but proof soon came from the assay reports that the system would not work except with a very high tail value, so the conclusion was arrived at that the lighter packing was inefficient and the larger weight was again resorted to.

A slime extractor was next taken and the results showed that the first compartment was in greater evidence than either the strong and the weak resulting in a precipitation of 88.9 per cent., leaving only 0.04 dwt. for the last three compartments, each of which extracted 0.01 dwt. Boxes have a capacity of 22 cubic feet to each compartment, amount of zinc 19.5 pounds per cubic foot. Rate of flow, 2.05 tons per cubic foot of zinc per 24 hours, strength of solution, 0.008 per cent. KCN., and 0.012 per cent. NaOH, sampled seven days before dressing.

No. of Compartment.	Entering dwt. per ton.	Leaving dwt. per ton.	Extraction dwt. per ton.	Per cent. Extraction.	Per cent. Extraction of Original Value.
1	0.36	0.04	0.32	88.9	88.9
2	0.04	0.03	0.01	25.0	2.8
3	0.03	0.02	0.01	33.3	2.8
4	0.02	0.01	0.01	50.0	2.8

It was considered that the dressing of these boxes could not be improved upon so they remain as before.

Regarding the cost, it will be readily understood that it would be unwise to try and obtain a very low tail value at a cost exceeding the value recovered, so some calculations were made to find out what the expense would be to precipitate on a value leaving the boxes

at 0.02 dwt. Taking an average over the twelve months ending March last, the figures including power, zinc, white and native labour, solution pumps, lead acetate and smelting, the cost came out at 0.75 dwt. per ton of solution precipitated. It will thus be seen that in precipitating at a tail value of 0.02 dwt. we were well in hand and could even afford to fill an extra compartment with zinc in each box—not a small item when it is considered that we have forty boxes in the extractors house at the Knights Deep Mine.

ELECTRICAL TRANSPORT ON THE RAND.

In view of the almost general exclusive use of electrical power that is expected to occur at the end of the present year on many of the Rand mines, and its probable extension until the use of steam as a motive power has been practically abolished, the paper read by Mr. W. C. Brown before the South African Institute of Electrical Engineers comes at an opportune moment. The writer pointed out that the principal points of a transport scheme adopted must depend upon the output, working hours, length of track and gradients. With these points settled, the proper size of locomotive can be determined, as well as other details, while the success of the scheme will depend upon the type of motor selected, the choice lying between direct current series, polyphase induction and single phase alternating current motors.

The direct current series are so well known as not to need description, but something may be said regarding the polyphase motor, its superior points being superior design, freedom from breakdown, low costs of maintenance and general reliability. It has, however, many disadvantages when used for traction work, the overhead construction is expensive, requires two trolley lines, double sets of insulators, and heavy poles. Speed control of a polyphase motor is limited, the starting torque is inferior to the direct current series motor in addition to other minor disadvantages.

The single-phase motor has a large field of usefulness before it where moderate distances have to be covered. It is better than the polyphase and closely resembles the direct current series motor in its characteristics. Its efficiency is about eight per cent. lower, but in long lines increased efficiency can be obtained by using high voltages, which, however, under some circumstances, may become dangerous. For the Rand conditions, however, the author considers that the best type of motor to use would be the direct current series type.

Two 20-ton locomotives could haul the ore for a 400-stamp battery, and eight or nine tube mills in two 8-hour shifts, from say 4 shafts, the farthest shaft not being more than a mile, providing the track is fairly level. Where steep gradients are encountered, the following formula can be applied:

$$\text{Drawbar Pull} = W.\ X. \pm \frac{W.2240}{N}$$

Where W = tons; X = track resistance, and N = inclination (1 in N).

The useful work of the locomotive may be regarded as .7 of the input at the motor terminals. The complete formula for total horsepower being in this case:

$$\frac{1.42}{S} \left(W.X. \pm \frac{W2240}{N} \right) = \text{H.P.}$$
$$33{,}000$$

Where S = speed in feet per minute.

Drawbar pulls can be obtained approximately from the volts and amperes input as follows:

$$\text{Drawbar Pull} = \frac{A.V.}{.746} \times 33{,}000 \times 0.7$$
$$\frac{\text{M.P.H.} \times 5280}{60}$$

Where A = amperes; V = volts, and M.P.H. = miles per hour.

Maximum starting effort a mining locomotive is capable of exerting is in pounds approximately weight of locomotive in pounds x .25, while the normal drawback pull can be taken as weight of locomotive in pounds x .18.

Many arguments can be brought forward as to whether a single unit of 50 tons or two of 25 tons each running in tandem as one unit should be employed. Both have their advantages and disadvantages, but the author considers that the tandem arrangement was most favourable for mining work.

Hitherto the gauge used on these fields had varied from 18 inches to 30 inches, but now that huge mills are being erected in these fields needing rapid transport, better results would accrue from the use of the local standard railway gauge of 42 inches, and, naturally, heavier rails must be used, as a scheme however excellent in other respects might prove a failure if the rails were too light. Steel tyred wheels are to be preferred to chilled iron wheels, as the former will last three times as long as the latter. Triangles for reversing purposes ought in all cases to be provided. Good shed accommodation is essential, and cleanliness in all direct current machines is necessary, but doubly so in a railway motor, neglect of which might lead to disaster.

In practice it is found to be satisfactory if the converter output is .5 of the total output of the locomotives where four or five are in use.

An instance was given of a railway where the gauge was 30 inches, rails 45 pounds, three locomotives of varying size used, weight of empty trucks 1.1 ton. Tons hauled per month, 106,920; cost per ton mile, 1.66 pence; maintenance cost per ton mile, 0.66 pence.

Cost of current, .75 pence per K. W. H. The operating cost might seem high, but this was due to the grade being 1 in 40, if the grade was level the cost would be 0.74 pence per mile. Three rotary converters 85 horsepower each, are installed, two of which are run in parallel, while the third is a standby.

The 20-ton locomotive consists of two 10-ton units coupled together and run in tandem. Each unit is equipped with two 45 horse power, 500-volt series motors. Steel tyred wheels, 33 inches in diameter, are used, the gear ratio being 5.78. The locomotives are electrically coupled by means of flexible conductors and multiple plugs, by means of which the locomotives can readily be uncoupled if required. Total drawbar pull, 7,000 pounds. Speed, 8.3 miles per hour.

Underground electrical traction has not come into extensive use as yet in these fields, but under the influence of the larger scale operations now in vogue and the better underground conditions, it cannot be expected to be long delayed.

Nova Scotia's output of gypsum during 1909 was 299,045 tons. Eleven concerns contributed to this. Only two or three of the operators attempt to turn the gypsum into manufactured products.

PRELIMINARY NOTES ON GEOLOGY OF THE PORCUPINE DISTRICT OF CANADA.

By A. A. Hassan.

Introduction.

Though the presence of gold in small quantities was known in the vicinity of Night Hawk, Porcupine and Miller Lakes as far back as the year 1896, not much prospecting was done here, until a year ago, when a man by the name of George Bannerman uncovered a quartz vein containing visible gold (June 12th, 1909) in the Township of Whitney, and in less than one year about eight townships have been staked.

For different reasons gold finds and gold mining in Ontario and other provinces of Canada have met with little success, and the mining world at large



A 2-Stamp Mill on Timmins' Property

held a very skeptical view about Porcupine gold finds. Nevertheless, the prospectors continued the search and the assessment work persistently, with the result that they made spectacular gold finds on and near the surface.

The persistent and quiet work has proven very beneficial to the district, as wild-catting was entirely eliminated.

Though about 40 miles away from a railroad, transportation being by boats and canoes over lakes and rivers, and by tramping and packing over the trails, there are now at least six plants in active operation and numerous shafts are being sunk. At this writing one three-compartment shaft is down one hundred feet, showing good gold values.

The accompanying photographs give a good idea about the vein outcrops, and the character and topography of the country in general.

Topographically the country is rather undulating flat ground with occasional swampy depressions. Some higher ridges and knolls are covered with a dense growth of moss and timber. The quartz outcrops are found mostly in the higher places, which makes prospecting comparatively easy.

Water is obtained from the several lakes, numerous springs and swamps.

Geology.

The whole make-up of the country rock, through which the quartz lodes, dikes, or veins came up, is of an ancient Keewatin or Pre-Cambrian Age, probably of the Algonkian Period. This Keewatin is highly metamorphosed.



Dome Mining Co.

The associated pegmatites contain gold in varying quantities, graduating insensibly into granitic rocks in the outlying districts.

However, the most important phenomenon, the guide for the prospector and the inexperienced gold hunter, is the presence of great bodies of schists, and especially of the green chlorite schist, which has developed from the darker horn-blende schist.

There appears to be no doubt that a regional metamorphism took place in this part of the country, having a strike of northeast and southwest, and the accompanying dynamic pressure changed the rocks in the lines of weakness to a schistose condition.

The quartz with the gold-bearing solutions was intruded afterwards in this prepared ground of schistosity.

As the several lines of regional metamorphism run almost parallel, striking northeast and southwest, the lines of weakness have been developed almost at right angles to the regional metamorphism, striking east and

west, and in some instances northwest and southeast, where most of the quartz veins are found.

Which gold surface showings will become gold mines is at present impossible to predict and only actual development work conducted under the direction of capable mining engineers of wide experience in gold mining, can prove the existence of paying gold mines.

The most interesting and characteristic occurrence in Porcupine district in relation to the deposition of the veins, lodes or dikes, is the fact that in some cases the quartz has overflown the schists, and in other cases the schists have overlapped the quartz. Some of the sup-



Five Shafts.

posed quartz veins found on the surface will prove only schist in depth, and vice-versa, the schist on the surface will give place to quartz in depth.

If the gold values are persistent at depth, as the Timmins three-compartment shaft has proved at a depth of 100 feet, Porcupine should have a future as a gold camp.

At this writing the Dome Mining Company also claims good gold values at a depth of 70 feet and the diamond drill cores show visible gold.



Timmins' Quartz Outcrops.

During my visit a domelike quartz vein has been uncovered with spectacular gold showings on one of the claims in Tisdale, and almost every day some surface gold finds have been made either in Tisdale and Whitney Townships, or in the Forest Reserve.

On certain claims in Tisdale Township two men obtained visible gold in every instance after each blast. Sampling is a very difficult task owing to the irregular width of the veins, as some will widen out to 30 or more feet and abruptly narrow down to several inches or disappear in some swamp and come up again in a distance of 100 feet or so.

To get an idea of average gold values on the surface is almost impossible and only prospecting pits and shafts can give more approximate estimates.

In some instances the schist or the carbonates enclosing the quartz outcrops will assay much higher than the vein quartz itself, like in the case of the Scottish Ontario Gold Mining Company.

The Curtis or Foster vein is unique, showing transverse bands of quartz with visible gold on the surface for considerable distance. The walls are well defined in the schist, being from 10 to 20 feet wide. The accompanying photographs show the vein after trenching.

There is another smaller vein on the Foster which is opened up to a depth of about 25 feet with an incline shaft. The quartz with enclosing schist appears to be well defined.

At Oldham, Halifax County, Nova Scotia, the Oldham Sterling Gold Company obtained 2,710 ounces of gold from 940 tons of ore, an average of 2.88 ounces per ton.

In 1872 Nova Scotia derived $59,155 from royalties on coal mined in the province. This amount stands in contrast to the sum received two years ago, $616,933. At the time of the organization of the Dominion Coal Company, the royalty amounted to $142,058. One year later it jumped to $209,830. That was sixteen years ago. The increase has been constant, with the exception of a few "strike" years.

Returns to the Bureau of Mines show that the output of the metalliferous mines and works of Ontario for the six months ending June 30th, 1910, was as follows:

	Quantity.	Value.
Silver, ounces	12,804,992	6,260,197
*Cobalt, tons	189	35,657
Copper, tons	4,634	660,497
Nickel, tons	9,339	2,005,660
Iron ore, tons	39,497	113,082
Pig iron, tons	221,718	3,540,688
Zinc ore, tons	576	5,000

*Only cobalt paid for included.

Shipments from silver mines aggregated 14,787 tons, of which 12,024 tons were of ore and 2,763 tons of concentrates. The former averaged 814 ounces of silver to the ton and the latter 1,017 ounces. Gowganda contributed 334 tons of ore containing 317,925 ounces of silver, and the Lake Superior district a small production, the remainder being from Cobalt proper.

The production for the corresponding period of 1909 was 11,234,382 ounces of silver, valued at $5,379,980.

The nickel-copper mines of Sudbury turned out 9,339 tons of nickel and 4,634 tons of copper, as compared with 6,027 tons of the former and 3,741 tons of the latter for the same period last year, an increase of 52 per cent. and 42 per cent. respectively.

The production of pig iron as compared with the first six months of last year does not show a very large increase, the figures being 221,718 tons, having a value of $3,540,688, as against 211,583 tons valued at $3,197,759 in 1909.

STANDARDIZATION OF ENGLISH IN TECHNICAL LITERATURE.

[Editor's Note.—We reprint herewith a communication from a bulletin of the Institution of Mining and Metallurgy. The character of the paper that caused the disturbance is sufficiently indicated by Mr. Rickard's reply, as is also the nature of the various criticisms.]

AUTHOR'S REPLY TO DISCUSSION.

Mr. T. A. Rickard: Criticism is a compliment, even when intended to be otherwise. Thus I accept Mr. Pratt's corrections and remarks as indicating, at least, a keen interest in the subject. So far, so good. He has put my contribution through the fine sieve of his intelligence and has detected several blunders, but not as many as he claims. Some are typographical errors for which I hope to be absolved; to others I plead guilty, cheerfully.

In turn the critic makes mistakes to which I might advert, but the *tu quoque* would be wearisome and would serve no purpose, for it misses the aim of this discussion, which is not to furnish models of correctness but to lay stress on the need for intelligent interest in the subject.

It may be, as Mr. Pratt says, that my "paper is worse than the average in the matter of careless or incorrect writing"; of that my readers can judge. If it be so, it will serve as an excellent warning to those that aim at perfection. But I confess that if I were to wait until my own statements could be expressed in perfect English, I would have to postpone a useful task until the Greek kalends; on the contrary, I deem it best in speech that may be burdened with blemishes to face the searchlight of criticism, in the hope of performing a practical service with such clumsy tools as may be available. The beam in my eye may look big as seen through the distorted vision of Mr. Pratt's optic, but I despair of the day when I shall possess a vision wholly unimpaired.

For the fun of it, however, I shall make a brief reply to my critics. In the first place, I am charged with breaking an elementary rule in beginning a sentence with a conjunction. It must be remembered that my paper was intended to be read before a meeting; the conjunctions to which objection is made perform their proper function, namely, to indicate the relation of one thought to another. It is an obvious blunder to say that it is "an elementary rule of English composition" that conjunctions "should never be used to begin a sentence," for sentences are normally joined by this part of speech, the second or dependent sentence necessarily beginning with a conjunction.

Whether in referring to three words it is better to say: "All three of them ought to be scrapped" or "All three of these words, etc.," it is not profitable to discuss. For 'sloppy' and 'scrapped,' I do not apologize. As Mr. Sulman says: "It behooves us to watch that our zeal for linguistic purity does not lead us into a campaign of phrase emasculation."

"Suppositious technical article" is open to correction, but I do not like 'suppositiously'; 'supposedly' is better. It becomes advisable to reconstruct the sentence and write: "In an article supposed to be technical."

As to the illuminating remarks on the obviously satirical use of 'inspiring' in connection with words like 'muck' and 'mucker,' I have only this to say, that a joke apparently is not a joke when told to Mr. Pratt.

Mr. Sulman's observations are keenly appreciated. The delicate humour is particularly welcome in the treatment of a subject always in danger of being dulled by pedantry. Mr. Sulman and I shall continue to disagree in regard to the use of preposition-verbs, but we shall not impute all manner of iniquity to each other because of this little difference. I venture, however, to say that there are few preposition-verbs that cannot be replaced advantageously by a verb composed of a single word. Thus the alternative to 'come out from' is not 'emerge,' which may or may not be "journalese," but 'escape.' Thus "we can escape from our inflectional thraldom." Mr. Sulman deliberately 'gets over' a difficulty that I should preferably try to 'overcome.'

Of course, the verbal dentistry to which he is unwilling to submit the names of mining companies is not the only alternative to the use of objectionable titles. He must know well enough that there is no rule for such proper names, that the censor in this case is not a grammarian but Somerset House; and that as regards proper names, in general, a man may spell his name as he pleases and christen his children as he likes.

Mr. Sulman makes a plea for the adoption or coinage of useful words. It is true, we are a polyglot race and our language does reflect the migratory history of our people. Did I not expressly say that "a language grows by such accretions; it is thus that English has borrowed from every country with which our people have traded or fought." But it were better to borrow from the wily Chinaman or the gentle Hindu, introducing a mintage that is foreign but made of pure metal, than to adopt thoughtlessly the nickel pennies and solder coins of American slang and Australian colloquialism. The emphasis is on "thoughtlessly."

Mr. Gregory will forgive me if I deny the prefix of 'professor' to one who is so competent a teacher, for I hold that 'professor' is not titular, but descriptive. However, I agree with him as to spelling reform, in general, even if I did make a bid for the use of *z* instead of *s* in words signifying agency. As regards spelling, I hold that it is not for a self-constituted board at New York to impose wholesale reform on a language that is not solely the possession of the people of the United States. The English language is the common heritage of all the English-speaking nations, and any reform must be undertaken not from an American or a British, an Australian or an African, but an English point of view. That is why I am making a fight against terms that are purely American or purely British, and likely to be unknown or misunderstood outside the place of their origin. As to 'mullock' and Chaucer: 'Mullock' may be good Old English. So is *he wasa-doing of it* and *I guess*, "but in neither case can the appeal to a dead usage—dead in polite society or in England—justify what is a modern vulgarism." I quote from 'The King's English,' an erudite and entertaining authority. Mr. Gregory asks for an equivalent to 'mullock.' Why not 'waste'? 'Mullock' has no precise meaning and no geological significance. At Bendigo the 'mullock' is a mixture of slate and sandstone, at Broken Hill it is quartzite and schist. 'Refuse,' 'waste,' 'barren rock,' 'discard'—there are many words adequate to replace a term so loose.

'Mullock' is Old English. It is a provincial word and the diminutive of 'mull,' meaning to reduce to dust or powder. It means 'rubbish' or 'dirt.' When a man's efforts are worse than futile, he is said to make "a mull (that is, a mess) of it." Perhaps I offer an unconscious illustration. 'Muck,' as used in American mines, is almost synonymous with 'mullock.' These two words are interchangeable and equally objectionable, for the rock separated from the ore in a mine is not filthy, it is not rubbish, and there is no sense in labelling it so.

In regard to 'calcination' it will serve no useful purpose to base current usage on an intermediate phrase of a word that has departed from its original meaning. The root is 'calx,' which in Latin signified a pebble or small stone; we use the diminutive 'calculus' still in surgery and mathematics, the latter application being due to the use of pebbles in making calculations. Subsequently the word was used to denote lime, and this meaning was employed at the beginning of the last century to serve as a root for the word 'calcium,' the name given to the metal separated from lime. Thus 'calc-spar' and 'calcareous' are identified with lime. In the middle ages, the chemists applied the word 'calx' to an earthy product obtained by expelling water, carbonic acid, or other volatilizable compound from any mineral, vegetable, or animal substance by the aid of heat. They also used this term to denote the powdered product obtained by heating anhydrous silica. As Mr. Sulman says, the elimination of sulphur was included in 'calcination' by medieval chemists; but the historical aspect of the case is only serviceable in so far as it gives an intelligent and complete view of the etymology. My point is that the metallurgy of sulphide ores has assumed so great an importance that it is a matter of convenience and in the interest of precision to use a different term when referring to the expulsion of sulphur—and arsenic or antimony, of course. The chemical operation of expelling carbonic acid and water is essentially different from that of dissociating sulphur. In the former case the operation is effected by the application of outside heat, while in the latter, one of the constituents of the substance treated provides most of the heat required. For this reason, the two reactions deserve distinctive names. A metallurgist working on copper ores may not see any need to differentiate between the terms, as they convey exactly the same idea to him; but a zinc-smelter objects to this interchangeability, for his furnace-charge is composed of both 'calcined' and 'roasted' ores.

The Oxford English Dictionary appears to have been unknown to my critics, except Mr. Shockley, but as it is the ultimate (in more senses than one) authority in our language, I do not apologize for quoting it. Most dictionaries require years to compile, and I do not agree with Mr. Stables that even in twenty years does a good dictionary become worthless or "out of date." It is not the function of a dictionary to note the passing phases of linguistic development, but only to record the words that have, after probation, found a place in the language.

Of course, in speaking of 'combs' of gold-bearing quartz, the reference was not to hatchways or waves, but to the comb of a cock—surely an appropriate metaphor. Possibly Mr. Stables had a smile on his face when he made this criticism, as when he objected to my reference to the squandering of a useful inflection "like a sailor on the spree." As to sailors and their sprees, and whether they squander useless money or useful inflections, I do not know, save by hearsay.

A 'vein' typifies the tabular and persistent ore deposit, and there is no reason why it should convey the idea of conformity to the strata; there was nothing in what I said to warrant such an inference. 'Seam' is not a good term for a lode of metal-bearing ore, because it carries the idea of regularity, uniformity, and conformity to the stratification. I agree that c o a l s e a m is better than c o a l v e i n, for 'vein' suggests ramification and irregularity of structure. Thus it is appropriately applied to the persistent (or continuous) tabular (between walls) ore deposit, traversing the country rock in accordance with a system of fractures that may or may not coincide with the stratification, cleavage, jointing, or any subordinate manifestation of structure.

Mr. Stables has misunderstood the reference to the use of the word 'camp.' The objection is not to the usage when justified by an official christening, but to the undiscriminating employment of 'camp' in speaking of mining settlements. His analogies are far-fetched.

Mr. Stables ends his contribution to the discussion with a remark of which no notice might be taken if the absence of a rejoinder were not likely to be misconstrued. It is true that "the suggestions as to the uniformity of expression in technical writing would have met with greater approval had they emanated from the Council," but it happens that the Council was not unwilling that the good work should be undertaken by a member who "assumed the position of mentor in technical literature." That member hopes to be forgiven for "assuming" to write and speak on a subject to which he has devoted many years of his life, and he will not be deterred from fulfilling a useful task by supercilious critics.

As to 'mullock' and its Old English origin, I have answered that feeble argument already. If every term that has been "used by Cornishmen for over thirty years" is to be adopted by technical writers, I can promise the rest of the world a merry time. 'Laccolite' and 'tundra' may or may not, be in the "Century" dictionary; they are in the "Standard"; moreover, these terms are constantly used in the publications of the United States Geological Survey—an excellent authority. As to 'cement' and 'cementation,' I refer Mr. Stables to the "Standard" dictionary, which is later than the "Century."

Mr. Louis offers some pithy remarks, for which I thank him, even if he takes exception to my use of an occasional French or Latin phrase. I refer to Macaulay's retort to Napier.

Next I find that Mr. Shockley has taken up the challenge implied in my suggestions. Such criticism as he offers, uncompromising though it be, is indeed a compliment, for it furthers the purpose of the original paper. The aim of serious criticism is, I believe, to be penetrating but polite. Mr. Shockley has succeeded. As regards the use of *z* instead of *s* in words signifying agency, I take pleasure in quoting William Skeat: "The suffix *-ize* is both Greek and phonetic, and much to be preferred if we are to have uniformity. The suffix *-ise* is French."

Mr. Shockley objects to my use of 'solecism.' This word originally referred to the bad Greek spoken by the colonists of Soli in Asia Minor; it carried no reference to grammar. I believe my use of it is fully justified. As to 'supposititious' in the context criticized, Mr. Shockley and Mr. Pratt are both correct in their objections. It was a slip.

Whether ease of translation be a poper test of lucidity I am willing to leave to my readers. It seems so to me, having known two languages (now forgotten) before learning to speak English fluently. Mr. Shockley says that "if the hypothetical educated Frenchman could talk for five minutes with an American engineer, he would have no trouble in translating the sentence containing 'muck' and 'mucker.'" My hypothetical Frenchman lives in France and is not so fortunate as to be able to converse by wireless telegraphy with the writers of 'muck' in Nevada.

We are told that "the difficulty of translating does not depend so much on the purity of the English original as on the familiarity of the translator with his subject"; apparently the language of an English author, being rendered obscure by reason of local terms or queer idioms, is to be translated successfully by aid of the foreign translator's knowledge of the subject, this knowledge be-

ing sufficient to fill the occasional hiatus created by the unintelligible English of the original. This reminds me of a friend who is engaged in translating 'Agricola' and finds that the author used mining terms now so obsolete that only an occasional illuminating guess will suffice to make sense of the text. But this argument against the use of 'muck' and 'mullock' is not the only one; such localisms restrict the usefulness of technical literature by making it unintelligible to English-speaking persons not living in the region where such terms are rampant.

It is amusing to learn from Mr. Shockley that 'muck' is gaining ground in America; it has actually been adopted in Southern Nevada. When the New Zealander stands on London Bridge gazing at the ruins of St. Paul's Cathedral we shall go to Southern Nevada to learn how to speak English correctly, but not until then.

My critics can defend 'muck' and 'mucker,' 'paddock' and 'mullock,' as they please; they may quote Chaucer or Choctaw; but the fact remains that these words are not used by men of culture anywhere, save as concessions to local slang, and the usage will die out because it is taboo among thoughtful technical writers and editors both in England and America.

Mr. Shockley has more to say concerning the translating of unfamiliar words; he says that the difficulty of translating "I am going home" into French is due "simply to the difference in idiom." He is mistaken; the difficulty is due mainly to the fact that the French language contains no word for 'home.'

As to 'partial' and 'partially,' I refer Messrs. Shockley and Allen to 'The King's English,' in which instructive volume they will find it stated on page 45, that "p a r t i a l l y, which should be reserved as far as possible for the meaning 'with partiality,' is now commonly used for p a r t l y." Again: "The rule should be never to write p a r t i a l l y without first considering the claims of p a r t l y." Where we have two words for two meanings, it is well to devote one word to one meaning, as nearly as we can. I do indeed "wish to avoid all ambiguous words," and in editing manuscript, whether my own or that of others, I delete words of doubtful meaning whenever practicable, choosing those that leave no room for misunderstanding. It happens that I have often noticed the confusion created by the undiscriminating use of 'partial' and 'partially,' when meaning 'in part' and 'partly.' Hence my mention of the matter.

Yes, Mr. Shockley is right in saying that "the ore shows free gold" is not the same as "the ore contains free gold." I accept the correction; the point, however, was not there, but on the use of 'at times,' when 'in places' is meant. His explanation is ingenious, but not convincing. Even if the progress of work underground be measured by the passage of time, the existence of free gold in the ore is not affected by the calendar. Of course, the man who wrote "at times" may mean that on Monday he saw free gold in the ore and on Tuesday he did not; but, in the absence of an interview (which Mr. Shockley may suppose to take place between author and reader, as between writer and translator), I surmise that he meant that gold was seen in the ore at a given place and was not visible when the drift or working had been advanced a few feet farther.

Next we come to 'preposition-verbs.' Mr. Shockley and Mr. Allen both object to my use of the term. One of them suggests 'compound' and both lay stress on the fact that some of the prepositions are used adverbially. Both, however, show that they understand what I mean and neither of them has suggested a better term. 'Compound' will not do; 'preposition-verb' suffices to indicate a verb to which a preposition is tied.

Of course, I use verbs followed by prepositions, as Mr. Shockley says, but my objection was to the unnecessary use of prepositions as part of a verb when single words of more expressive character are available. Mr. Shockley is in error in judging that I do not mean what I say; he will be correct if he states that I sometimes do not say what I mean. After all, language is an imperfect implement, like those tools "ill-adapted to the purpose" with which a golfer harries a little white ball into a small hole.

Both Messrs. Allen and Shockley have detected the error of omitting *on* after 'depend'; I stand corrected, and invite them to accept the alternative 'trusted' instead of 'depended on.' Whether a man who can and is 'depended on' is and can be 'trusted,' I leave to my readers. If Mr. Shockley prefers that "the proceedings" shall "end up with a dinner" instead of "end with a dinner," he is welcome. To me the former suggests nausea.

To Mr. Shockley my objection to preposition-verbs is a "mystery." Let me state frankly that I have found, by personal experience and by editing much manuscript from others, that the use of verbs of this kind tends to clumsy construction and to lack of precision. For one preposition-verb that serves a useful purposes there are half a dozen that are awkward excrescences. Moreover, daily work as an editor has given me sufficient warrant for saying that the tendency is peculiarly British. An American who had been to a rich mine would not say it was the finest mine he had *met with* in his travels"; an Englishman would say so, but an American would say that it was "the finest he had *seen*." If *ended up with* be "a most valuable mode of expressing a shade of meaning," Mr. Shockley is welcome to it. In this and in one or two other minor matters I do not follow him nor is it necessary for me to reply. As to the Bible, if technical writing is to be modelled on that venerable and beautiful relic of old-fashioned English, we shall see strange phraseology. The Bible is inspired poetry, not technical science. Similarly it is beside the point to quote Shakespeare in this connection. We are discussing technical writing, not blank verse. I refer Mr. Shockley to Huxley, Geikie, and Raymond, if he is in search of models of scientific or technical expression.

Mr. Robert Allen also has made some effective criticisms and I appreciate the reasonable tone of most of them. He begins by demurring to my use of 'British.' The English-speaking races use the same language, but with local variations; the variety in vogue in the British dominions is 'British,' as distinguished from the dialect peculiar to Americans. As a sub-dialect of the British I referred to 'Australian' and 'South African.' 'Reef' originally was Australian, it is now British, having been adopted in London and at Johannesburg, but it is not English, because it does not pass current in America. 'Continuous' is no improvement on 'persistent,' although 'persistent' is obviously preferable to 'permanent,' as applied to an ore body.

What carelessness will do to technical writing is exemplified by the title of a recent article in *The Mining World*, of Chicago: 'The Perpetuity of Vein Mines referring to the longevity of mining enterprises or the persistence of veins in depth.' In describing 'field' as "a verbal iniquity" when applied to a mining district, I did not condemn the use of it in a metaphorical and familiar sense, as in "the field of wet metallurgy." Mr. Allen's question is trivial.

As to 'scrapped,' I refer Mr. Allen to the issue of *The Spectator*, published on July 9th, 1910, where he will find a reference to the proposal "to *scrap* the existing Parliament." Co-eval' may be written with or without

a hyphen; on further consideration, I agree with Mr. Allen that the hyphen may be omitted without error, although I like to separate vowels in words beginning with *co-*, and *re-*, as 'co-operate' and 're-invest.'

Mr. Allen's criticism on the use of 'partial' and 'partially' has been anticipated in my reply to Mr. Shockley. I appreciate his humour.

His defence of the preposition-verb is laboured. The quotation from the *Westminster Gazette* does *not* contain a misprint, but a blunder frequently made by those that bespatter their writing with preposition-verbs. Mr. Allen insists that *met with* is "undoubtedly correct" in the sentence "The richest mine I *met with* in my travels." Did the mine come forth to meet him or did he hasten with outstretched hands to meet the mine? It is absurd to defend so feeble a colloquialism. As to whether 'devise' conveys the meaning of 'work-out,' I am prepared to say, as I wrote the sentence quoted.

Mr. Shockley exercises his imagination recklessly in depicting the man who is doing all kinds of things to ascertain what process to adopt. Mr. Allen suggests that 'devise' is to sit in a chair (the "editorial" is scarcely funny) and "*draw up*" a scheme. The fact is the consulting engineer asked one or two friends to dine with him, and when the dinner was satisfactorily concluded, they lit their cigars and discussed the question of metallurgical treatment, roughly sketching a flow-sheet. Thus they 'devised it.' 'Work out' possesses no advantage over 'devise.' We 'work out' the ore in a mine; to 'work out' is to work exhaustively, if it means anything in particular.

Incidentally, both Messrs. Allen and Shockley failed to note that the 'out' in *work out* is an adverb, for it qualifies the verb. It is a preposition used adverbially. The remark that 'away' in *done-away with* is an adverb is hypercritical, for 'with' is a preposition, and my objection is to the adverb-preposition-verb as a whole.

If 'maintain' be not a substitute for 'keep up,' then 'upkeep' is not a synonym for 'maintenance,' as I hold it to be. We use 'maintenance' in a technical sense, on railways, for example, and it is an excellent term, easily understood. 'Upkeep' would puzzle an American and confuse a foreigner.

If Mr. Allen likes to have his ore 'wetted down,' he probably would enjoy the language of a cockney waitress who asked me whether I wanted my soup "hotted up." The surface of ore when 'wetted' is not always "lowered," for the addition of moisture may set in motion chemical processes inducing a swelling of the mass. The reference is usually to preventing the dust from rising.

The criticism of 'intersect' is fanciful. If Wellington Street and Strand 'intersect' each other with propriety why should not a cross-cut and a vein do so without apology? Two lines cross each other, in one case the line of two streets, in the other case the line of an opening made by man and an older opening made by Nature.

Mr. Allen's further remarks on preposition-verbs do not require reply. I leave it to him and to others to use them, if they prefer, but I am confident that this discussion will open their eyes to the clumsy construction resulting from such usage.

I appreciate Mr. Allen's approval of my remarks on the excessive use of the indefinite pronoun. Apparently nobody cares to defend the abuse. Of course, it is absurd to quote Byron and Shakespeare; we are discussing prose in the first place, the prose of to-day, and technical prose in particular. I would paraphrase Lord Rosebery's remark thus: "The less I say about a subject concerning which I know nothing, the better it will be for you and for me." The remark, needless to say, has nothing to do with this discussion; we must not confuse a coincidence with a consequence. Of course, Lord Rosebery might not accept my version of his statement as a faithful expression of his meaning, any more than I accept Mr. Allen's paraphrase of my remarks. He omits the 'you' and 'your,' but forgets that my statement, such as it is, was supposed to be addressed to a meeting of members of the Institution.

Mr. Richardson's contribution to the discussion is useful, although I demur to some of his arguments. Even if our language be "the product of evolution," we need not be deterred from an effort to influence its development at a few points, as at that particular point where it becomes the medium of technical information. In any event, I am unwilling to wait until the language is "dead." Again, if the best of dictionaries be (to Mr. Richardson) an insufficient authority, I marvel that he should be willing to bow to the "sanction of government and finance," as expressed presumably by politicians and promoters. When the directors of Rand companies and Government officials in Australia become authorities on Spelling then we shall go to Southern Nevada to learn English—a procedure that will, at least, have the merit of pleasing Messrs. Richardson and Shockley.

Mr. Richardson's interpretations of 'profitable' and 'payable' call for no special comment; obviously a mine cannot be 'profitable' unless it is productive. 'Payable' does not mean what Mr. Richardson says it means, and only confusion can result from defining one doubtful word in terms of another doubtful word.

This ends my reply. I note with pleasure that nobody has defended the unnecessary plural nor the excessive use of the indefinite pronoun. The discussion has served its purpose, in calling attention to careless writing and the thoughtless use of local terms. Whether those who read my paper agree with all of my suggestions, or not, is unimportant; my aim has been fulfilled, for a few of my countrymen, members of the profession to whose service the Institution is dedicated, have been compelled to "sit up and take notice" of a feature of their work usually disregarded.

Henceforth when a mining engineer takes his pen, whether an eagle's plume or a goose's quill, he will recollect the fuss made by a member of this Institution and he will hesitate, not long enough to be self-conscious but at least long enough to use words thoughtfully. I refuse to believe that the attention drawn to the technicalities of writing will deter men from contributing to technical literature; on the contrary, I hope that the interest of the subject will lead them to use the implement of written speech whenever they have something worthy of record.

THE PREVENTION OF MINE EXPLOSIONS.

[Editor's Note.—In view of the step taken by the Dominion Government in securing the temporary services and advice of Captain Arthur Desborough, H. M. Inspector of Explosives, part of the report issued by the United States Geological Survey, two years ago, is herewith reprinted. This report embodies the recommendations of Capt. Desborough and two other experts.]

RECOMMENDATIONS.

A.—Selecting the Explosives to be Used.

(1) We recommend that the Government of the United States examine the explosives now and hereafter used in mining, with a view to eliminating the more dangerous explosives and to improving and standardizing such explosives as may be considered most suitable for such use, these to be designated by the government 'permissible explosives.'

The term 'permissible explosives' is suggested for the reason that no explosives are entirely safe, and all of them develop flame when ignited; and we advise therefore against the use in the United States of the terms 'safety explosives' or 'flameless explosives,' as these terms may be misunderstood and this misunderstanding may endanger life.

(2) We recommend that the operators and miners of coal use only such explosives as are included in a list of 'permissible explosives,' when the same has been published by the Government, in all mines where there is risk of igniting either dust or gas, selecting that one which their own experience indicates can be used to the best advantage under local conditions.

(3) We also recommend that investigations be conducted to determine the amount of charge of such 'permissible explosives' which may be used to the best advantage under different conditions with a view to reducing danger to the minimum.

B.—Carrying the Explosives into the Mines.

(1) All explosives should be made into cartridges and placed in closed receptacles before being carried into the mine, and the quantity carried into the mine during one day by any miner should be limited as nearly as practicable to the quantity needed by him for use during that day. Handling loose explosives and making them into cartridges by an open light in the mine should be prevented.

(2) Detonators or caps should be handled with great care, and should be carried only by a limited number of responsible persons.

C.—Use of Explosives in the Mine.

(1) Shooting in or off the solid should not be practiced.

(2) The depth of the shot hole should be less by at least 6 inches than the depth of the cutting or mining. The use of very deep shot holes should be avoided as unnecessarily dangerous.

(3) The overcharging of shots (the use of a larger charge than is required to do the work satisfactorily) should also be avoided as unnecessary and dangerous. The proper standardization of explosives used in coal mining will greatly facilitate the carrying out of this recommendation. (See also 'A' 1.)

(4) Shots should never be tamped with fine coal or material containing coal. Clay or other suitable material should be supplied and used for this purpose.

(5) The firing of two or more shots in one working place, except simultaneously by electricity, should not be allowed until a sufficient interval has elapsed between the firings to permit an examination of the working place, in order to see whether any cause of danger has arisen.

(6) Before a shot is fired the fine coal should be removed from the working place, as far as practicable, and the coal dust on the floor, sides, and roof, for a distance of at least 20 yards from the place where the shot is to be fired, should be thoroughly wet, unless it has been demonstrated that the dust in the mine is not inflammable. (See also 'E' 1.)

(7) If gas is known to occur in the mine, no shot should be fired until, in addition to the watering, an examination made immediately preceding the time for firing, by a competent person, using a lamp which will easily detect 2 per cent. of gas, has shown the absence of that amount of gas from all spaces within 20 yards of the point where the shot is to be fired.

(8) Believing that such will be one of the greatest advances which can be made in safeguarding the lives of the miners, we recommend the adoption of a system of electric shot firing, in all mines where practicable, by which all shots in the mine, or in each ventilation district of the mine, may be fired simultaneously, at a time when all miners and other employees are out of the mine.

D.—Keeping the Mine Roadways Clean.

(1) The roadways of the mines should be kept as free as possible from loose coal which may be ground into dust, and of rubbish in which such dust may accumulate, in order to facilitate the removal and wetting of the dust.

E.—Wetting the Coal Dust.

(1) In all coal mines where explosives are used it is desirable, and in all mines containing gas it is highly important, that the dust on the walls, timbers and floors of the working places and roadways should be kept continually wet prior to and during the work in the mine. If, however, conditions of roof or lack of water render this general watering impracticable, at least the dust within twenty yards of each shot should be wet before each firing, and other precautions against explosions should be practised with unusual care.

It is our opinion that a system of watering which occasionally sprinkles the floor only and leaves dry the dust on the walls and timbers of the roadways is useless, and is also dangerous, in that it may generate an unwarranted feeling of security against an explosion.

F.—Special Precautions for Mines Containing Gas.

(1) In any mine where as much as 2 per cent. of gas can be detected by suitable method, only locked safety lamps of an approved type should be used so long as such condition exists or is likely to recur.

All safety lamps should be maintained in good condition, cleaned, filled, kept in a special room at the surface, and carefully examined both when delivered to the miner and when returned by him at the close of each day's work. A defective safety lamp is especially dangerous because of the false feeling of security it engenders.

In the filling of lamps with benzine or other low-flash oils, which should always be done at the surface, special precautions against fire or explosions should be taken.

G.—Use of Electricity.

(1) Electricity in mining operations offers so many advantages, and has been so generally adopted, that no reasonable objection can be made to its use under proper restrictions. The electrical equipment, however, should be installed, maintained, and operated with great care, and so safeguarded as to minimize danger from fire or shock. The fact that the effectiveness of some insulating materials is soon destroyed in most mines should not be lost sight of.

We recommend the following precautions: For distribution underground the voltage should not exceed 650 direct current or 500 alternating current, these voltages being intended for transmission to machinery operating at 500 volts direct current and 440 volts alternating current, respectively. Even lower voltages are preferable. The trolley wires should be installed in such manner as to render shocks least likely; that is, placed either high enough to be beyond easy reach or at one side of the track and properly protected.

(To be continued.)

PERSONAL AND GENERAL.

Mr. Martin Nordegg has returned to Toronto from the West.

Mr. Lewis Hind, of Victoria, B.C., has gone to Mexico on mining business.

Mr. J. C. Murray has returned from a visit to several mining districts in Nova Scotia.

Major Leckie went to Portland Canal, B.C., last month, to investigate conditions on some mineral claims there in which he is interested.

Mr. J. B. Turney, Fernie, B.C., for nine years purchasing agent for the Crow's Nest Pass Coal Mining Company, has resigned that position.

Mr. Charles S. Herzig, president of the Constant-Herzig Company, New York, has been appointed consulting engineer of the Jumbo Extension Mining Company.

Mr. John Hopp, of Barkerville, Cariboo, B.C., is at Harrison Hot Springs, recuperating after ptomaine poisoning, which a few weeks ago incapacitated him for work.

Mr. J. W. Astley has resigned his position as consulting engineer to the Peterson Lake Silver Cobalt Mining Company. At present he is paying a professional visit to Porcupine.

Mr. W. Yolen Williams, of Spokane, Washington, who for years directed the development of the Granby mines at Phoenix, B.C., has been examining the Cliff mine at Rossland. It is stated that Granby people are interested in its proposed purchase and operation.

A party consisting of Mr. Ambrose Monell, Capt. De Lamar, Mr. C. L. Dennison, and Capt. Lawson, recently visited Porcupine. There they examined the Dome mines in which they are largely interested. Mr. Tom Jones, manager of the Buffalo mine, joined them at Cobalt.

Mr. Herbert Carmichael, assistant provincial mineralogist, British Columbia, has been on an official visit to the Engineer mine, Atlin mining division, lately reported to have made unusually rich recoveries from small quantities of gold ore. His report to the Minister of Mines will shortly be printed.

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt.—Recent developments on the Crown Reserve have been very encouraging, and the work accomplished on two veins in particular has largely augmented the ore reserves. On the new vein found about 900 feet down the lake a raise has been put up for a distance of forty-five feet, and for this distance the vein was of good width and carried high-grade ore. Drifts on this vein are being run at the 200-foot level and there the ore is also showing up well. When the drift on the Victoria vein was in one hundred feet the values gave out, and it was believed that the end of the ore-shoot had been reached. The working was, however, carried on a short distance farther, and the high values returned. It has now been pushed some distance past this point, and the face of the drift is still in good ore.

At the drilling contest held in Cobalt recently, the Gowganda team raised the record for local miners by drilling 39¼ inches.

The McKinley-Darragh has declared the regular quarterly dividend of three per cent. with a two per cent. bonus. The works close September 10th and the cheques will be sent out on October 1st. When this is paid the company will have disbursed to the shareholders a total of thirty-six per cent. The property as a whole is in splendid shape and the Savage in particular is making great advances. The small concentrating plant is treating between thirty and forty tons of ore per day and is making good extraction. Some of the veins have also been cut on the lower level, and they are showing up extremely well.

The mill report of the Buffalo mine for the month of July shows that 3,398 tons of ore, averaging 33.75 ounces, were treated and that 88.078 ounces of silver were recovered.

The report is as follows:

Mill ran 597 hours.

Ore milled, 3,398 tons.

Average assay per ton, 33.75 ounces.

Milling Expenses—

Labour	$3,262.31
Power	682.78

On Lot A14 in the Gillies Limit a large gang of men have been at work all summer running trenches. Several promising veins have been uncovered and the owners have decided to install a small plant and sink on one of the best of these. A syndicate with a capital of $600,000 has been organized to work lots 85 and 88.

Figures for the first six months of the present year show that Cobalt and the surrounding districts have produced more than a million and a half ounces of silver in excess of the corresponding period for last year.

The production is as follows:

	Ounces.	Value.
1910	12,804,992	$6,260,197
1909	11,234,382	5,379,980
Increase	1,570,610	$ 880,217

This increase is largely due to the greater amount of concentrates now being produced. The proportion of ore and concentrates shipped is as follows:

	Tons.	Ounces per ton.
Ore	12,024	814
Concentrates	2,763	1,017

As there appears to be no probability of a decrease in the rate of production the total output for the year will probably exceed 26,000,000 ounces. This amounts to practically one-eighth of the world's total production of silver.

Since the City of Cobalt started concentrating their ore at the Muggley mill, they have again become fairly regular shippers. Approximately forty-two tons a day are being treated, that will average about thirty ounces to the ton. Development work under ground is proceeding on all the levels, and two veins are being drifted on. These are narrow but carry high-grade ore.

A new gold field is reported to have been discovered in Western Quebec near the Ontario border. The majority of the finds have been made in Privas Township, and fairly high assays have been obtained. The Grand Trunk Pacific will pass within a short distance of this section.

A compressor plant is to be installed on the O'Connor property which adjoins the Last Chance, near Latchford. A shaft has been sunk about sixty feet and the vein in the bottom shows considerable niccolite and some silver.

It is stated that Mackenzie and Mann have taken up a working option on 4,000 acres of iron lands near Grand Rapids, on the Mattagami River. Five diamond drills and a considerable force of men will be sent in to prove up the deposits. The options cover the Powell, Glidden, Shields and La Duke properties, which are believed to be among the best up there. The entrance of this firm into the Mattagami district is of great importance and if they take up their options, there will be plenty of capital with which to work them. Senator Flynn, of Pittsburgh, also has control of a considerable acreage, and he will send in a diamond drill.

Reports have lately been circulated regarding the position of the Kerr Lake and the possibility of the directors reducing the rate for the next dividend. On account of the large shipments of low-grade ore the reserves in the mine were reported lower than was generally supposed. In this connection it is interesting to note that the management state that the big ore shoots above the 150-foot level have not been drawn on. The rich ore being shipped comes from the 190-foot level and the new vein discovered some time ago. The low-grade shipments are drawn from an accumulation of about 1,500 tons of screenings assaying from 100 to 300 ounces per ton. The mine is keeping up a production of about 200,000 ounces a month from which the profit is approximately $80,000.

On August 29th the T. & H. B. Company paid another dividend of 300 per cent., which is equivalent to $23,263. This last dividend makes a total of 16,900 per cent. on an issued capital of $7,761. Good progress is being made with the new concentrator, which the company expects to have completed about January.

An accident that might very well have ended disastrously occurred recently in the T. & N. O. yards in Cobalt, in front of the new station. The bank at this point gave way and slid into Cobalt Lake, carrying with it several freight cars. A large part of this ground has been made by filling in along the edge of the lake, and the heavy weight of the trains loosened it so that it finally gave way.

The old Green Meehan mine has been leased to Mr. E. C. Kingswell, of Ottawa, and associates. By the terms of the agreement the property is leased for five years and the new owners must spend $30,000 the first twelve months. This property was one of the best known in Cobalt in the early days and shipped a considerable quantity of high-grade ore. No work has been done on it for some time.

A few days ago a large nugget weighing approximately 1,200 pounds, of very high-grade ore, was taken from the winze on vein No. 4 below the 400-foot level of the Temiskaming. This vein has been producing a large amount of very spectacular ore, and is one of the best in the mine. The main shaft has been sunk to a depth of 500 feet, and at this point a crosscut is being run to cut the vein, which it is estimated, is about 60 feet distant. Heavy shipments are being made from the property and the financial position has greatly improved the last six months.

The pressure of the hydraulic air has again practically reached the point at which it stood when the company first commenced operating and the management expects no further difficulties. The trouble arose over the mines using a great deal more air than they had contracted for.

A new discovery has been made at a depth of 286 feet in the shaft of the Ophir property. Where intercepted the vein showed about ten inches of calcite carrying some silver values.

At the Beaver two good finds have lately been made. The first was in the back of the stope on the 200-foot level where the values were supposed to have given out. The first round opened up a rich ore shoot. Some time ago a crosscut was started from the 300-foot level to cut this same vein. In the face of the working it shows about three inches of high-grade ore.

There is at the present time considerable activity in the Matachewan district and quite a number of prospectors are in there staking claims. The district is being widely talked up with a view, it is believed, of creating a boom there this winter. Some very good discoveries have been made, but not enough to create any excitement.

The Nova Scotia has stopped work on the Peterson Lake lease on account of the reopening of the litigation between these two companies. Good results are being obtained by the mill, but no records are as yet available as to the extraction and costs of operation.

The road from Silver Centre to the Keeley mine in South Lorrain has recently been completed, and the Wettlaufer is now shipping ore. Several cars are already bagged and in the ore house, but the roads were formerly so poor that it was practically impossible to make shipments. The Mines Power Company is rapidly completing the construction of the sub-station at Beaver Lake and power will then be ready in a short time. The Wettlaufer has a twelve-drill power-driven compressor already set up, and when power is obtained the work at the mine will be carried on on a much larger scale. The Haileybury Frontier also has a new compressor installed, and has erected a number of new buildings. The shaft has been sunk to 150 feet and a crosscut is being run to open up the vein that showed on the 65-foot level. Trenching on the Harris Lorrain, Alice Lorrain and Marathon properties has been productive of encouraging results. On the former a vein was picked up near the Wettlaufer boundary that carries smaltite with some silver. It has been decided to sink a 100-foot shaft on it. A new vein was also discovered recently on the Alice Lorrain and this will be developed immediately.

Gowganda.—It is reported that the control of the Boyd Gordon has passed into the hands of Buffalo people. Under the new management more extensive development will be undertaken.

Good ore is being obtained on the O'Gorman and Sweet claim near Hangingstone Lake. The shaft is down sixty feet, all in ore, and the vein, although narrow, is very high grade.

The latest discovery in the Elk Lake section is a vein of galena found near Thin Lake. The vein is from four to five feet in width and some exceedingly fine ore has been uncovered.

Samples from the different properties in Elk Lake and Gowganda have been sent to the Department of Mines. They will be displayed in the mineral exhibit at the Dominion Exhibition at Toronto.

It is reported that the Ottawa Gowganda Company, operating near Lost Lake has made a good surface discovery.

Some fairly good discoveries have lately been made on properties near Elk Lake. A small vein carrying considerable silver was found on the Ribble-Emery. No sinking has been done as yet, but a shaft will shortly be started. A rich surface discovery has also been made on a claim owned by Messrs. Otisse and Currie near Hubert Lake. Work on the Montreal James has been stopped. This is one of the Julian Hawthorne properties.

A four-inch vein of calcite carrying good values in native silver has been found on the Crawford claims in Gowganda. This property adjoins the Reeves Dobie.

Porcupine.—A half interest in the Sandy Falls power has been purchased by the Timmins McMartin syndicate. The power plant will be only a few miles from the mine and this property will undoubtedly be one of the heaviest users. The preliminary surveys will soon be completed. The small stamp-mill on the Timmins property is producing good results, and recently two tons of ore were treated that produced over $200 per ton.

The stockholders of the Porcupine Gold Mines Company have authorized the installation of a stamp-mill. The company's engineer states that there are ten tons of ore on hand worth $1,000 a ton.

On the Hylands property some free gold has been found, although but little work has so far been done. The owners have decided to put in a small mill with two stamps, as soon as the winter roads are in condition.

For the purpose of centralizing their efforts in looking after the best interests of the district, the mining men in the camp have formed a mine owners' association. The association already has members from many of the most important properties and has elected its officers. The power and transportation questions are those that will probably first engage its attention.

BRITISH COLUMBIA.

Cariboo.—Information received from Cariboo is to the effect that the long-continued dry weather is making the gravel-washing season a short one. Unless copious rain shall fall in the early part of the autumn, the yield of gold from the placer mines may be expected to be short of the quantity regarded as an average of production in recent years. On some placer mines there has been a "clean-up," and a resumption of operations this season will only be practicable if the water supply shall be renewed.

Additions to ditches and flumes, and the provision of more storage reservoirs, etc., is being continued on some of the properties near Barkerville, owned by Mr. John Hopp. Here, as elsewhere, shortness of water will curtail the washing season this year; thus far, however, results have been fairly satisfactory, the amount of gold recovered having been fully up to the average of seasons in which water was not plentiful. Operations on this group of mines are on a larger scale than on any other in Cariboo district.

Lillooet.—Placer mining is carried on along several streams, including both north and south forks of Bridge River and Tributary creeks—Alexander, Sucker and Cadwallader Creeks, and on Cayoosh Creek. There are quartz properties, too, some of which are being operated. Last year's official returns accounted for a recovery of between $6,000 and $7,000 in gold, and this year an encouraging increase in production is looked for. At the Ben d'Or mine there is a 10-stamp mill; at the Lorne there is an arrastra, and others at the Pioneer and Woodchuck. There is also a 10-stamp mill in connection with the Anderson Lake M. & M. Company's property on Gold Creek, a tributary of McGillivray Creek. The Wayside group, on Bridge River, is being developed by a Cincinnati syndicate. Facilities for transportation are generally lacking in the parts of the district where promising mineral claims have been prospected, but it is hoped this difficulty will be overcome in the near future. The provincial mineralogist, Mr. Wm. Fleet Robertson, is in the district, making an official investigation of mining progress and conditions, and the publication of his report should assist in drawing the attention of men with capital to the good prospects for profitable mining here.

East Kootenay.—Apart from operations at the St. Eugene and Sullivan lead mines, both being operated by the Consolidated Mining & Smelting Company, several mines are being developed. It is planned to erect a concentrating plant for the Aurora, situated across Moyie Lake from the St. Eugene, where a large quantity of ore has been opened by prospect workings. The Society Girl, situated about 2,000 feet higher than Moyie Lake, and distant two miles southeast of the St. Eugene mine, has had two adits driven, and during the summer wagon-road construction work was done, so that ore might be hauled to the railway for shipment. Other claims near Moyie Lake are reported to have good showings of ore, but these have not yet been considerably developed.

Placer mining is being done on Wild Horse Creek, Bull River, Perry Creek, and other streams. Of these that on Perry Creek appears to be the most important, for there a steam shovel handles the gravel and about 20 men are employed.

Coal mining in southeast Kootenay shows increased production. The output of the Crow's Nest Pass Coal Company's mines has been up to 5,500 tons on one day; the company's payroll for July required a disbursement of $193,856. The Hosmer Mines, Limited, is producing 700 tons a day, of which half is made into coke.

West Kootenay.—Two mines in Ainsworth division are resuming operations, namely, the Highland, near the town of Ainsworth, and the Blue Bell, across Kootenay Lake from that place. The company working the former late last year and in the beginning of this year, got behind in its payments so had to stop work. A new company, organized recently in Vancouver, put men to work in August; its advertising methods and expenses have been such as are unusual in connection with really good mining enterprises, yet since the mine was, some years ago, a profitable producer it would scarcely be fair to condemn it until it shall have been given a fair chance to again prove itself of commercial value. The Blue Bell, on the other hand, is being financed by French capitalists, who are stated to be providing the additional capital requisite for obtaining hoisting and pumping machinery, and making additions to concentrating mill equipment. Last year's output from this mine was approximately 60,000 tons of ore, yielding about 70,000 ounces silver and 6,500,000 pounds lead, beside much zinc concentrates put aside for marketing when conditions shall be favourable for making a profit out of it.

Slocan mines continue to make progress, with some of them shipping ore. The latter include the Ruth and Richmond-Eureka, near Sandon, and the Van Roi, Standard, Mollie Hughes and Eastmont, near Slocan Lake. Of the latter the Van Roi's production figures of ore concentrated are large, while the others have shipped crude silver-lead ore—the Standard about 900 tons, the Eastmont 600 tons, and the Mollie Hughes 300 tons. In Eastern Slocan, wagon-road communication to the Lucky Jim and Rambler-Cariboo mines has been provided and materials are being taken in to replace mine buildings, tramways, ore-bins, etc., destroyed by the forest fires of July. Both mines will again be shipping ore before the close of the autumn. At the Whitewater, too, matters are being shaped for an early resumption of mining, wagon-road connection being provided to give an outlet to the Kaslo & Slocan Railway at Sproules, 14 miles from Kaslo.

Activity prevails in parts of Nelson mining division. Near Nelson, at the Granite-Poorman and Athabasca gold mines, particularly, conditions are satisfactory. Road-makers are making provision for hauling from the Mollie Gibson, on Kokanee Creek, to Kootenay Lake; in the opposite direction from Nelson the Queen Victoria mine is shipping copper ore to Trail, shipments ranging from 200 to 400 tons per week. At Ymir, the Yankee Girl is most active, its shipments to Trail having reached a total for the year to the end of August of 3,700 tons of ore. Last year's production was about 3,200 tons, which averaged 1.4 ounces gold and 7 ounces silver per ton, and 6 per cent. lead. Work has been resumed at the Wilcox mine, after several years' idleness; this is a gold mine, having its own stamp mill, situated in the neighbourhood of the one-time productive big gold mine, the Ymir. In Sheep Creek camp, the Queen, Nugget, and Mother Lode are the leading mines; the last-mentioned is not now producing, but its development is on a larger scale than in any other mine in the camp. Other claims in this and the neighbouring Bayonne district are being given much newspaper publicity, but as yet they are generally non-producers. The Emerald mine, near Salmo, has this year shipped about 1,200 tons of lead-silver ore, while the Second Relief, at Erie, makes an occasional small shipment to Trail, whether of concentrate or gold quartz is not stated.

Rossland mines shipping ore are the Centre Star-War Eagle group, Le Roi, Le Roi No. 2, and Velvet. The total of the Centre Star to the end of August is approximately 128,000 tons; Le Roi No. 2 has shipped 22,000 tons, a small part being concentrate from some 10,000 tons of low-grade ore put through its concentrating plant. Le Roi is still sending from 200 to 300 tons of ore to Trail each week; the Nelson Daily News gives its total to end of August as nearly 10,400 tons, while the Rossland Miner states it at about 7,300.

The northern part of West Kootenay is not doing much productive mining at present, the only mine shown as shipping steadily being the Silver Cup, in the Lardeau, owned by the Ferguson Mines, Limited. Several other properties in that district are also being worked, but are not shipping much ore. Placer mining is still being done in the Big Bend district, Columbia River.

Boundary.—With the exception of a reduction in output at the Granby Company's mines, following the recent destruction by fire of one of its four shipping units, there is little change

to note at Boundary district mines. Granby tonnage is now equal to the requirements of four of its blast furnaces, instead of six as was the case prior to the occurrence of the fire. Renewals are being made at the mine, so production will probably be normal before the close of autumn. The several mines of the British Columbia Copper Company continue to ship to their smeltery an aggregate of between 8,000 and 9,000 tons per week. The Snowshoe's output is from 1,600 to 2,000 tons of gold-copper ore, shipped weekly to the Consolidated Company's works at Trail. A resumption of work at the Fontenoy and Waterloo gold-quartz properties in Camp McKinney, has been announced.

Similkameen.—An endeavour has been made to draw the attention of mining men to the good field the lower Similkameen district especially offers for the outlay of money in developing mineral claims. The comparatively large profits the Hedley Gold Mining Company is making—the report for the quarter ended June 30th having shown, as published, a net profit of $99,154, equal to three times present dividend requirements, which are three per cent. quarterly, are pointed to as indicative of the possibilities of mining in this district.

Kamloops.—The Standard states that 25 men are employed straightening and retimbering the shaft of the Iron Mask mine, near Kamloops, and that when this work shall be completed mining will be resumed with a larger number of men engaged in the mine. The shaft is 600 feet in depth; much drifting and stoping was done in the years 1904, 1905 and 1906, and about 25,000 tons of ore was taken out.

Coast.—Experiments with oil as fuel in copper smelting have been made recently at the old smeltery at Van Anda, Texada Island, under the supervision of Mr. Thomas Kiddie. Results were sufficiently satisfactory to warrant a continuance of operations. It is yet early, though, to assume that it will be practicable to smelt ore on a commercial scale with oil as fuel, but there seems to be a reasonable chance of success being achieved. The Marble Bay mine is closed temporarily, so far as ore production and further development are concerned. Repairs are being made to the main shaft, and the mine workings are being wired for lighting by electricity. A comparatively large quantity of copper ore (bornite), also containing good value in gold and silver, has been shipped to the smeltery at Tacoma, Washington. Work is in progress at both the Copper Queen and Cornell mines, also on Texada Island, and near the Marble Bay mine. During recent weeks some high-grade ore, running in value to more than $100 per ton in gold, silver, and copper, has been shipped from the Cornell.

Forest fires have destroyed the shafthouse, bunkhouses and other surface property of the Canadian-American Exploration Company on Valdes Island, but the machinery and plant were saved, the miners piling sacks of ore over them when the fire was approaching the houses. At the neighbouring Jucky Jim mine the buildings were saved owing to there being fire hose and a good supply of water available. A logging tramway, which gave connection with tide-water three miles distant, was also destroyed in places.

Portland Canal camps are still drawing attention, but published statements are now not nearly so sensational as earlier. Reports are to the effect that on five or six properties development work of some importance is being done, while the Portland Canal Mining Company is hastening the completion of the first unit of its concentrating plant so as to give its ore a bulk test as soon as it shall be practicable to do so—probably during September. There is no doubt as to the bona fides of this company, for it has done more development work than others, has constructed an aerial tramway 8,500 feet from mine to mill site, and has erected and equipped a concentrator; besides, it has put in an air compressor. Many prospectors attracted to Stewart by glowing reports, have gone to Goose Bay and other parts of Observatory Inlet, an arm of Portland Canal. Good reports come from Hazelton, Skeena River, of finds of galena ore in the country around that town. Specimens of ores are promising and outcrops indicate occurrence of ore bodies, but not much development has yet been done. Assurances from responsible men encourage the expectation of important developments resulting from the opening of some of these ore bodies, which are situated within easy reach of the Grand Trunk Pacific Railway route.

SOUTH AFRICA.

Johannesburg, July 25.—At the Transvaal University College Mr. Lionel Phillips, one of the Rand mining magnates, in lecturing on the "Rand Gold Deposits" pointed out that mining operations on the Rand could, with profit, be carried on to a depth of at least 7,000 feet from the surface, and that, therefore, the Witwatersrand goldfield would not be exhausted during the present century.

It is generally considered here that, owing to the extremely unfavourable conditions for deep mining prevailing on the Rand, that mining operations will be possible at a much greater depth than 7,000 feet from the surface, providing an adequate method of hoisting is available, and the coming extensive use of electrical power for all mining operations on these fields seems the best likely to afford a solution to the deep winding difficulty. It must not be forgotten that on the Rand, as the mining operations deepen, the rate of increase in underground temperature steadily decreases. At first it was estimated at 1 degree Fahr. for every 82 feet, but when actually tested down to a depth of 1,000 feet, it was found to be 1 degree Fahr. for every 100 feet. Recent observations down to a depth of 3,500 feet, however, showed 1 degree for every 208 feet, and more recent tests have shown that over 4,000 feet the rate of increase was only 1 degree Fahr. for every 255 feet. There seems every likelihood of a constant decrease in the temperature gradient as greater depths are attained on these fields. Mines are working here at a depth of 4,500 feet without the slightest attempt at fan ventilation and, as a matter of fact, are dependent on natural ventilation and the compressed air used for power purposes. Eventually, it seems possible that the temperature gradient will fall as low as 1 degree Fahr. for every 400 feet or 500 feet in depth, so that as regards temperature that does not at present seem likely to form an insurmountable obstacle to deep mining on these fields. Then it must not be forgotten that the native labourer here is capable of working efficiently at much higher temperatures than the white labourer and this, again, is a valuable local asset to the prospects of ultra deep mining on these fields. The atmosphere here is also much drier than in other parts of the world, whilst the hanging and foot walls leave nothing to be desired. The banket rugs are equally hard and capable of standing a pressure of 7,000 pounds per square inch and, even if crushed, are not like coal seams, but will still retain their value. No matter what is said to the contrary the Witwatersrand is destined to become the scene of the deepest mining operations in the world and is destined for many years if not for centuries, unless some new field is discovered to continue to be the premier gold producer of the world.

Mining engineers and managers on these fields have been much concerned of late in the proposal of Mr. Hugh F. Marriott, of the Eckstein group of mines, that, instead of the ton milled being used as the basis of mine values and costs, the square fathom should be substituted, and at the Eckstein mines this is actually being done. For a long time past consulting engineers and mine managers have been strenuously striving, with considerable success, to bring down the working costs per ton milled and several of the large mines have been striving for first positoin in this respect. Mr. Marriott, however, is of the opinion that in the struggle for low costs per ton milled, the profits have been sacrificed owing to unpayable ore having been out

through the mill so as to produce a big divisor and low average cost per ton milled. It is, of course, quite possible, that in the recent rage for big outputs, mills and low costs, some managers may have put through the mill unpayable ore, but not when payable ore was available; but it is difficult to see how the substitution of a square fathom for a ton milled unit will prevent the practice. Coupled with this charge, however, Mr. Marriott is about to estimate the efficiency of the mine manager by the profits produced, but in that case the risks are much greater that the rock put through the mill may not be a true record of the capabilities of the mine, as there will be an inducement to exploit the rich sections and leave the poorer stopes to the next manager. At the Village Main Gold Mine, Mr. Marriott's proposals have been carried out and the profits have been thereby increased, although less tonnage has been milled and the costs have been slightly increased, but the better results are admitted to have been produced by revaluing the mine and abandoning the stopes which were estimated as unpayable, but it is difficult to see what this has to do with the tonnage or fathomage system proposed as the practice is equally applicable to both systems. This new proposal has created some annoyance amongst the American consulting engineers and mine managers employed by the Eckstein group, several having thrown up their positions rather than attempt to carry out Mr. Marriott's suggestions, whilst one has written a strongly worded paper to one of the leading engineering institutions of the Rand, which, at the present time, is down for discussion. It would seem that more is being made of the proposals than originally intended and probably the object of Mr. Marriott in removing the tonnage unit is to get it out of the way altogether, thereby enabling the consulting engineers and mine managers to devote their sole attention to increasing the profits no matter whether the tonnage costs increase or not.

The Vogel Deep Consolidated Mine is about to be closed down, the shareholders declining to find the necessary additional capital. The circumstances are somewhat peculiar as the reef was first struck about twelve years ago, since which date the company has undergone two reconstructions. It is most unusual here for a company to be reconstructed twice after proving the reef, and the general opinion here is that the present unsatisfactory condition of affairs is due to having spent the company's capital in erecting the mill before the mine had been sufficiently developed. The first development drives showed the reef to be quite payable, but these results were not confirmed by subsequent drives and stoping operations, whilst, owing to the bad hanging wall, it was found necessary to stope wider than originally anticipated, thus reducing the average value from eight to five dwts. It is urged that if the mill could be kept fully employed, then the mine could be worked without loss, and it certainly does seem strange that after considerable work has been done in the mine, it is found impossible to keep the mill fully employed. The difficulty is one entirely of mining and, if it was only grappled in a proper manner, it is abundantly clear that it would be quite unnecessary to close down both the mine and the mill.

The Government returns issued to-day show that the value of the Transvaal mineral output in June was as follows: Gold, £2,648,758, a decrease of £40,340 as compared with May; coal, £88,279, an increase of £3,120; silver, £7,534, an increase of £162, an increase of £3,120; silver, £7,534, an increase of coal and base minerals show a record output in value. No returns are issued monthly regarding the diamond industry.

Regarding the gold industry there were 103 mines producing in June, as compared with 106 in May; 9,853 stamps at work as against 9,912; 182 tube mills as against 177; whilst the total output in ounces of fine gold was 618,339 as against 629,873 in May. It must be remembered that June had one less milling day than May.

With regard to the coal trade there were twenty-seven collieries at work, producing saleable coal to the extent of 360,618 tons, which realized an average of 4s. 10d. per ton at the pit's mouth. The highest previous tonnage of coal sold was in May being 347,546 tons. The average selling price of coal at the pit's mouth was the lowest yet obtained in the colliery history of the Transvaal. A new coal association started on July 1st and slightly better prices are now anticipated.

The base mineral output of the Transvaal continues to expand steadily and for June the details are as under: Copper ore, 437 tons, value £8,873; tin, 306 tons, value £28,357; magnesite, 44 tons, value £132; flint, 249 tons, value £1,921; lime, 12,115 tons, value £19,200; asbestos and graphite, 5 tons with a value of £245; the total value being £58,728. The output of both tin and copper ore is expected to show a steady increase. For the other base minerals there does not seem much of an immediate future. An iron and steel industry is being started, but so far it is only intended to use up the scrap.

The half-yearly production of diamonds in the Transvaal was 1,147,779 carats of a value of £721,606, from January to June, 1910, whilst the production for the year ending June 30th, was 2,098,527 carats of a value of £1,317,479.

In the whole mining industry of the Transvaal there were employed during June 26,697 whites and 231,782 natives, the latter showing a slight decrease and the former an increase of 225.

The gold mines made an estimated profit in June of £955,170.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—In view of the fact that the bounties on steel are expiring next year, the Nova Scotia papers are beginning to agitate for higher duties as a measure of compensation.

In concluding a long letter on the subject, a correspondent of the Halifax "Chronicle," says:

"At the present moment the iron industry of Nova Scotia is in jeopardy. The federal subsidies all expire by next year and are not to be renewed. They were given to obviate the necessity of levying higher protective duties on a number of iron and steel products. But if Parliament, frightened by the vociferous campaign in the West, should refuse to grant compensatory duties in lieu of them, a great catastrophe in Nova Scotia must inevitably follow.

"I have no means of knowing exactly how much capital, home and foreign, is invested in the iron and steel works and coal mines of this province, but surmise that it is in the neighbourhood of $120,000,000. Nor can I tell offhand how many persons are employed in them; or how many more benefit by the labour of these men and by their trade and custom. It must be obvious to us all, however, that our duty as Nova Scotians, whether we be Liberals or Conservatives, is to use our best efforts to save these, our only great industries, from the fate that just now appears to threaten them."

Halifax.—The Nova Scotia Steel Company, since the re-lighting of the blast furnaces, has been putting all previous records for daily production far in the rear. Before the improvements in this direction were completed, the average daily output was 180 tons; since that time the average has been greatly increased. One day the output was 230, and on another it reached 275 tons.

Sydney, Sept. 10.—Manager Butler, of the Dominion Iron & Steel Company, said to "The Star" this morning: "Enquiries

are being received from Australia, South Africa, India, and other places for our rails, but as long as the Canadian demand keeps up to the output we are not very particular about the foreign orders. One more Bessemer furnace will be erected,'' said Mr. Butler. ''The order has already been placed, and the work will be begun this fall. It will take about three months to complete the work. Unskilled labour is hard to obtain here.'' Mr. Butler said the new immigration law requiring foreigners to have $25 before entering the country no doubt has an effect here. In reply to a question as to when the new blast furnaces would be ready for operation, Mr. Butler stated that it would be about six months. The steel work on the new furnaces, which was being done by the Canada Foundry Company, was being held back by several unforeseen delays. The Steel Company has bonded the iron areas at St. George's Bay, Newfoundland. There is a vast deposit of red hematite at this place.

NEW BRUNSWICK.

St. John, Sept. 9.—At a meeting of the shareholders of the Disrael Asbestos Company here to-day, it was decided, after a very lively discussion, to reorganize, pay off indebtedness and proceed with development work.

ONTARIO.

Kenora, Sept. 2.—Gold mining operations received an added stimulus Wednesday, when R. B. Nickerson, manager of the Mikado mine, brought in $1,200 gold bullion from the mine, the result of two days' run from the debris. The twenty-stamp mill will commence running in less than two weeks, and, as there is a good showing of ore in the stopes, returns are expected to be large. The Mikado mine, which is fifteen miles out on the Lake of the Woods, has been closed down for some seven years, and its reopening marks a new interest in this district.

ALBERTA.

Medicine Hat, Sept. 1.—In the closing hours of Sir Wilfrid Laurier's tour, the tariff question has again become paramount.

This time the city council and coal operators of Lethbridge pointed out to the government that reciprocity with the United States would enable the operators to find a market for their surplus supply in Montana. The United States farmers, seizing upon the premier's presence again, stated that they were satisfied with his utterances with reference to the tariff, but claimed that Hon. George P. Graham's idea of railway liability was not acceptable.

The coal industry around Lethbridge has attained a large growth, and, although the present supply is equal to the demand, new mines which are now opening will require a more widely extended market. Montana imports a considerable quantity of Lethbridge coal in summer time, but, as the local demand increases in winter, the supply for export falls off. Several members of Sir Wilfrid's party inspected shaft No. 6 of the Alberta Railway & Irrigation Company this morning, and ''The World'' correspondent was informed that people in Montana regarded the tariff against Lethbridge coal as a hardship, as being so far removed from any other source of fuel supply. Alberta coal enters that state without competition. It is estimated that $9,000,000 is invested in the coal industry around Lethbridge, and about 1,400 to 1,500 men are employed. The output of all mines cannot so closely be estimated, but the one in question has sufficient coal in sight to keep the plant busy producing 1,800 tons per day for 20 years. A farmer may drive up to the pit mouth and receive dusty diamonds for $3.85 per ton. The dealer in Lethbridge gets $4.50 per ton delivered, while Winnipeg is said to pay $8. The railways, however, are the worst sinners, and it virtually costs more to carry coal than to produce it. Local officials told the premier plainly that exclusive railway charges were killing the industry.

BRITISH COLUMBIA.

Fernie, Sept. 2.—The inquest to inquire into the circumstances surrounding the death of James Robey, who had his back broken in Coal Creek mines, was held in the provincial building last night. Only three witnesses were examined, and as none of these actually saw the accident, it was impossible to determine exactly how it happened. The jury came to the conclusion that the man had been killed by a runaway mine car and that the victim himself was responsible, for the reason that he had used a defective chain. The jury also recommended that the officials of the coal company use more care in seeing that the chains and other equipment in their mines be kept in good condition.

Nelson, Sept. 2.—A deal has been consummated by which L. B. Orchard and principals of Toronto buy an interest in the Evans group, situated on White Fish creek, a tributary of the St. Mary's River, about 20 miles west of Marysville, for $10,000 cash. The owners are William and Charles Evans, of Marysville, James Lemmon, of Moyie, and William McAllan, of Nanaimo. The claims carry copper, gold and silver, while a trace of nickel is known to exist. The ore is of medium grade, the veins running nearly east and west through a diorite formation. Stuart J. Schofield, of the Dominion Geological Survey, classes this formation as being identical with that of the copper-nickel mines of Sudbury, and speaks very highly of the district. Mr. Orchard is at present in England with a view to interesting further capital in the development of the group.

MINING NEWS OF THE WORLD.

WEST AFRICA.

The West African Chamber of Mines states that the gold yield of the colony for July was 15,564 ounces, valued at £58,551, a decrease of 1,630 ounces, or £12,437, as compared with the preceding month.

RHODESIA.

The total output of gold from Rhodesia for the month of July is cabled as 46,367 ounces, valued at £195,233, as against 51,016 ounces, valued at £214,709, in the previous month. This is a decrease on the month of £19,476. There were 173 gold producers last month. The output of other minerals for last month was: Silver, 18,723 ounces; lead, 61 tons; coal, 16,267 tons; copper, 5 tons; chrome ore, 3,304 tons; asbestos, 81 tons.

UNITED STATES.

New York, Sept. 1.—Yukon Gold declares the regular quarterly 2 per cent. dividend, payable October 1st.

Chicago, Sept. 2.—Following a conference between committees of the Illinois Coal Operators' Association and the Illinois body of the United Mine Workers of America yesterday, it was announced that the end of the strike of forty thousand coal miners is in sight and that to-day will probably see the end of the dispute which began April 1st.

Rhyolite, Nev., Sept. 3.—The Montgomery Shoshone is making a record for low cost of mining and milling which compares favourably with the most economical mining projects in the state. During the month of July, the cost sheet showed $1.90 per ton for mining, and $1.90 per ton for milling, or a total of $3.80 per ton.

Joplin, Mo., Sept. 3.—Word comes from Iola from an apparently reliable source that the Lanyon zinc smelters of that place are being wrecked and will be moved to Springfield, Ill. It is stated also that the acid works of the United States Zinc & Chemical Company are being razed and this plant will be taken to Kansas City, Kan., where this company has another large sulphuric acid factory.

Cripple Creek, Colo.—The production from the Cripple Creek district for August, as compiled from figures given out by mill managers, was $1,314,200, the highest production for any month of the year. The tonnage was 69,800. In comparison with July the values are $64,000 greater and the output is estimated at 17 tons more. The rich ore totalled 4,100 tons, exceeding July by 500 tons. The Golden Cycle report shows a gain of 2,000 tons over last month, or a gain of $5,000 tons in two months.

Leadville, Colo., Sept. 6.—August was the banner month of the year so far as the monthly output is concerned, reaching 74,000 tons of all classes of ore. The increase over the preceding month is due principally to the extra tonnage shipped from the outlying districts, and during the present month the tonnage from these districts should be increased over that of August. The increase over that of August, 1909, is fully 10,000 tons, due to the general revival of mining throughout the entire district. The outlook for the present month is that the tonnage will be increased materially, as the ore bodies caught during the month of August in the Yak tunnel, Cleveland, New Monarch, Dinero tunnel, etc., have been further developed, which will permit all of them to increase the daily output. It is also expected that the new shaft on the Colonel Sellers will be completed this month, and when it starts hoisting ore the daily tonnage will be increased fully 250 tons.

COMPANY NOTES.

CANADIAN WESTINGHOUSE DIVIDEND.

The Canadian Westinghouse Company has declared the regular quarterly dividend at the 6 per cent. rate, payable October 10th.

The T. & H. B. Company has just paid dividend No. 27, of 300 per cent. This is the sixth dividend of a like amount paid this year by this pioneer company.

In the closing months of 1908 the Canadian Iron and Foundry Company, Limited, the Canada Iron Furnace Company, Limited, and John McDougall & Company, were consolidated under the style, The Canada Iron Corporation, Limited. The majority of the shares of the Londonderry Iron & Mining Company, Limited, were also incorporated in the merger. The new company has blast furnaces in Ontario, Quebec and Nova Scotia, with foundries in the same provinces, and iron mines in these provinces and in New Brunswick as well.

For the short period ended May 31st, 1909, the net earnings were $146,743.39, on a preferred capital of $2,759,000. During the present year £100,000 bonds in the treasury have been sold, so that the present amount outstanding is $2,920,000. An increase has been made this year in the preferred stock, which now stands at $2,909,000, and of the $5,000,000 common authorized, $4,832,300 is now outstanding.

The annual report for the year ended May 31st, 1910, has just been issued, showing net earnings of $18,994.22. Accounts and bills payable are $2,533,490, against $1,505,640 last year.

The company were unfortunate this year in having two disastrous fires, namely at Montreal and Three Rivers, which undoubtedly made serious inroads into the profits.

BRITISH COLUMBIA COPPER COMPANY PROFITS.

The British Columbia Copper Company reports net revenue for August as $32,500. Copper was produced at 7.7 cents per pound. Only two furnaces were in operation.

TEMISKAMING COMPANY PROFITS.

In August the Temiskaming mine showed a profit of $103,969. The net value of ore produced was $125,984.

LA ROSE AND NIPISSING.

Directors of both the Nipissing and La Rose Companies have been notified of meetings to be held September 19th, when dividend action will be taken. Regular dividend will be forthcoming —3 per cent. and 2 per cent. extra on Nipissing, and regular 2 per cent on La Rose.

Nipissing is maintaining a monthly yield of about 400,000 ounces. The Kendall vein, which was uncovered several years ago, has proved a bonanza for the company, and it has to date contributed $2,000,000 to income.

La Rose has recently uncovered at a depth of 135 feet in the Princess mine a vein which has assayed between 3,500 and 4,000 ounces, and which is looked upon as a second "Kendall." If the vein holds good for a distance of 100 feet with similar values the company's dividend requirements at the present rate for a full year are assured from this one section of the property.

La Rose has paid in dividends during the past year $600,000, but its treasury position will probably show a much improved condition in a few months.

STATISTICS AND RETURNS

CROW'S NEST OUTPUT.

The output from the Crow's Nest collieries for August amounted to 109,000 tons, as compared with 73,000 tons during August of last year, an increase of almost fifty per cent. The output during this year has shown a substantial increase over last year, when, of course, the company had not fully recovered from the first of August, 1908. At the same time by August of last year production was again on its normal basis, which makes the present large increase the more encouraging. The figures for the past four months compare as follows:

	1910.	1909.	Increase.
May	92,900	54,000	38,900
June	116,450	83,400	33,050
July	104,000	72,000	32,000
August	109,000	73,000	36,000
Total	422,350	282,400	139,950

CONSOLIDATED ORE RECEIPTS.

The Consolidated Mining and Smelting Company of Canada reports ore receipts at Trail smelter for the week ending September 3rd as 7,536 tons; year to date 320,711 tons.

HILLCREST SENT 18,000 TONS.

August shipments of the Hillcrest Collieries amounted to 18,000 tons. Development work is steadily progressing. The new slope is down 125 feet, in a 16-foot vein of first-class steam coal.

RAND GOLD OUTPUT.

The August gold output of the Rand is estimated at 640,000 ounces fine.

Comparison of the value of the August output, on the basis of the above estimate, is:

August, 1910, $13,760,000; August, 1909, $12,988,000.
July, 1910, $13,565,000; August, 1908, $12,484,000.
June, 1910, $13,278,000; August, 1907, $11,788,000.
May, 1910, $13,468,000; August, 1906, $10,812,000.
April, 1910, $13,147,000; August, 1905, $9,102,000.

COBALT ORE SHIPMENTS.

Both Kerr Lake and La Rose were out of the shipping last week, and the total output from the Cobalt camp was unusually small, the ore consigned being only 478.95 tons. The Nipissing sent out only three cars. The Central, shut down for a short period, is now running again for the benefit of the creditors and they sent out a small car of concentrates. The Colonial is another "occasional" that has started up operations again. From their mill they shipped 23 tons to Denver, Colorado.

The shipments for the week ending September 9th, in pounds, and approximate values were:

McKinley-Darragh, 5 h	242,390
Nipissing, 3 l	192,180
Crown Reserve, 1 h 1 l	141,450
O'Brien, 1 h	66,270
Buffalo, 1 h	62,140
Hargraves, 1 l	60,000
Temiskaming, 1 l	60,000
Central, 1 h	46,910
Colonial, 1 h	44,580
Trethewey, 1 h	41,990
11 h, 6 l	957,910

The shipments for the week ended September 9th and for the year 1910 now read:

	Week ended Sept. 9th.	Year to date.
Nipissing	96.09	4,203.09
La Rose	.....	4,105.37
Kerr Lake	.....	3,714.47
Crown Reserve	70.72	2,339.07
McKinley-Darragh	121.19	1,397.68
Temiskaming	30.00	814.70
Buffalo	31.07	801.70
Chambers-Ferland	.....	610.23
Right of Way	.....	609.23
Coniagas	.....	612.92
O'Brien	53.13	372.08
Trethewey	20.99	378.42
Drummond	.....	336.76
City of Cobalt	.....	236.94
Little Nipissing	.....	213.93
Cobalt Central	23.45	243.13
Hudson Bay	.....	201.22
Hargraves	30.00	170.53
Townsite	.....	144.67
Cobalt Lake	.....	117.30
King Edward	.....	111.12
Silver Cliff	.....	106.28
Colonial	22.29	105.59
Beaver	.....	57.53
Provincial	.....	32.05
Waldman	.....	31.99
Rochester	.....	30.37
Wyandoh	.....	24.15
Casey	.....	17.90
Total	478.95	22,015.67

COBALT SHIPMENTS.

The Cobalt mining district is producing more silver at a lower cost than at any previous time in its history, notwithstanding a marked decrease in speculative interest.

For the first seven months of 1910 Cobalt shipped a total of 18,029 tons of ore, as against 29,942 tons for the whole of 1909, 25,265 tons in 1908, and 14,788 tons in 1907. During the first year of Cobalt's existence, 1904, the total output was 158 tons. At the present day the output is about 15 per cent. of the total production of the world.

In the following table is shown the number of ounces of silver and their values for the several years since 1904:

	Tons.	Silver, Oz.	Value.
1910†	18,029	15,491,000	$8,320,336
1909	29,942	25,885,985	12,456,301
1908	25,654	19,437,875	9,133,378
1907	14,788	10,023,311	6,155,341
1906	5,335	5,401,766	3,667,551
1905	2,114	2,451,356	1,360,503
1904	158	206,875	111,887
Total	96,020	78,898,188	$41,205,297

† Seven months.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending August 26th, and those from January 1st to date:

	Aug. 26. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	180,617
Buffalo	59,240	1,484,198
City of Cobalt	60,140	482,875
Chambers-Ferland	.....	1,149,100
Cobalt Central	.....	293,286
Cobalt Lake	.....	260,900
Cobalt Townsite	66,000	302,840
Colonial	.....	148,900
Coniagas	.....	1,119,616
Crown Reserve	181,090	4,545,110
Drummond	.....	664,200
Hargraves	.....	281,170
Hudson Bay	.....	360,825
Kerr Lake	480,000	6,944,640
King Edward	.....	221,296
La Rose	170,320	8,193,341

McKinley-Darragh	180,260	2,484,189
Nipissing	445,340	7,922,047
O'Brien		822,146
Peterson Lake		432,420
Provincial		65,000
Right of Way	111,420	1,191,637
Rochester		60,750
Silver Cliff		212,770
Standard Cobalt		147,992
Temiskaming	120,000	1,428,080
Trethewey		725,380
Waldman		63,992
Wyandoh		48,300

Ore shipments for the week ending August 26th were 1,873,810 pounds, or 936 tons.

Total shipments from January 1st to August 26th were 42,237,617 pounds, or 21,118 tons.

TORONTO MARKETS.

Sept. 9.—(Quotations from Canada Metal Co., Toronto).

Spelter, 5½ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 38 cents per lb.
Copper, casting, 13.25 cents per lb.
Electrolytic, 13.25 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

Coke.

Sept. 7.—Connellsville Coke (f.o.b. ovens).

Furnace coke, prompt, $1.60 to $1.65 per ton.
Foundry coke, prompt, $2.10 to $2.25 per ton.

Sept. 7.—Tin (Straits), 36.20 cents.

Copper, Prime Lake, 12.75 to 12.87½ cents.
Electrolytic copper, 12.50 to 12.60 cents.
Copper wire, 14.00 cents.
Lead, 4.47½ cents.
Spelter, 5.55 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.20 cents.
Aluminium, 22.00 to 22.50 cents.
Nickel, 40.00 to 47.00 cents.
Platinum, ordinary, $34.00 per ounce.
Platinum, hard, $36.00 per ounce.
Bismuth, $1.85 per lb.
Quicksilver, $46.00 per 75-lb. flask.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—September 9, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	15
Dominion Coal Company	..	..
Dominion Steel Company	..	..
Nova Scotia Steel	83½	84½
Granby	32	34
Consolidated Smelting	65	75
Crow's Nest Pass	No. quotation	
Dominion Steel Corporation	..	62

Cobalt Stocks—September 9, 1910.

Amalgamated	.02½	.06
Bailey	.07	.07¾
Beaver Consolidated	.30⅝	.30⅞
Big Six	.02	.04
Buffalo	1.85	2.40
Chambers-Ferland	.18½	.19¼
City of Cobalt	.26¼	.27
Cobalt Central	.06	.08
Cobalt Lake	.15	.15¾
Coniagas	4.50	5.00
Crown Reserve	2.79	2.81
Foster	.11	.12¾
Gifford	.07⅛	.07½
Great Northern	.08⅝	.09½
Green Meehan	.04	.04½
Hargraves	.25½	.26¼
Hudson Bay	100.00	110.00
John Black	.03	.04
Kerr Lake	6.60	6.75
La Rose	3.78	3.80
Little Nipissing	.18⅝	.18⅞
McKinley Ex. Div. 5 per cent	.94	.95
Nancy Helen	.04	.05½
Nipissing	10.70	10.85
Nova Scotia	.24½	.24¾
Ophir	.29	.35
Otisse	.03	.03⅝
Peterson Lake	.22¾	.23
Right of Way	.24	.25
Rochester	.17	.17⅛
Silver Leaf	.06¾	.07¼
Silver Bar	.04¾	.05¼
Silver Queen	.07	.11
Temiskaming	.79⅜	.79¾
Trethewey	1.30	1.33
Watts	.03	.08
Wettlaufer	.65	.72

New York Curb—September 9, 1910.

Boston Copper	14¼	14¾
British Columbia Copper	4⅝	4¾
Butte Coalition	18	19
Canadian Mines	6¼	6⅜
Chino Copper	15⅛	15¼
Davis-Daly Copper	1¼	1½
Ely Consolidated	.30	.32
Gila Copper	....	....
Giroux Mining	6½	6⅝
Goldfield Consol	8	8⅛
Greene-Canadian	6⅞	7
Harcuvar Copper	10	15
Inspiration Copper	7 13/16	8
Miami Copper	18½	18¾
New Baltic Copper	3	7
Nevada Con. Copper	20¼	20½
Ohio Copper	1 11/16	1 13/16
Rawhide Coalition	.10	.11
Ray Central	2	2⅛
Ray Consolidated	17¾	18¼
Union Mines	1	1 1/32
Yukon Gold	3 15/16	4

SILVER PRICES.

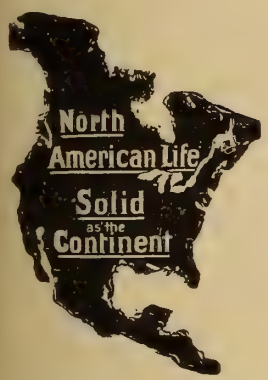
		New York cents.	London pence.
August	23	52⅞	24⅜
"	24	52⅞	24⅜
"	25	52⅞	24⅜
"	26	52⅞	24⅜
"	27	52⅝	24¼
"	29	52½	24 3/16
"	30	52⅜	24 1/16
"	31	52⅝	24 5/16
September	1	52⅞	24⅜
"	2	52⅞	24⅜
"	3	52¾	24 5/16
"	5	Holiday	24 5/16
"	6	52⅞	24¾
"	7	52⅞	24⅜

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto



ON TIME

One of the most important business transactions which sensible minded men should perform on time is that of making proper provision for those who are dependent on them for the necessities of life.

The only way to do this is by means of life insurance. The only way to do it on time is to act now while in health. The most satisfactory way is to insure at once in the

North American Life

ASSURANCE COMPANY

"Solid as the Continent"

HEAD OFFICE, - - TORONTO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

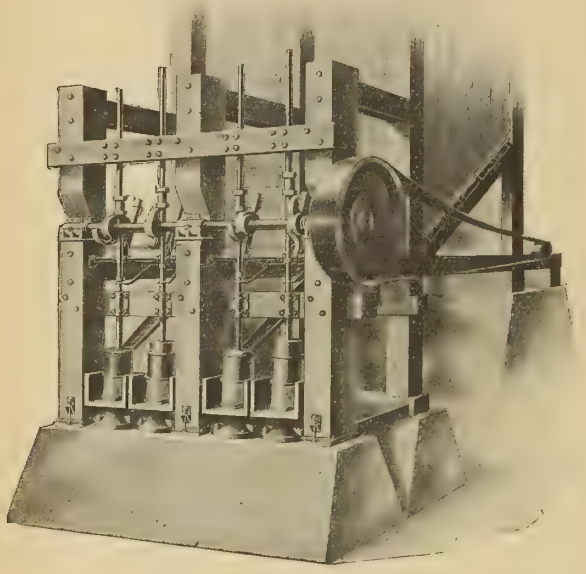
For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent
Board of Trade Bldg.
Montreal

J. S. CARTER, Gen. Agent,
217 McDermott Ave.
Winnipeg, Man.

I. E. SUCKLING, Gen. Agent,
S. E. Corner King & Yonge Sts.,
Toronto, Ont.

Nissen Stamp Mills



Will Save 50% of Your Power

Owing o the maximum crushing efficiency secured, the power required to operate **NISSEN** Stamp Mills in about half that of other mills of the same capacity output.

The Nissen Stamp in Cobalt

Read what a Supt. writes:

NORTHERN CUSTOMS CONCENTRATORS, LIMITED.
COBALT, ONT., December 31st, 1909.

The Canadian Fairbanks Co., Toronto, Ont.

Dear Sirs:—

In answer to your inquiry regarding the Nissen Stamps supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one inch hole.

The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening 018. With a coarser screen the tonnage would of coarse be larger.

The shoes and dies wear even, and the splash is well distributed over the screen.

The arrangements for keeping up the weight of the stamps are very good.

I can recommend the stamps. Yours truly,

(Sgd.) F. J. Bourne, Superintendent.

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

Montreal, Toronto, St. John, N.B. Winnipeg, Saskatoon, Calgary, Vancouver.

CONSTANT-HERZIG COMPANY

SUCCESSOR TO

C. L. CONSTANT COMPANY

MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS

42 NEW STREET, - NEW YORK

Mine Investigation and Mine Management Our Specialties

Our organization makes a specialty of mine management and is prepared to plan the most economical method of operation, the dividend paying method, for your mine.

Put your mine troubles up to us.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

This year we are building **Green Silk Tents** which we believe will be popular with Tent users. They are no heavier in weight but have an advantage over white color, for **sleeping purposes** so that one is not awakened by the early rising sun, and can sleep in comfort. All sizes at reasonable prices.

We are sole manufacturers of STANDARD WEATHERPROOF DUCK TENTS, Tarpaulins, etc. For Camp Beds, Chairs, Stoves, Grey Blankets or any other supplies. Send your orders to

J. J. TURNER & SONS, - Manufacturers,
Agents Everywhere PETERBOROUGH, ONT.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects. Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HITCHCOCK, C H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

HORE, R. E.
Geologist
Specialty : Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

LONGYEAR & HODGE
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

RALPH A. MEYERS, E.M., B. SC.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address : OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

SUTCLIFFE & NEELANDS,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

WILLMOTT, A. B., M. A., B. SC.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq.. Buffalo, N. Y.

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B. Sc.
Manager

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

S. F. KAVANAGH
Assayer
Minning Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors. Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
404 Lumsden Bldg, TORONTO.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

G. W. DIXON,
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building,
Montreal

CAPITAL SECURED FOR
GOLD, SILVER, IRON
and other Mining Properties
Address F. C. SCHULTE
Sault Ste. Marie, Ont.

ORE BUYERS

FOR SALE
A few very good gold, silver and copper properties, on working options—Easy terms. Address
P.O. Box 973, Sault Ste. Marie, Ont.

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1075. Report on the Gowganda Mining Division 1908, accompanied by a map, by W. H. Collins.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology as applied to practical mining.* It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

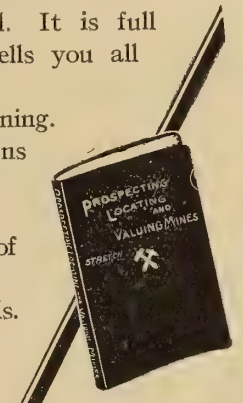


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,
TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vi
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xv
Paterson Mfg. Co, ...ii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, C. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST. JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,
John McDougall Caledonian Iron Works Co., Ltd.

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,
John McDougall Caledonian Iron Works Co., Ltd.

Condensers—
John McDougall Caledonian Iron Works Co., Ltd.
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
John McDougall Caledonian Iron Works Co., Ltd.
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
John McDougall Caledonian Iron Works Co., Ltd.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
John McDougall Caledonian Iron Works Co., Ltd.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse

Type "H" Oil Circuit Breakers

Made in Two, Three and Four Pole Styles.

Although specially designed for industrial, mining and general motor applications being placed in any position convenient to the motor, they are also adapted to switchboard mountine. Type "H" Breakers can be used on both alternating and direct current circuits, and have a maximum capacity of 100 amperes at 500 volts. Their calibration range is from 80 to 160 per cent. of rated carrying capacity. While automatic in action it can be tripped by hand by means of a small lever on the side of the case.



Write for Circular 1096

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appear ance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines

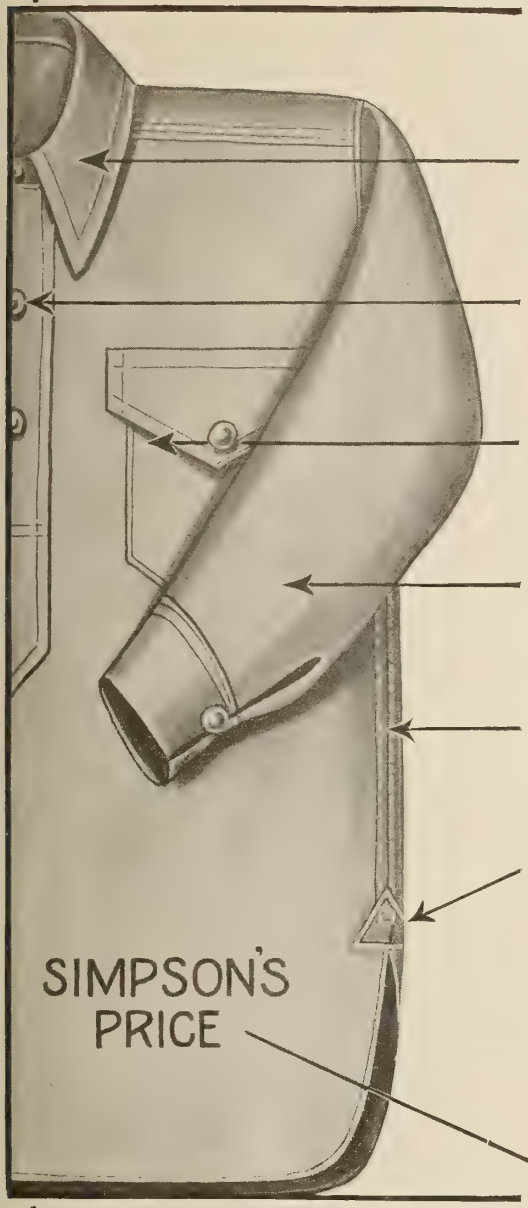
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

KHAKI DUCK SHIRT

For Miners, Lumbermen, Prospectors, Surveyors



MADE THE SIMPSON WAY

NOTE THE DIFFERENCE FROM THE ORDINARY WAY:—

COLLAR will fit neatly, all ways, all the time. Is well interlined to retain its shape. Steels inserted to prevent curling points.

DOME FASTENERS of brass used throughout. No buttons to come off. No occasion to swear. A feature that will be appreciated by every man.

POCKET Two pockets, one on each side, with dome fastened flap. A splendid idea. Plenty of *pocket space* is a Simpson improvement.

SLEEVES are made large. Plenty of elbow room. Inter-lined wrist-band, dome-fastened. One of the strong points not to be overlooked, viz.—roomy sleeves.

DOUBLE STITCHED seams throughout, with extra strong thread insuring strong wear. This Simpson shirt is made stronger to wear where the most wear comes.

GUSSETS are made strong and double stitched, adding extra strength. You can be absolutely sure the seams will not rip at this point.

FABRIC extra heavy khaki duck. Wind-proof and shower-proof. Will stand the hardest kind of wear. Try it. Almost indestructible.

KG522 IS THE ORDER NUMBER
Sizes 14½ to 18

$1.00

THE POSTAGE IS 20c EACH
Order at Once

A SHIRT OF EQUAL VALUE WOULD SELL IN MOST STORES AT FROM $1.50 to $2.00

THE ROBERT SIMPSON COMPANY LIMITED

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

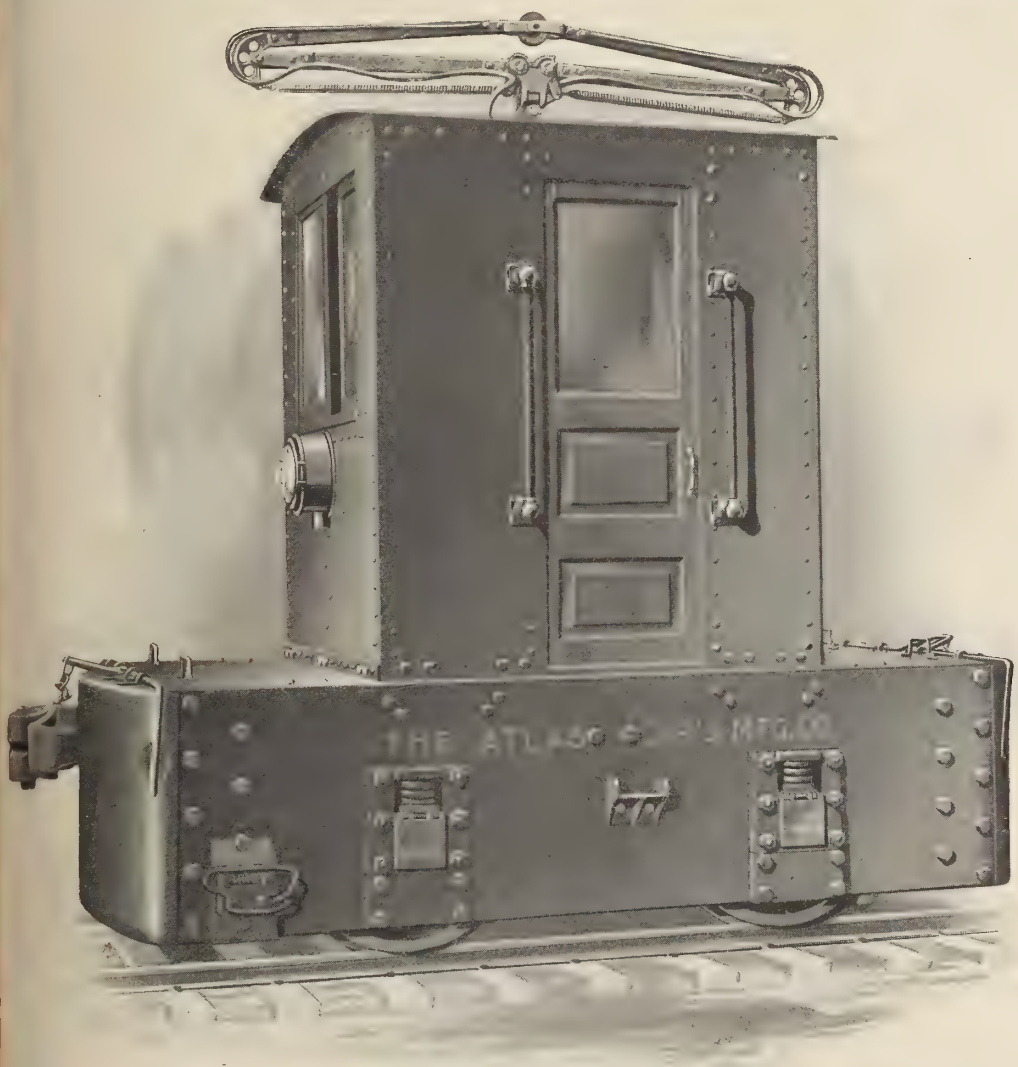
The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

Vol. 31 TORONTO No. 19

ELECTRIC LOCOMOTIVES



We can supply:

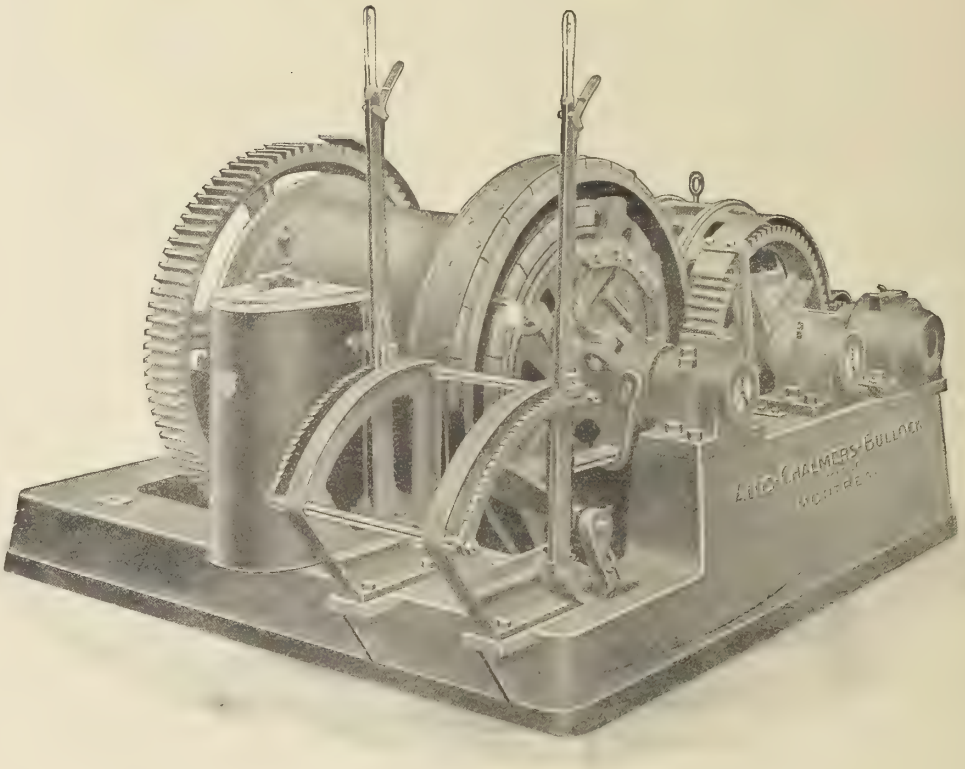
Plain Storage Battery, Combination Storage Battery, and Trolley or Third Rail, or Plain Trolley or Third Rail, Electric Locomotives of Regular or Special Design, for Surface or Underground Use.

Write for Bulletins 1090 and 1095.

MUSSENS LIMITED

MONTREAL, 318 St. James St. | **TORONTO,** 73 Victoria St. | **COBALT,** opp. Right of Way Mine | **WINNIPEG,** 259-261 Stanley St. | **CALGARY,** Crown Bldg. | **VANCOUVER.** Mercantile Bldg

ELECTRIC HOISTS
FOR
MINING WORK



ELECTRIC HOISTS, to give the best service must be designed and built to meet operating conditions. The hoist shown in the illustration is operated by one of our 40 h.p. induction motors and is designed for a load of 3,000 lbs. at a speed of 300 feet per minute.

ALLIS-CHALMERS-BULLOCK
LIMITED

WORKS - - - MONTREAL

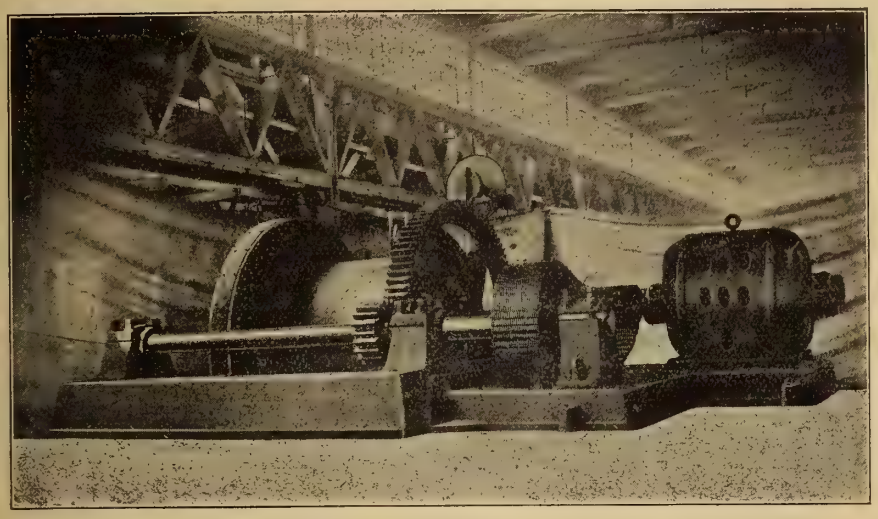
SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

Renold Patent Silent Chains

Manufactured Solely by Hans Renold, Ltd., Manchester, Eng.



A Renold Silent Chain driving a mine hoist from a 150 h.p. motor, centres 6'.

Transmit at a high speed any power and do it as quietly as a belt with the certainty of gears. Being positive effects a continuous saving of power.

Not effected by HEAT or DAMPNESS.

JONES & GLASSCO

Sole Canadian Agents **MONTREAL**

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just because it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

SPEED

A single motion is quicker to make than two.

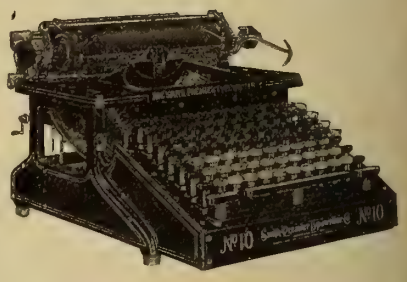
Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of the

easy action
light running **Model 10**

Smith Premier

The Smith Premier Typewriter Company, Inc.
Syracuse, N. Y.

Canadian Representatives:
National Typewriter Co., 87 Victoria St., Toronto
Wm. H. Hall & Co. 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 1157 Holis St., Halifax, N.S.





UPPER HOLES

in Canadian, American and Mexican Mines are being drilled faster and more cheaply with Sullivan New Stoping Drills than with any other tool.

"Class D A 21"

Ask for reasons; They are in Bulletin 660 D.

Air Compressors, Rock Drills,
Hoists, Diamond Drills, Coal Cutters

SULLIVAN MACHINERY COMPANY,

Cobalt, Nelson, B.C. Claremont, N.H.

Birmingham, Ala. Joplin, Mo.
Butte Knoxville
Denver New York
El Paso Paris, France

150 Michigan Avenue
CHICAGO, ILL.

Pittsburg Spokane
Salt Lake St. Louis
San Francisco Sydney,
Seattle Australia

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

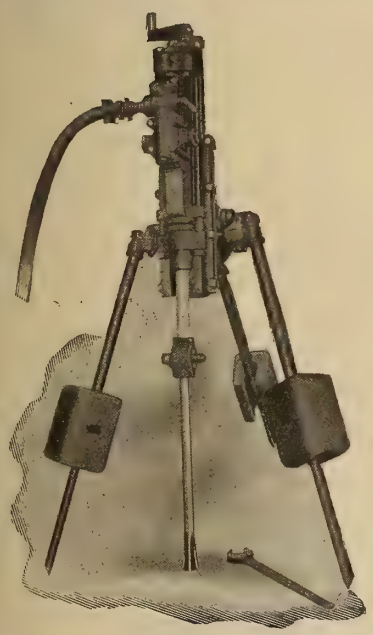


BEST FOR MINE BUILDINGS

Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.



Rock Drills of Quality

The magnitude of our business proves that the vast majority of buyers buy on the basis of quality and not of price.

High-grade materials, special treatment of steel parts, limit-gauge test to assure interchangeability, inspection of parts and rejection of defective materials, are essential elements of quality which help to make **RAND ROCK DRILLS** the best investment.

Sole Agency for B. C. Steel in Cobalt Territory.

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

The Deister Concentrator Co., Ft. Wayne, Indiana, U.S.A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
REST, - - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Every Branch of this Bank is able to issue, on application, Drafts on the principal points in the following countries:

Africa	France	Peru
Arabia	French Cochin-China	Philippine Islands
Argentine Republic	Germany	Portugal
Australia	Great Britain	Roumania
Austria-Hungary	Greece	Russia
Belgium	Holland	Servia
Brazil	Iceland	Siam
Bulgaria	India	Siberia
Ceylon	Ireland	Soudan
Chili	Italy	South Africa
China	Japan	Spain
Crete	Java	Straits Settlements
Cuba	Malta	Sweden
Denmark	Manchuria	Switzerland
Egypt	Mexico	Turkey
Faroe Islands	Norway	United States
Finland	Panama	Uruguay
Formosa	Persia	West Indies

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd. Nova Scotia Iron & Steel Co. and all the leading English American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. New Brunswick : W. H. Thorne & Co., Limited.
Montreal and Toronto : Drummond, McCall & Co. Vancouver, B.C. : John Burns, Winnipeg : David Philip, Portage Ave.

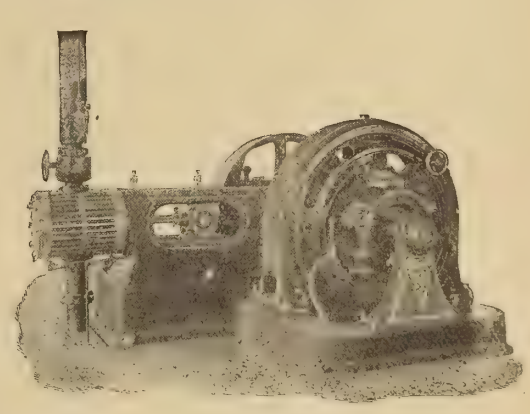
HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

McEwen Engines

FOR DIRECT COUPLING OR BELT DRIVE

With Alternating or Direct Current Dynamo

The most reliable and economical installation for the production of Electric energy, because these Engines are designed and built for the work.

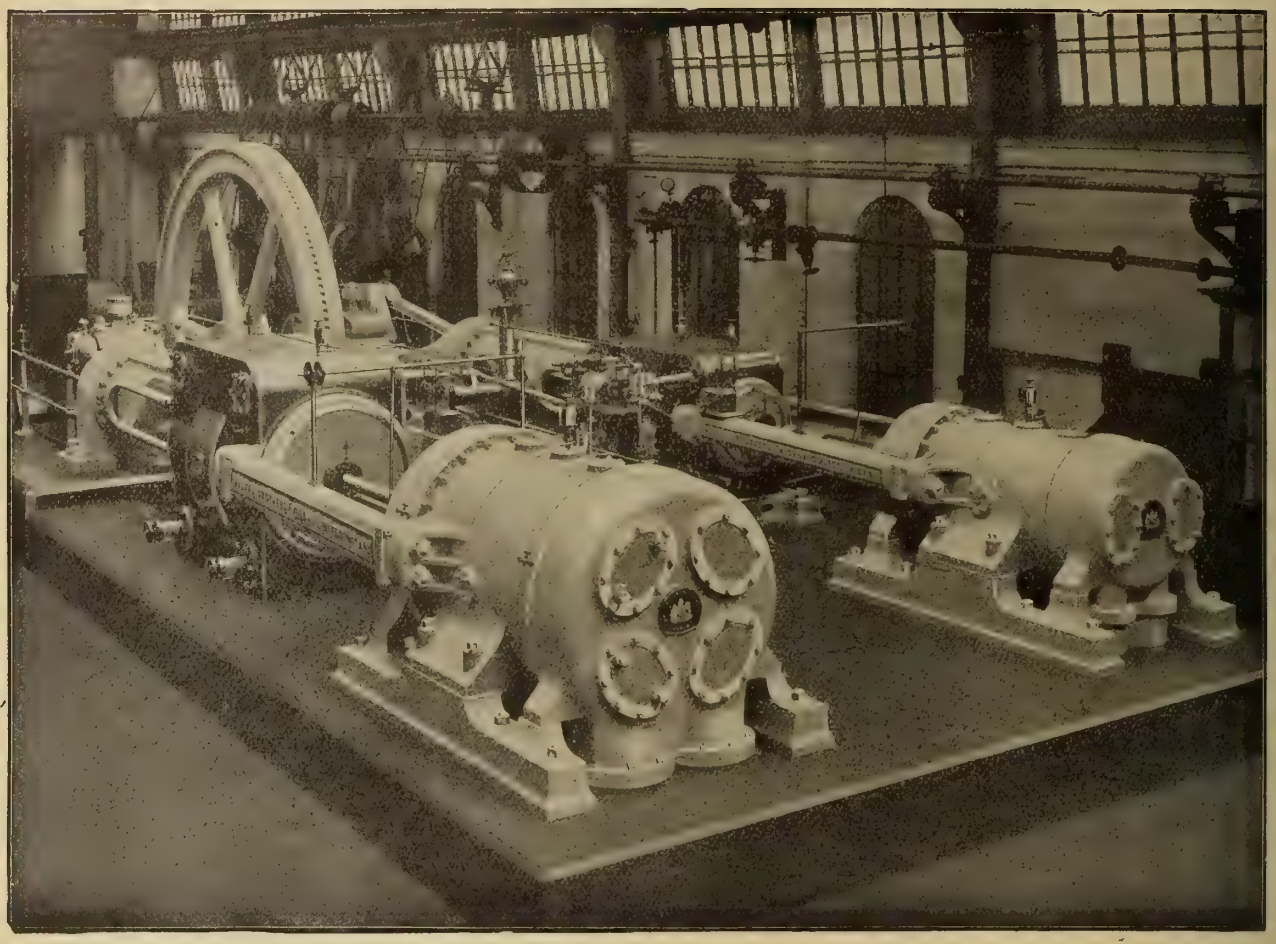


HAVE YOU READ OUR McEWEN ENGINE BOOKLET? SEND FOR IT.

The Waterous Engine Works Co., Ltd. Brantford Canada

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves, Walker's Latest Patents.

AIR COMPRESSORS

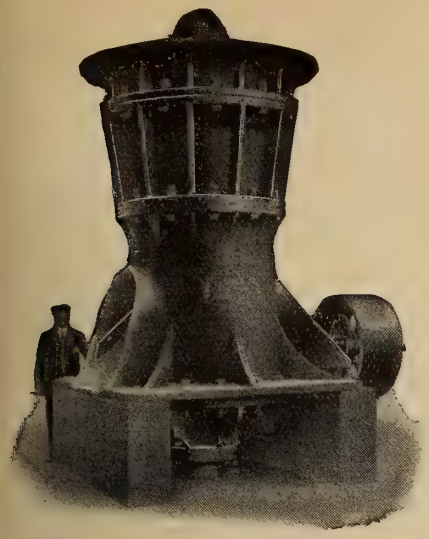
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jack s Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

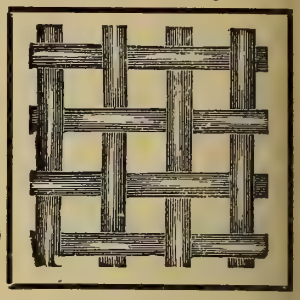
CORRESPONDENCE SOLICITED

THE BROWN MACHINE COMPANY, LIMITED

NEW GLASGOW — ENGINEERS — NOVA SCOTIA

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalogue 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: **NEW GLASGOW, NOVA SCOTIA**

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Mine Hoisting Engine

Cylinders 22 inches diameter, stroke 42 inches, about 900 horse power; double drums 8 feet diameter, 5 feet wide.

Corliss valves, steam actuated clutches and brakes. The reversing gear, throttle, brake and other levers are grouped at a central platform.

This engine was completed within the Past few months and is thoroughly modern. Write for drawings, specifications and photographs.

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



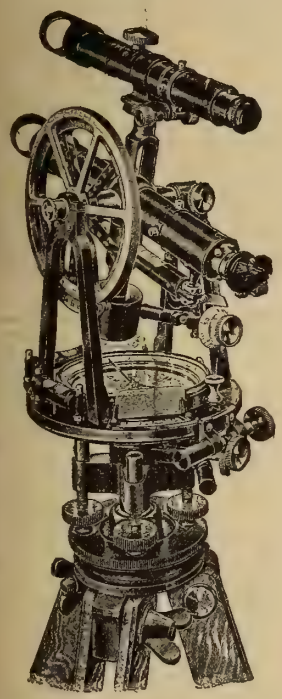
Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments
FOR
Civil, Mining Engineers & Surveyors



Maufacturers
Instruments of
Precision

also

Engineers and
Draftsmens
Supplies

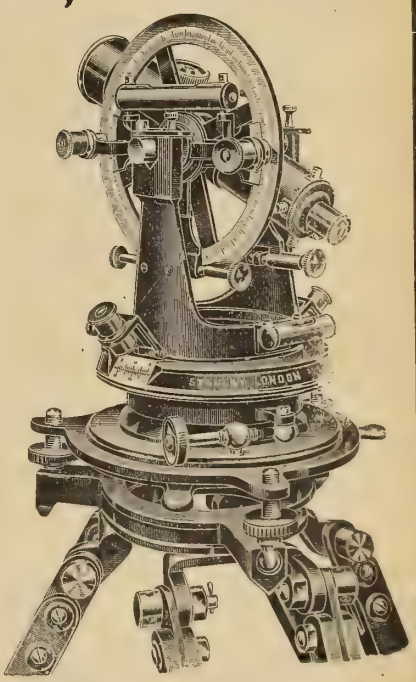
Eugene Dietzgen
Co., Limited
TORONTO

STANLEY, LONDON

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our H 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK



Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

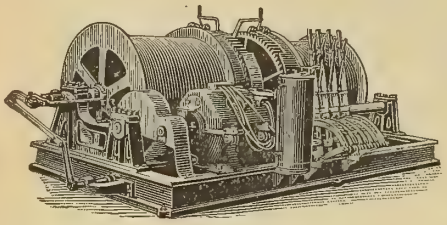
W. F. Stanley & Co., Limited
Great Turnstile, London, England

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

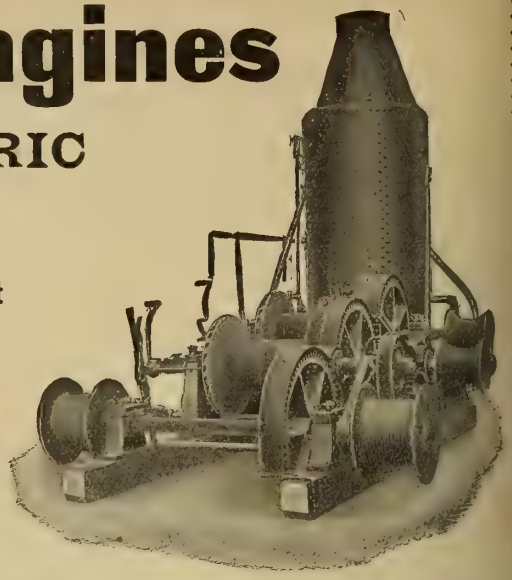
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.

MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

50 SWITZERLANDS IN ONE



Write for copy of "Challenge of the Mountains."

The Canadian Rocky Mountain National Park

The Largest Park in the World. 5,732 miles in extent.

Pre-eminent Natural Grandeur. Splendid Hotel Accommodation. Luxurious Train Service. Most delightful place in the world for a vacation. A paradise for Mountaineers, Naturalists, Geologists and Mineralogists.

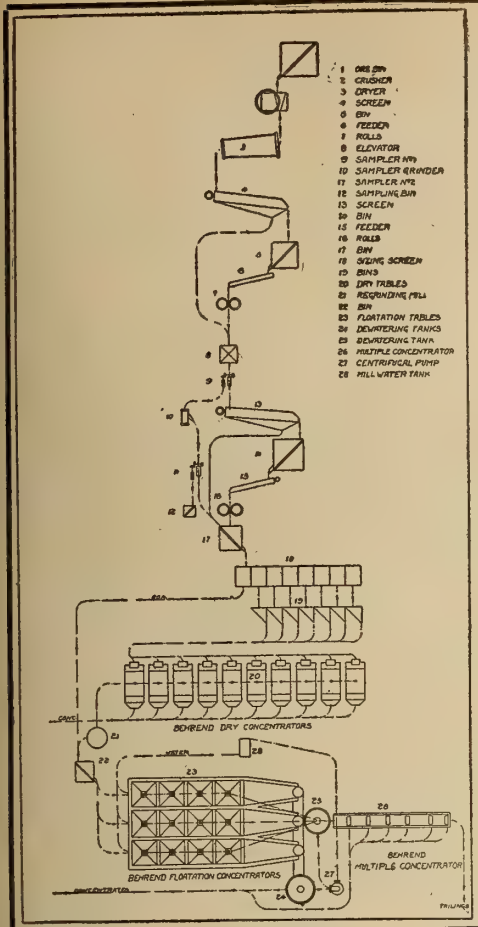
Reached by the

Canadian Pacific Railway

ROBERT KERR, Passenger Traffic Manager, MONTREAL.

OR

R. L. THOMPSON, Dist. Pas. Agent
TORONTO, - CANADA



FLOW SHEET

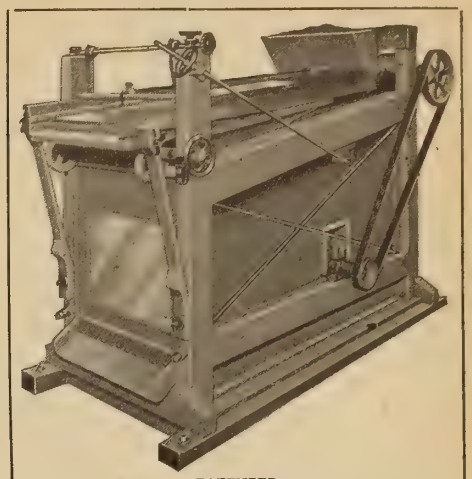
OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM

OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED

32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

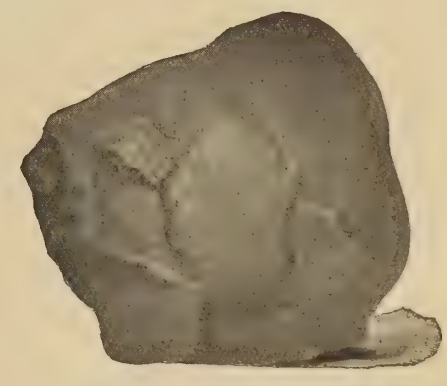
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

TO BE SEEN AND OBTAINED AT THE OFFICES OF THIS PAPER.

NOW READY

Published February 9th *Twenty-fourth Year.*

Containing all the latest information up to within a few days of publication.

THE

MINING MANUAL

1910

BY WALTER R. SKINNER.

The Standard Reference Work on Mines.

Price 17/- net Post Free (Abroad).

1,600 pages. In demy 8vo, handsomely bound in RED cloth.
A record of information concerning

MINING COMPANIES
(Gold, Diamond, Silver, Copper, Tin, Iron, and other Mines, Collieries, Land, Exploration and Mining Investment Concerns, &c.)

Arranged in three sections—

Australasian, African, Miscellaneous,

Preceded by Tables of Crushings and followed by lists of Mining

DIRECTORS, SECRETARIES, MINING and CONSULTING ENGINEERS and MINE MANAGERS.

Their Names, Addresses, and Descriptions, and Names of the Companies with which they are connected, and a

DICTIONARY OF MINING AND OTHER TERMS.

THE MINING MANUAL for 1910 contains particulars of over 3,600 Companies arranged in three sections, 430 Companies being AUSTRALASIAN (including Western Australia, Queensland, Broken Hill, Deep Leads, New Zealand and Tasmania); 1,030 AFRICAN (including Transvaal, Rhodesia ,West Africa, Cape Colony, Natal, Egypt); and 2,140 MISCELLANEOUS (including Siberia, Mexico, India, British Columbia, America, &c., and the Coal, Iron, Tin and other Mining concerns of the United Kingdom). The particulars given of each Company include the Directors and other officials; date of establishment; seat of operations; description of the property, with the purchase consideration; plant erected or in course of erection; present working results; ore reverses; details of capital; calls; dividends paid; and the financial position as disclosed by the accounts. Highest and lowest prices of the shares for the last four years, also latest price. The three sections extend over 1,100 pages,

Crushing tables and Gold Outputs from the principal mines are given at the commencement of the volume, showing tons treated monthly, results obtained, and yield per ton; also annual yields.

The Lists of Directors (8,000), Secretaries (1,900, Mining and Consulting Engineers and Mine Managers (1,400) include their addresses and descriptions and names of the Companies with which they are connected.

A complete Alphabetical Index, containing the names of 5,300 Companies and including many useful items of reference, occupies 42 pages.

Full particulars of all Re-constructions, Re-organisations and Amalgamations during 1909 are given in a simple and concise form.

LONDON:
WALTER R. SKINNER, 11-12, Clements Lane, Lombard St. E.C.
Nat. Tel.: 1323 Avenue. Tel. Address: Capitalist, London.

PICKING TABLES

ANY DESIRED CAPACITY

Prompt Shipment



Three "Link-Belt" Picking Tables, each 100 feet long, installed for Le Roy Mining Co., Rossland, B.C.

We Design and Construct:

Retarding Conveyors
All kinds of Chain Conveyors
Belt Conveyors
Bucket Carriers
Screw Conveyors
Car Hauls
Tipples, Washeries
Coal Pockets
Coaling Stations
Power House Fueling Equipments
Industrial Cars and Tracks
Ball-Bearing Turntables
Steam and Electric Locomotive-Cranes
Lumber and Log Hauls
Car Loaders and Unloaders
Steel Casings, Chutes
Hoppers, Feeders
Weigh Boxes, Crushers
Rotary, Stationary and Shaking Screens
Elevator Boots, Buckets
Bearings, Takeups
Friction Clutches, Jaw Clutches Etc.
Conveying and Power Transmission Chains
Sprocket Wheels, Small Rollers, and Truck Wheels for Conveyors, Carriers and Cars

CATALOG

LINK-BELT COMPANY

PHILADELPHIA **CHICAGO** **INDIANAPOLIS**

299 Broadway
NEW YORK

1501-2 Park Building
PITTSBURGH

Central Nat'l Bank Building
ST. LOUIS

439-440 N.Y. Block
SEATTLE

Lindrooth, Shubart & Co.
DENVER

Wilmot Machinery Co.
NEW ORLEANS

SAN FRANCISCO, Eby Machinery Co.

ACKROYD & BEST, Ltd.

MORLEY, LEEDS, ENGLAND.

CANADIAN AGENTS

Messrs. G. .M GRAHAM & CO.

North Sydney, C. B.

Are the only makers of an unpickable Magnetic Lock, and of an Electrically-lit Oil Lamp having a snuffer which completely snuffs the wick, and are the only makers of a Relighting Machine for the Mine which is Flame and Fool Proof.



Catalogue of Braun's Laboratory Appliances is interesting reading to the Assayer and Chemist, and is yours for the asking.

What is Your Address?

LYMANS, Limited,
MONTREAL

DIAMOND DRILLS

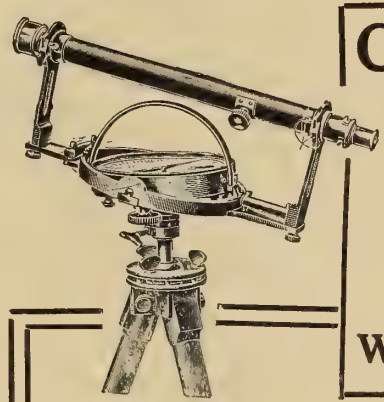
We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.
138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Casartelli's Patent Mining Dial With Telescope

Sight limb moves on axes cast on the Compass box. No loose quadrant. Arc pivoted on compass box in line of N. and S. with degrees graduated upon face—read off by indices attached to sight limb. Arc folds down along side of compass box when not in use. Two big spirit levels. Clamp attachment to legs. Vernier can be clamped for fast needle work.

Supplied without telescope if desired.

Tangent Motion fitted at slight extra cost.

Sizes 5 inches and 6 inches

Joseph Casartelli & Son
Scientific Instrument Makers
43 Market Street
Manchester, Eng.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co., Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd- Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Are You "Killing" Your Expensive Machinery

by installing it in poorly constructed—vibrating—fire-threatened buildings?

The "BEATH" SYSTEM of triangle-mesh RE-INFORCED CONCRETE

ensures permanent fireproof structures, resisting vibration and thus adding to the life of the machinery.

And the cost of construction is surprisingly small. Let us get in touch—write us about your needs.

Also enquire about our metal roofings.

W. D. BEATH & SON - - Toronto

The South African School of Mines and Technology, Johannesburg.

Owing to the present Principal and Professor of Mining of The South African School of Mines and Technology having been appointed Consulting Engineer to one of the Witwatersrand Minning Houses, the Council invites applications for the joint position, or alternatively for the chair of Mining alone. The salary attached to the chair of Mining is £1500 per annum. This would be increased by £250 per annum if the Professor were also appointed Principal of the School.

Particulars with regard to the School and the vacant posts may be obtained on application to:—

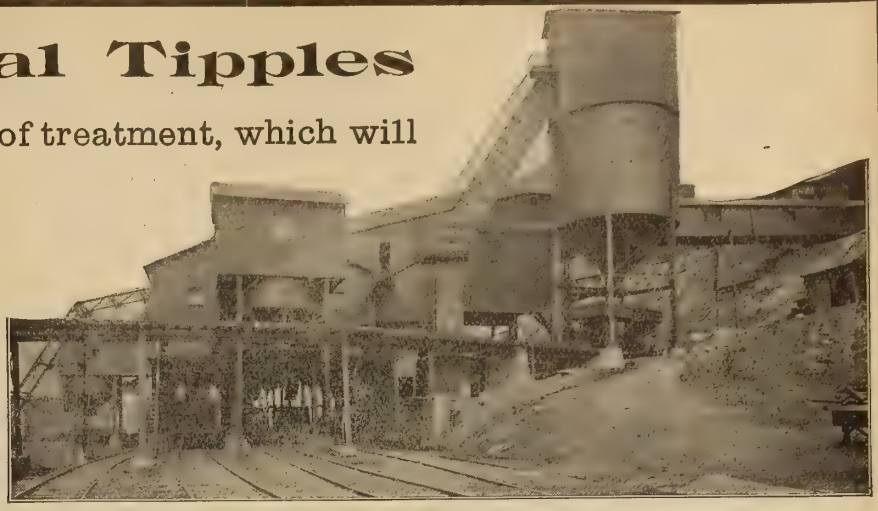
The Registrar, McGill College and University,

Montreal, Canada.

Applications must be sent so as to arrive in Johannesburg not later than the 30th November, 1910. They should be addressed to:—

THE SECRETARY,
P. O. Box 1176,
Johannesburg.

Jeffrey Coal Tipples



Embody modern methods of treatment, which will insure increased value per ton of coal produced.

We are prepared to design, erect and equip Coal Tipples complete with every detail carefully adapted to meet special requirements of existing conditions.

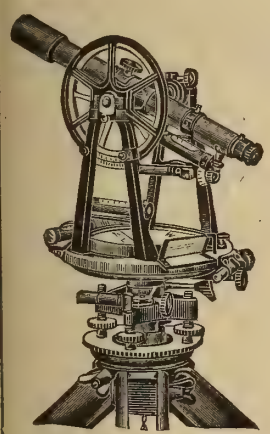
Our long experience in the design and construction of Coal Tipples enables us to combine the latest and most successful methods obtaining in tipple practice.

If you have any Tipple problems, call on our expert engineers, who will gladly assist you. Send us your name for our Tipple Book X 22.

THE JEFFREY MANUFACTURING CO.

Canadian Works: Montreal, Cote and Lagauchetiere Sts. **Toronto Office: 174 King St. East.**

Jeffrey Branch Offices in the leading Commercial Centres all over the World.



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

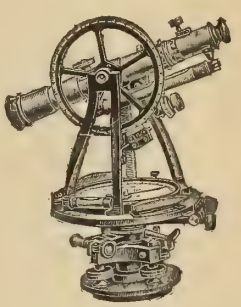
SPECIALTIES:

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

REPAIRS To Surveying Instruments

WE have established in MONTREAL a **Repair Department,** fully equipped to repair surveying instruments, drawing instruments, measuring tapes, etc., in the most careful and workmanlike manner.



We employ in this department mechanics trained at our works, experienced in the repair of a wide variety of instruments of every make, and we can assure our customers that any repair work entrusted to our care will be promptly and satisfactorily executed.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

General Office and Factories, HOBOKEN, N.J.

New York, Chicago, St. Louis, San Francisco

Mathematical and Surveying Instruments

Drawing Materials **Measuring Tapes**

Springhill Coal

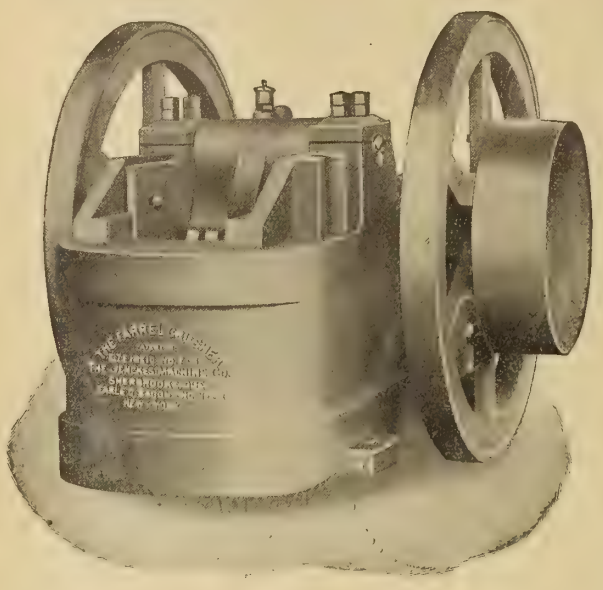
The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196



The Farrel-Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

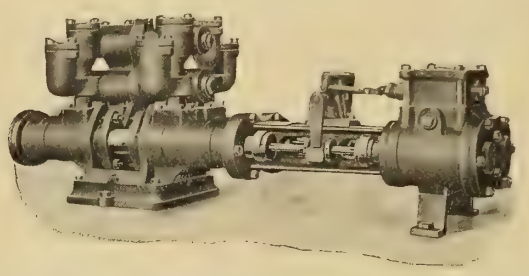
Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices:

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver

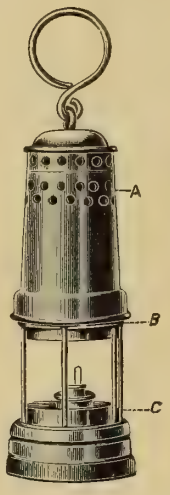
Power & Steam Pumps, Condensers, Travelling Cranes, Etc.

Write for Catalogu



THE SMART-TURNER MACHINE COMPANY, Limited

HAMILTON, CANADA



DAVIS DERBY.

Miners' Safety Lamps

GAS TESTING LAMPS

(STOCK AT MONTREAL)

SEND FOR CATALOGUES

PEACOCK BROS.

68 BEAVER HALL HILL

MONTREAL

Write for pamphlet No. 42 M.

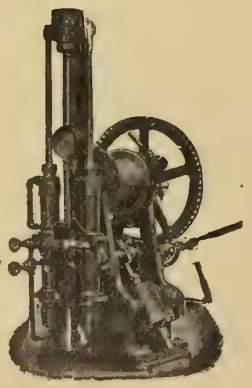
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, Oct. 1, 1910 No. 19

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 581
(a) Gowganda To-day 581
(b) Practical Conservation 582
(c) American Labour Unionism in Canada..... 583
(d) Miners' Phthisis 583
(e) One View of Modern Education 583
(f) Internationl Geological Congress 584
(g) Editorial Notes 584
Present Developments at Gowganda, by G. M. Colvocoresses 584
The Nickel Industry 589
Eleventh International Geological Congress, by Dr. W. G. Miller..... 591
Prevention of Mine Explosions 598
Briquetting of Iron Ores, by Chevalier C. De Schwarz.... 599
Northern Partnership Group, Atlin, B.C..... 603
Canadian Patents 604
Personal and General 604
Special Correspondence 605

GOWGANDA TO-DAY.

We recommend to our readers the article "Gowganda" that appears in this number of the CANADIAN MINING JOURNAL. It is written by Mr. G. M. Colvocoresses, who is manager of one of the successful mines of that neglected district, and who has been responsible from the first for the development of the mine that he superintends. Mr. Colvocoresses speaks with the temperance that is born of experience.

Perusal of the article leads to the conviction that to dub Gowganda a failure is unwarranted and unfair. Gowganda's good name was almost fatally wounded by fakirs and fools. Moreover, Gowganda has been injured by quite absurd comparison with Cobalt. As Mr Colvocoresses points out, Gowganda is not, and may never be, in the same class with Cobalt. But Gowganda promises to make a respectable younger sister.

One important point dwelt upon in the article refers to the mistake of looking upon Gowganda as being solely a high-grade camp. "A very considerable quantity of milling ore assaying from 30 to 100 ounces of silver per ton is now being developed," says Mr. Colvocoresses. Further, he affirms his belief that the greater part of Gowganda's production will eventually come from mills treating comparatively low-grade rock, which is excellent concentrating ore.

This fact bears essentially upon the future of the camp, and is surely full of meaning. Given the assurance of large reserves of low-grade milling ore, a railway into Gowganda becomes perfectly feasible. At present it is out of the question to move large quantities of freight into or out of the camp. The erection of mills must be postponed, therefore, until such time as a railway is built. We believe that the Ontario Government cannot long refuse to guarantee the construction of a railway. Or, rather, we may reasonably assert that the Government will be glad of good cause to take action. It looks not unlikely that good cause can be shown.

The story of Gowganda accentuates one basic truth. That truth is that in the selection, in the development, and in the operation of mining properties, level-headed competent men are needed. Never was illustration so complete, nor contrast so startling. A collateral truth is that competent men must take some measures to protect first the camp and next themselves from the reproach brought on all by the unrighteous. Gowganda lost years of growth through the reckless cupidity of the get-rich-quick class.

Quite by-the-way, our readers must not imagine that Gowganda is a land of perpetual snow. It is a sad fact that most of our photographs are taken during the

winter. In summer, luxuriant foliage springs up and blocks the camera.

To the careful, vigorous and sustained efforts of a few mine managers Gowganda owes its present healthy condition. These men we congratulate.

PRACTICAL CONSERVATION.

The Nova Scotian Department of Mines has issued a statement form that is designed to furnish a complete yearly record of the extent of the coal mining operations conducted by each colliery. The form is designated "Coal Depletion Statement." The items are sufficiently inclusive to show the amount of coal mined, the reserves developed, the amount of coal remaining in old workings, the tonnage recoverable, the percentage of extraction, and the total area worked over. Each manager will be compelled to fill in this form.

The commercial value of this step can hardly be overestimated. Not only does it provide means for forming a close annual estimate of actual coal reserves, both old and new, but it also will remove many erroneous conceptions as to the status of Nova Scotian collieries. Particularly this will be true of certain Cape Breton collieries, whose areas are mainly submarine.

One of the first revelations that will be brought out by "Coal Depletion" returns will be the fact that in many collieries there are enormous quantities of available coal remaining in old workings. There are areas, in fact, where, in old workings, the remaining recoverable coal exceeds the quantity extracted. An estimate of this class of reserves is vitally important.

Much light will be thrown upon the applicability of methods used. The determination of the percentage of coal loss or not recoverable will afford a fair standard of comparison between simlarly conditioned collieries. Here, however, we would suggest that the item, "Percentage loss or not recoverable," be divided into two distinct, and not alternative, items. The reasonableness of this suggestion is obvious.

As we present herewith a reproduction of the "Coal Depletion Statement," further comment upon the form is not needed. But it is appropriate to urge upon the

Coal Depletion Statement.

.....Company.....1909.....Year

ITEMS	QUANTITY
Average thickness of Coal Seam in feet	
Angle of dip	
Area worked over during year	
Total quantity, by calculation in tons, in Area worked over during year	
Quantity extracted in tons from Area worked over during year	
Percentage of quantity extracted from Area worked over during year	
Quantity in tons remaining in " " " "	
" " recoverable " " " " "	
Percentage loss or not recoverable " " " " "	
Total area in acres worked over in the Colliery at close of 1906	
" " " " " " " " " " " " 191	

Name or No. of Colliery.....

Name of Coal Seam.....

System of working.....

Total Area proposed to be worked from ..... Colliery.....

Remarks

other coal-producing provinces the exigent need of following in Nova Scotia's steps. They will thus be advancing in a practical and useful manner the work of conserving our natural resources. The word "conservation" is limited arbitrarily by the unthinking to apply merely to nature untouched by man. But the one great lesson that all of us must learn is the duty of using properly what we actually possess. Nova Scotia has mastered the alphabet.

AMERICAN LABOUR UNIONISM IN CANADA.

That American labour unions are losing ground in Canada is patent. It follows, naturally, that home-made labour unions are gathering strength. But the most pregnant fact is that there is now definitely declared opposition to the invasion of Canada by American labour organizations.

For this the costly strike forced upon the employees of the Dominion Coal Company may be thanked. In this strike loud-mouthed agitators from the other side, aided by irresponsible local disturbers of the peace, attempted to gain absolute control of the workmen and to destroy the purely Canadian organization, the P. W. A. In this attempt they failed. Their methods could not carry them to lasting success. They appealed not to the loyalty and decency of the men, but to their cupidity. And good resulted from evil, for the P. W. A., a body deserving of confidence and respect, fought a good fight and emerged strong and confident.

To those who watch current events it would seem a national calamity were American unionism ever to dominate Canada. We are quite capable of conducting our own affairs. If we may judge by a comparison of the U. M. W. A. with the P. W. A., it is obvious that our labour leaders are saner and wiser citizens than any of their foreign opponents.

MINERS' PHTHISIS.

The report of the South African Mining Regulations Commission states that while the death rate among surface and underground white mining males in the three years, 1905, 1906 and 1907, was comparatively low, yet this low death rate concealed a very high mortality among a limited class of white rock drillers. The death rate among mining males is 60 per cent. higher than among those who are not constantly underground. Miners' phthisis (silicosis) carries off six times more underground workers than surface employees. The exact figures of underground death rates are not obtainable as it is known that a considerable number of the afflicted go home to Cornwall to die.

The Commission's Report emphasizes the fact that miners' phthisis is induced almost entirely by the inhalation of dust created by rock drilling and shovelling, and, incidentally, by air vitiation after blasting. The terrible condition of affairs is illustrated by the statement that the average term of rock drillers' employment is seven to nine years; that is, a driller's usefulness is gone after he has worked from seven to nine years.

As a preventive, the Commission strongly urges the compulsory use of sufficient quantities of water. It is pointed out, however, that the men, and not the managements, are to blame. The miners are incredibly indifferent to the danger of phthisis. As a necessary measure it is recommended that no tuberculars be permitted to work underground.

ONE VIEW OF MODERN EDUCATION.

A passage in the inaugural speech of Dr. James Moir, president of the Chemical, Metallurgical and Mining Society of South Africa, is so apt that we quote it here in full. Dr. Moir hits hard and straight:

"What is wanted of modern education is that it shall produce a man who is both a gentleman and an accurate problem-solver; as an American writer says, 'it is necessary to understand that moderately accurate knowledge is like a moderately fresh egg;' and I may say at once that accurate knowledge is not to be gained from text-books and a 50 per cent. pass examination, but solely from the experimental method. Unfortunately, as Armstrong says, our headquarters are 'people who have never knowingly made an experiment, and do not even know how to set about making one.' The result is seen in the so-called 'educated population,' three-quarters of whom still believe in water-diving, or in finding live frogs in stones or similar superstitions, all on evidence, too, that wouldn't convict a nigger. Even the universities want reforming badly: they should leave text-book examinations to preparatory schools, and they should give proper scientific degrees. Why, for example, should the Cape University call a man a Bachelor of Arts after he has passed an Honours examination in Science? What they should organize is a degree in Technics, or Applied Science, only to be given after training in experiment and research. I assume, of course, that elementary science will have been taught at school. The fact is, that British university training, is, almost everywhere except in Scotland, modelled on the Oxford and Cambridge type: the former of these universities apparently considers the acme of human culture to consist in the knack of rendering into more or less indifferent Greek such things as 'we don't want to fight, but by Jingo if we do,' whilst the strong point of the other university appears to be the cultivation of a certain carefully artificialized variety of English speech; and, in both universities, sad to say, Chemistry, almost the most fundamental branch of human knowledge, is relegated to a back seat under the name of 'Stinks.' I will myself say nothing of the educative and disciplinary value of chemistry; let Nernst speak: 'the doctrine of the constitution of organic compounds stands at the head of all theories that the human mind has ever conceived.'"

THE INTERNATIONAL GEOLOGICAL CONGRESS.

From the gathering together of professional men there comes good. The Canadian Mining Institute transcontinental excursion, in 1908, brought definite and prompt commercial results. Also it established many lasting friendships. It is not to be doubted that the recently concluded International Geological Congress will induce similarly beneficent effects.

Dr. W. G. Miller, who was Ontario's representative at the Congress, contributes to our pages a very interesting account of the convention in Sweden. In commenting upon certain iron mining enterprises, Dr. Miller alludes to the surprisingly good treatment accorded to the Swedish miners. The mining towns are commendably clean. The men are well cared for and are well paid. Living expenses are low. Pensions for long service, and insurance against injury are provided. Herein is food for thought.

Canadian operators, especially operators of iron mines, will do well to read carefully and to digest thoroughly this highly informing article.

EDITORIAL NOTES.

The State Geologist of Wyoming, Mr. Edwin Hall, recognizing the evil wrought by long-distance promoters, wrote lately a strong letter on the subject of oil promotions in Wyoming. At the request of Sir Boverton Redwood, to whom the letter was addressed, the communication was published in full in "The Financial Times," London, Eng. Mr. Hall has a practical sense of his duty to the public and to his own state.

Judge Mabee, as chairman of the Dominion Railway Commission, has given recently a decision that bears upon the mining development of northern British Columbia. It appears that, contrary to specific agreement, the White Pass & Yukon Railway has fixed an exorbitant freight rate as between Carcross and Skagway. This rate the Commission decided to cut in half.

A fourth edition of the geological map of the Cobalt area has recently been published by the Ontario Bureau of Mines. The first edition was issued in 1904 before Cobalt had attracted the attention of the public, and was of service to the early prospector in the camp. There have also been reprints of the first three editions. Separate maps have been published from time to time of South Lorrain and other areas contiguous to Cobalt. The last edition combines therewith the area mapped in 1904 and includes the Gillies Limit. The new map is in the same scale as the former ones, 1 mile to 1 inch. The large scale map, 400 feet to 1 inch, was published in 1907.

Great Britain imports granite in large quantities from Belgium, and marble from Italy. The great bulk of imported granite, however, comes from the Channel Islands.

PRESENT DEVELOPMENTS AT GOWGANDA

(Written for the Canadian Mining Journal by G. M. Colvocoresses.)

People visiting Gowganda this summer complain that the camp is very quiet and, from some points of view, this is certainly a fact. From the standpoint of the boomer Gowganda is now numbered among the down-and-outs, and in the columns of certain daily papers it no longer furnishes the settings for thrilling romances of the Monte Cristo order. On the other hand, there is more real serious development and mining work going on than at any time in its short history, and in many cases the results are highly encouraging.

A glance over the present situation shows both bad and good points; the latter I think predominate. The failures that have already been recorded can nearly always be traced to one of two causes,—trying to mine where there is no silver, or lack of sufficient capital to develop properly the property. The last mistake can often be rectified in time; the first is bound to be fatal. There is no excuse for people who buy claims that they have never seen nor have sent any responsible person to examine; no more is there for those who purchase a property on which has been found diabase, calcite and the so-called "aplite," with the conviction that large bodies of pay ore must necessarily be associated with these rocks; and there seems but little more excuse for the men who paid $100,000 in cash, on the surface showing of a single tiny vein with a high grade silver ore shoot two feet in length, three-quarters of an inch wide, and developed by test pit eight feet deep. As a matter of history the ore shoot referred to and many others like it have never produced $100 worth of silver.

At the present time several Gowganda properties are closed down or operating with reduced forces of men. Some of these properties have not been able to find any ore, but in other cases promising finds were made and the suspension of work is due to financial difficulties or lack of power plants, which cannot be installed until next winter. In these cases the management figures that it will be more advantageous to wait until winter than to continue work by hand throughout the expensive summer months. I say expensive summer months because Gowganda is a topsy-turvy place in this respect. It is fifty miles from the railroad and in the midst of a forest, where nothing edible is yet grown and no industries or settlements are established. In winter, over the snow road and lakes, it costs $1.50 per 100 pounds to bring in supplies from the railroad; in summer by boat to Elk Lake, and thence by a very rough wagon road, it costs $2.50 to $3.00 per 100 pounds, with a practical impossibility of hauling in boilers or heavy machinery. So instead of laying by supplies for the winter, Gowganda takes advantage of the winters to bring in its machinery, send out most of its ore and lay in supplies to last until the succeeding December. Some day, it is to be hoped that a railroad will find justification for building



Camp and Power Plant, Millerett Mine

into the camp, but that has not yet been the case. After all, Gowganda is barely two years old, and development under the existing conditions is of necessity slow.

On the bright side of the picture it may be said that Gowganda has already (September 1st) shipped out 415 tons of cobalt-silver ore, contributed by seven different mines, and another 100 tons is now bagged up in the ore houses. About 120 tons of the production is high grade ore assaying between 3,000 and 4,000 ounces in silver per ton, and the balance is second grade ore assaying somewhat less than 800 ounces per ton. Besides this there are several thousand tons of low grade ore on the dumps awaiting the arrival of concentrators, of which I shall have more to say later.

Another encouraging point is the continually widening area in which good properties are being developed. Last summer nearly all underground work was confined to the Gowganda ridge and the Miller Lake section, whereas this year development is going on to the south and west at Smoothwater, Wapoose, Spawning, Duncan, and Shining Tree Lakes, and to the east at Calcite. Bloom, Lost, Wigwam, and Long Point Lakes. At all these places some ore has been bagged up and it looks as if productive mines might be developing.

The geology of the Gowganda district is similar to that of Cobalt and the Montreal River section, and I shall not describe it in detail. The rock formations are Keewatin greenstones, Laurentian granite and gneiss; Huronian conglomerate, slates, graywackes, quartzite, and Pre-Cambrian diabase. With one notable exception all the producing veins have so far been found in the diabase.

The original discoveries of the camp were nearly all made on bald bluffs and ridges, but this seems merely due to the fact that these ridges required no stripping and were most easily prospected. Subsequent work has uncovered equally good veins under overburden and in the hollows and when the underground exploration gets under the muskegs and shallow lakes which occupy a very large area there is good reason to believe that, as at Cobalt, important finds will be made beneath them.

A more detailed description of some of the mines in the camp may be of interest, the properties mentioned being those on which the development work has been most extensive and with which the writer is best acquainted. There are many other properties which from present indications will have equal merit.

Near the south end of the "Ridge," just west of Gowganda Lake, is located the Bartlett mine, which for certain reasons was once the most widely known proper-



Car Load of Ore Leaving Mine for Charlton



No. 1 Shaft, Millerett Mine, April, 1910

ty in the camp. The prospect itself appears to have real merit. The surface showings were very fine and two shafts some distance apart have been put down to a depth of 100 feet. Very little drifting or crosscutting was done at this level. The ore shoots appeared to pitch in the veins and no ore was found in the bottoms, though it had shown up strong for 40 or 50 feet in depth. Some high grade ore over three inches in width was taken out in sinking these shafts; one ton was shipped out last summer by canoe and a few tons are left in the ore house. The mine is equipped with the largest plant in the camp, much too elaborate for a prospect. This consists of two 85 h.p. return tubular boilers, a 12-drill compressor, high speed engine and generator for electric lights, large hoists, pumps, machine shop, etc. The cost of the plant and its erection is said to have been $125,000, and after this expenditure there was comparatively little money left for development work, and in December, 1909, the mine closed down. Since then the company owning this property has been partially reorganized, and it is to be hoped that operations will shortly be resumed and the mine be given a chance to show its value as an ore producer and not as a vehicle for stock jobbing.

North of the Bartlett is located the Reeves-Dobie, which had the finest surface showings in the camp. Last winter 62 tons of ore were shipped, extracted largely from open cuts near the surface, and several tons are now bagged up awaiting shipment next winter. Besides the original showings, many new surface finds have been made and the stripping has proved a dozen veins in a width of 300 feet lying parallel to each other and nearly all showing high grade ore shoots. The main shaft is now down 200 feet, and a crosscut has been started to intercept these veins, and should they prove strong at this depth the future of the property will be assured for some time to come. At another point several calcite veins close together and all carrying a little silver give a body of ore 12 feet wide and said to average close to 100 ounces in silver. This has been developed to a depth of 80 feet and the management are so well satisfied with the quantity and grade of ore shown that they have ordered a small mill consisting of a crusher, four Nissen stamps and Wilfley tables, and this equipment is now on its way to the mine.

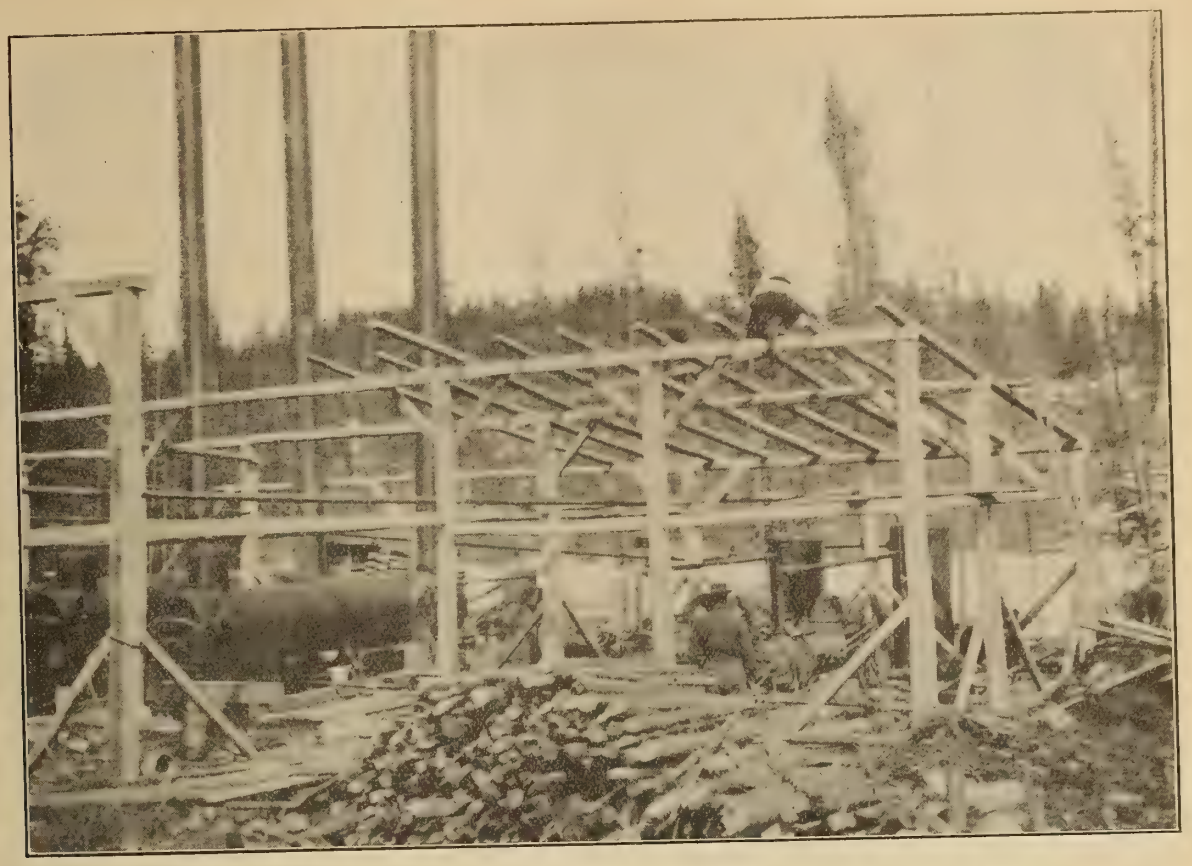


Power Plant Reeves-Dobie Mine

The Reeves-Dobie veins extend over into the Welsh claims, where active development is in progress. Two shafts are now down about 50 feet on different veins and both show some silver in the bottom. Moreover, an adit crosscut is being driven from the hillside to cut through all the principal veins at a depth of 120 to 160 feet. This has now a length of some 250 feet; but when completed will be over 1,200 feet long and will join with both the shafts.

A mile north of these properties the Mann mine is working. The spectacular hillside silver shoot which used to be one of the sights of Gowganda is no longer to be seen. At this particular point the production was most disappointing, for the rich ore only extended down a few feet below the outcrop. However, several other good finds have been made on this property, and from one of the veins good ore is now being taken at the 90-foot level, while upwards of $20,000 worth of high grade material is in the ore house and several hundred tons of mill rock are on the dumps.

Just west of the Mann the Boyd-Gordon has done ex-



Erecting Power Plant, April, 1909

tensive development work with a shaft 125 feet deep and some 500 feet of crosscutting and drifting. This property shipped 35 tons of ore last winter. Work was suspended for a time this spring and summer, but the mine is now operating again and should contribute to next winter's ore shipments.

East of the Mann the LaBrick Company began active developments this summer and are sinking a shaft on a strong calcite vein carrying smaltite and niccolite.

Further north again, several properties are carrying on developments, notably the Bishop and Trans-continental. The surface showings were fairly good, but the underground work has not progressed far enough to prove or disprove the existence of workable ore bodies.

All the producing veins in the Gowganda ridge are of practically the same type. They are narrow fissures in the diabase with little or no evidence of faulting. The width varies from one to three inches and on the surface the veins are traced from 50 to 500 feet, showing calcite throughout their entire length. Cobalt bloom is often found for a good part of the distance, and the silver ore shoots are comparatively short, from 10 to 50 feet in length, though sometimes more than one ore shoot will occur on the same vein. The silver occurs native with calcite and occasionally as argentite or ruby silver, nearly always accompanied by cobalt and nickel minerals, but conversely silver does not by any means always accompany cobalt and nickel, though it can fairly be said that the cobalt is a good indicator for its occurrence. Other minerals found in the veins are bismuth, galena, graphite, specular iron and copper pyrites. These have no commercial value, nor can the presence of any of them be called especially favourable to the discovery of silver.

There are also several strong fault fissure veins on the ridge filled with calcite and from one to six feet in width. Cobalt minerals are found in places in these veins and low silver assays are reported, but in this section no mining has yet been done on them.

Four miles east of the Gowganda Lake mines lies the Miller Lake group of properties. The veins in this section present more variety than those in the "Ridge," and the development work is just now being carried on more vigorously than in any other part of the camp.

South of Miller Lake, properties have been developed by two syndicates at LeRoy Lake (one closed down temporarily), and by the Canadian-Gowganda and Northern Mining Company (Morrison Claim).

The developments at the two last named have been encouraging. The Canadian-Gowganda is down 100 feet and several veins have been crosscut on both the 58 and 100-foot levels. From the 58-foot level a little ore was produced by the development work and, if work is carried on steadily, the mine should ship next winter.



Loading Ore Shipment on Montreal River Steamer at Elk Lake



Mann Mine Trenching, Showing Surface of Typical Vein

On the Morrison property developments only started in July and two shafts are being sunk on a strong calcite vein having a width of three to eight feet and traced on the surface for one-third of a mile. There is silver in both these shafts, the high grade ore being confined to a width of four inches. Elsewhere the calcite contains copper and iron pyrites, galena, bismuth, smaltite and niccolite. Two other veins which intersect the main lead show silver on the surface, and the outlook of this prospect would seem exceptionally promising.

Just north of Miller Lake is the Gates, or Big Six mine, belonging to Mr. M. J. O'Brien. This property has been vigorously developed ever since March, 1909, and last winter eleven tons of ore were shipped. The values were pockety in the vein above the 50-foot level; but a marked improvement took place at that depth, and on the 90-foot level the ore shoot is 116 feet long, averages rather better than two inches wide, and the ore assays close to 4,000 ounces in silver. A car load of very high-grade ore has been extracted this summer and will probably be shipped at once.* The ore has every appearance of going down strong, and if another level proves it up equally good, this mine will be a steady shipper. At the present time I think it has the best underground showing in diabase in the camp.

North of the Gates is the Millerett which has shipped 305 tons of high-grade and medium-grade ore. This property, formerly known as the Blackburn claim, has 42 1-2 acres, on which Keewatin, conglomerate and diabase are found. There are some nice surface showings in the diabase and they are being developed at the present time, but so far almost all the production has come from one strong vein in the conglomerate. The high-grade ore

* Editor's Note.—This car has already been shipped and smelted. The returns were exceedingly satisfactory.

showed on the surface for a length of only 20 feet, but an adit level run in from the hillside under a back of 50 feet proved the ore to have a length of 150 feet, and this shoot has now been developed continuously to a depth of 180 feet below the surface and excellent ore is being taken from the lowest level. The width of the vein varies from one to four inches and the high grade ore so far has assayed 3,500 ounces. On each side of the vein for two feet the wall rock is well shot with silver and a large tonnage of good milling rock is on the dump and developed in the mine. To treat this it will probably seem advisable to erect a concentrator this winter.

It should be said that there is a great deal of similar Huronian conglomerate in the Gowganda district, and it appears to warrant more careful prospecting than has yet been accorded to it, for it would be very strange if this formation, which is responsible for 80 per cent. of the producing veins at Cobalt, should carry only this one Millerett vein at Gowganda.

The Bonsall mines adjoin the Millerett on the north and west and development is also in progress on this property. Four tons of high-grade ore was shipped by this company during the summer and ore is being mined at the bottom of a shaft now 66 feet deep.

Northeast of the Bonsall a strike has recently been made on the property of the Everett Lake Company and good ore is being sacked up from a surface opencut 70 feet long.

Something over a year ago the Canadian Mining Journal expressed the opinion that Gowganda was a camp well worth prospecting and development. I think this has proved to be the case. The prospecting is still going on and new veins found this summer are quite as promising as any of the original discoveries. The development is progressing and some of it is serving to block out reserves of rich ore, while a small but steady ore production is being made by at least ten different mines, all of which should make shipments this coming winter. The development has proved that it takes both time and money to put a mine on a producing basis at Gowganda and the money has to be put into the ground and not spent in advertising or head office expenses. It has proved that the ore lies in shoots or lenses of irregular length and depth, and in width rarely exceeding two or three inches. These shoots sometimes pinch out into blank calcite, but just as suddenly another good shoot will appear below or further along the same level. The shoots generally pitch in the veins, sometimes at quite a flat angle, and it is this which has caused many shafts to pass through the good ore at a depth of from 20 to 60 feet and often the ore will be picked up in the drifts.

At first Gowganda was looked at solely from the standpoint of a high-grade camp. This is a mistake. A very considerable quantity of milling ore, assaying from 30 to 100 ounces per ton in silver, is now being developed. It is all very nice to mine ore worth $1,000 or more per ton, but the occurrences of such ore are irregular, the veins extremely narrow, the quantity is sure to be limited, and the working costs very high, for, obviously, we must handle four feet width of waste rock to get the one or two inches of bonanza vein matter. It has become a pretty well established rule in all mining camps that in the long run the low grade mines are the biggest dividend payers, and I believe that the greater part of Gowganda production will eventually come from mills treating the comparatively low-grade rock which is really first-class concentrating ore.

So far it cannot be said that any very large mines have been developed at Gowganda, nor, indeed, has the development proceeded far enough to make any definite forecast as to the future of the camp; but from present appearances there are pay veins in the district. There are properties that can make a steady and profitable production and that in another year will deserve to be classed as good little mines, and Gowganda may hope to hold its present place after Cobalt, but a long way after Cobalt, as the second silver producer of Ontario.

THE NICKEL INDUSTRY.

(From Engineering Supplement, London Times.)

The world's production of nickel, which showed a marked increase during the years subsequent to 1900, has for the last few years remained fairly constant. The demand has been steady, but there seems very little doubt that it would have been much greater had the metal been obtainable at a slightly lower price. The price has been high chiefly through the instrumentality of the International Nickel Company, which has controlled prices in America and has succeeded in influencing outside markets as well.

The properties of nickel in itself are such that it will always command a wide sphere of utility. Its resistance to the attack of alkalis, the difficulty with which it is corroded by most acids, its durability, and the high polish it is capable of taking place it high amongst the commoner metals. It is these properties which have led to its adoption for such purposes as field and ship cooking utensils and for replacing copper as coinage, while it has long been used for electro-plating, and in this respect is little inferior to silver, while obtainable at a much smaller cost.

Nickel will alloy with most of the useful metals. Among such alloys the so-called German silver, which consists essentially of nickel, copper and zinc, is most widely known. The most valuable properties of German silver are its white colour, its brilliant lustre, hardness, tenacity, toughness, malleability, ductility, and power of resistance to many chemical influences. The presence of cobalt does not seem to interfere with these properties. A new alloy known as monel metal, which consists of one part copper and three parts nickel, with a small amount of incidental impurities, has many excellent properties, chief of which is its great resistance to the attack of acids.

It is the combination known as nickel steel, however, which utilizes most of the nickel mined at the present day. Nickel steel is principally used for armour plates, but the toughness of this alloy or mixture renders it also applicable for other purposes. Recent tests have shown its utility for rails and for rivets, and it has been adopted for the barrels of small arms. The presenec of nickel, up to 20 per cent., in steel increases the elastic limit and breaking stress, and steels rich in nickel are practically non-corrodible. Alloys have been made containing a high percentage of nickel, but it has been found that for general purposes, taking into account the relatively high price of the metal (at present about £160 a ton), the best result is obtained with the greatest economy when it is present to the extent of about 2 per cent.

Until quite recently the entire nickel supply of the world was obtained either from the Sudbury district of Ontario, Canada, or from the ores of New Caledonia. The other sources are still insignificant compared to these, but there is a possibility of great developments in the near future. About 60 per cent. of the world's nickel supply is mined at the present time in the Sudbury district. As early as 1770 Canada's deposits in Algoma, which borders on Sudbury, were worked as a

source of copper; but the true nature of the deposits was not recognized till in recent times the officers of the Canadian Geological Survey pointed out that they would probably be workable. The Sudbury deposits first attracted notice in 1883, during the construction of the Canadian Pacific Railway, and in 1886 they were first exploited for nickel. The ore in this district is mined and treated by two companies—the Canadian Copper Company and the Mond Nickel Company. A new company, the Diamond Nickel Copper Company, has started operations in the Northern range. The ore of the Canadian Copper Company is chiefly raised from the Creighton mine, which is rich in nickel, while the Mond Nickel Company obtains its supply principally from the Victoria mines. The ore is smelted into a matte by the Bessemer process, and this matte, which contains about 40 per cent. of nickel and about the same amount of copper, is then shipped for the production of pure nickel, by the former to Constable Hook, Nova Scotia and other places, and by the latter to South Wales. The ores from the Cobalt district, worked for their high silver content, give the only other supply from Canada, but in this case the metal is only a by-product, and the nickel content is not reckoned with in the sales. There are indications of workable deposits further north in Canada. Returns for the nickel industry of Ontario in 1908 give the following figures: Ore raised, 409,551 short tons; ore smelted, 360,180 tons; Bessemer matte produced, 21,197 tons; nickel contents, 9,572 tons; copper contents, 7,503 tons. The ore also contains considerable amounts of silver, palladium, platinum and gold.

All the ore in New Caledonia is exported to France, Great Britain and Germany for smelting, although plans have often been discussed for treating the ore on the island. In Great Britain the ore is treated by the Glasgow Nickel Company at Kirkintilloch. The approximate output of nickel ores from New Caledonia during the year 1909 was 120,000 tons.

There are now two other countries which produce nickel. In Norway it is worked in the valley of Sotersdalen, not far from Christiansund. The output in 1908 was only 81 tons, but has now probably much increased. Nickel was produced in the United States for the first time from its own ores in 1908, by the North American Lead Company, but the production was small. The Orford Copper Company and the Balbach Refining Company refine nickel, but obtain their supplies from the Bessemerized matte from Sudbury or from other sources. A deposit of ore somewhat resembling the Sudbury ore has been found in Nevada, but has not been worked. Particulars of a recent development at Webster, Jackson County, North Carolina, were given lately. Dr. Hennig has worked out a process for direct reduction in the electric furnace of a nickel silicate ore found there. A product consisting of silicides of nickel and iron with some chromium, aluminium, magnesium and a little carbon is obtained, which can be applied directly to the manufacture of nickel steel. The production of ferro-nickel, nickel alloys, and metallic nickel is also contemplated.

For refining nickel, or obtaining the metal from a nickel-copper matte, various processes have been adopted. The preparation of nickel oxide and direct chemical reduction gives an impure product as a rule. Formerly commercial nickel only contained about 94 per cent. of the metal, but in the last few years the commercial metal has greatly risen in purity. An analysis of one of the best makes of nickel would give figures of the following order: Nickel, 99.1 per cent.; cobalt, 0.4 per cent.; iron, 0.3 per cent.; carbon, 0.05 per cent.; manganese, 0.05 per cent.; silicon, 0.10 per cent. These figures, and the nature of the elements present as impurities, of course vary according to the nature of the ore and the methods adopted in refining it. In the United States, since 1894, electrolytic methods have been largely employed. Copper is deposited apart from the nickel in the actual electrolysis. Nickel is almost invariably deposited from solutions which have been made alkaline by the addition of ammonia, copper having been eliminated in a previous operation. In Germany, at the Papenburg works of the Aligemeine Electro-Metallurgische Gesellschaft, an electrolytic process known as the Hoepfner process has been adopted. In America the chief processes which have been tried or adopted are the Thum process at the Balbach Company's works, Newark, the process of the Orford Copper Company at Bayonne, New Jersey; the Brown process at Cleveland, Ohio, by the Canadian Copper Company, and the Hybinette process at Sault Ste. Marie.

The process adopted by the Mond Nickel Company at their Clydach works in South Wales is unique not only in the manufacture of nickel, but in the whole domain of metallurgy. The method adopted gives nickel of a very high degree of purity, seldom less than 99.9 per cent., the small trace of foreign elements left being carbon and iron. The Mond process depends on the formation of an easily volatile compound formed by the action of carbon monoxide gas on finely-divided nickel. This compound, known as nickel carbonyl, is easily decomposed by heat, leaving pure nickel, with the evolution of carbon monoxide, which is used again to act on further impure metal. The discovery of the formation of this compound, which was originally accidental, led to a patent being taken out in 1890 by the late Dr. Ludwig Mond for refining nickel, but it was not until 10 years later that it was used on the commercial scale. Since no other element present under ordinary conditions, with the exception of iron to a very limited extent, forms a carbonyl, the nickel is free from other metals, and especially from cobalt, which is separated only with extreme difficulty in other methods of refining. The metal appears on the market in the form of pellets varying in size up to 5-16-inch in diameter. The works at present turn out about 1,800 tons of nickel a year, but are being much enlarged.

The future production of nickel, at any rate in so far as it will be used for the manufacture of nickel steel, will, it seems, lie in the formation of ferro-nickel by direct reduction in the electric furnace, and with cheap electric power, and by working possibly some of the sources of nickel not yet tapped, it seems probable that the price may be considerably reduced. But in such a complicated problem as is afforded by the addition of various alloys to steel, it is difficult to see what the future may have in store. There are indications that vanadium and chromium, if the former can be obtained sufficiently cheaply, may replace the use of nickel; but, whether or not it is superseded as a toughening addition to steel, the fact remains that pure nickel, by reason of its excellent properties as a metal, must always find its uses, and the extent to which it is employed will depend on its cost.

Out of a group of 23 British iron and steel companies whose reports are lately to hand, 17 paid dividends during the past fiscal year, and 6 paid none. Dividends ranged from 1 1-4 per cent. to as high as 30 per cent. Six of the companies paid 10 per cent. or more. 16 companies showed larger cash reserves.

ELEVENTH INTERNATIONAL GEOLOGICAL CONGRESS, SWEDEN, 1910

By Dr. W. G. Miller.

(Written for the Canadian Mining Journal.)

The International Geological Congress meets at intervals of three or four years. In 1906 the congress was held in Mexico and in 1903 in Austria. Meetings in earlier years were held in Russia, France, and other countries. The eleventh, or 1910, congress met in Sweden. At this congress, following the custom of preceding ones, there were geological excursions both before and after the sessions, together with short ones from Stockholm during the sessions.



Parliament Buildings Stockholm, Headquarters of Congress

Before the sessions, which were held during the period August 17th to 25th, one had the choice of eight excursions, the two longest of which began in July and lasted for about three weeks. The excursions were numbered A1 to A8 respectively, and were arranged with the object of illustrating special branches of geology as exemplified in Sweden. For instance, excursion A.1 was to Spitzbergen. In order to show the object of this excursion one cannot do better than quote from the excellent guide book written for the excursionists by De Geer, the distinguished leader of the party: "When it was determined that the International Geological Congress should meet in Sweden, it was but natural to arrange a geological excursion to Spitzbergen, a land, which, owing to the numerous Swedish expeditions, has been called a Swedish scientific conquest. On Spitzbergen the different geological systems are more fully represented than in any other land in the polar region.

"This together with its geographical position gives to Spitzbergen a special geological interest, that land being situated just where the great continents of the eastern and western hemispheres most closely approach one another, thus giving a chance for more reliable time-correlations than is possible by palaeontological evidence alone when applied to far distant localities on different sides of the great oceans.

"Furthermore, Spitzbergen forms a part of the same continental plateau as Fennoscandia, and affords valuable information about the evolution of Scandinavia and the adjoining oceanic depression even during periods which are not represented on the peninsula in question.

"Last, but not least, Spitzbergen affords excellent opportunities for comparative studies of glacial conditions and glacial organisms, the knowledge of which is so necessary for the closer study of such a land as Sweden, being essentially characterized by its former glaciation. It has, indeed, become almost indispensable for Swedish scientists now and then to revisit the Arctic region where it is best accessible, or in Spitzbergen, in order to get the right explanation of such new questions as always arise with the development of science."

Spitzbergen is "no man's land," being under the jurisdiction of no country. Several nations are casting covetous glances towards it, now that a United States company has put the coal deposits on a commercial basis. This coal, by the way, came in very opportunely for the excursion steamer this summer. She ran aground and her supply of coal had to be thrown overboard. After being floated a supply of Spitzbergen coal was secured and proved to be of good quality. Had it not been for the enterprise of the American miners, distinguished geologists of several nations might still be lingering in the chilly atmosphere of the far north. This coaling station, it may be added, disturbs the naval plans of several nations. A supply of fuel for warships is now available from a new quarter.

I shall not, however, say more of the perils and pleasures of the Spitzbergen excursion, although I heard much of them from members of the party on their return to Stockholm, but suggest to the Editor of the Journal that he try to induce Prof. A. P. Coleman, of the University of Toronto, who accompanied the excursion, to write a paper and illustrate it with some of those excellent sketches he made of icebergs, fiords and mountains during the trip.

Excursion to Norrland and Lappland.

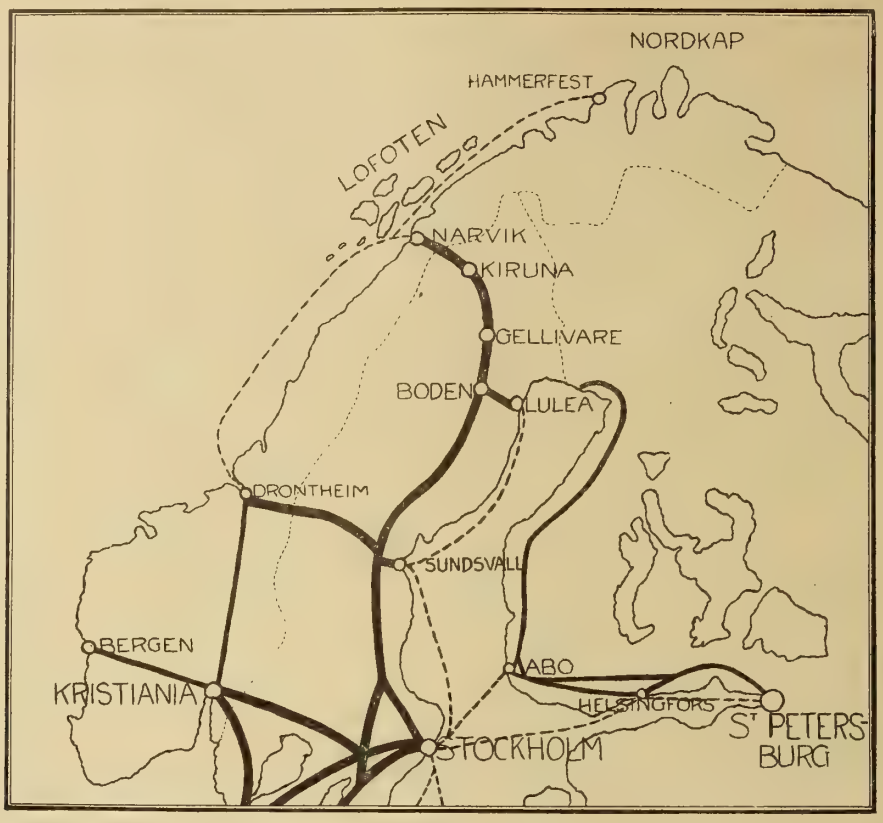
Excursion A.2, which the writer had the good fortune to accompany, left Stockholm on July 27th and returned on August 17th. The object of the excursion was to study "the structural geology and eruptive rocks of Norrland together with the iron ore deposits of Lappland." The route we followed to the north is shown in the accompanying sketch map.

The train was left at Sendsvall and an excursion of a few days' duration was made by boat to Alno and other islands along the coast. After leaving Kiruna we proceeded to the port of Narvils. Thence by boat south along the Norwegian coast to Trondhjem, whence we took train to Stockholm.

We were fortunate in having such an interesting route chosen for the excursion, and we were doubly fortunate in having such good men as leaders. From the day of departure until August 7th, Prof. A. G. Högbom was our "guide, philosopher, and friend." Earnest, enthusiastic, kindly, and conscientious, he captivated us all. The geology of his native country is a serious subject with him. Dilettantism has no place in his make up. What a great theologian he would have made in the olden days!

The first six days of the trip were devoted to a study of thrust planes, pre-Cambrian and other series of rocks, together with an ascension of one of the popular mountains of Sweden, Areskutan.

The next five days were given to "the eruptives of Ragunda, Alno, Rodo and Nordingara," famous locali-



Itinerary Map

ties. We all heard of them in our student days. One gets curious preconceived ideas not only of men but of places. I had always thought of the Isle of Alno as having "a storm- and rock-bound coast"—probably the study of thin sections of alnoite under the microscope had something to do with it—but we found it to be a smiling isle "where every prospect pleases." Our visit was in haying time, and, after looking at outcrops of remarkable rocks, alnoite and various nepheline and olivine-holding types, together with what is said to be eruptive limestone at the seashore, we tramped across country through sweet-smelling meadows and over park-like hillsides, viewing outcrops of various facies of the eruptive rocks, among which was calcite pegmatite. Then we had luncheon beautifully served on a lawn which "scorned Arcadian pride." I, at least, departed from the isle with my preconceived impression of it entirely gone. Alnoite will mean more to me hereafter.

Gellivare and Kiruna.

Having finished the second section of the trip we proceeded northward in order to visit the great iron deposits of Lappland—"les grands gisements de fer de Gellivare et de Kiirunavarra-Luossavarra, leur rapport avec les roches encaissantes." Our leader in the study of these iron deposits was Hjalmar Lundbohm, "directeur des mines de Kiirunavarra et Gellivare." What shall I say of Lundbohm? He possesses social qualities that would make him a desirable member of the Canadian Mining Institute. Need I say more? I wish Sweden were not so far away. We should have him at some of our annual meetings. That Scotch set—the Major, the Colonel, the late ex-Treasurer et al—would find that there are others.

Mr. Lundbohm has accomplished much for the mineral industry. He is given the credit of having done most to make iron mining at Kiruna and Gellivare the great success it has become. Early attempts at iron ore mining in these northern latitudes were not very successful. It was a question of waiting for the man. A former member of the Geological Survey, he saw the great opportunity there was for developing an industry that would be of great benefit to his country. He took hold of the mines when they were almost at a standstill. The government, although subjected to much criticism, built a railway through the barren region of Lappland and to the seacoast, where a harbour has been developed for the shipment of the ores at Narvik. Shares in the company controlling the mines are now selling at about five times their par value. In a short time the mines at Kiruna will be models for the world.

In addition to his work in mining, Lundbohm takes an active interest in all things that tend to the advancement of his country. He is a close student of technical education problems and is providing educational facilities both for the workmen and for the boys and girls of his mining towns. He is also an intelligent student of political conditions in general.

The iron deposits at Kiruna can be classed among the great ore bodies of the world. The following notes on the Kiruna district are taken from Lundbohm's guidebook, prepared for the excursionists:—

Iron Mines at Kiruna.

"About the geology of the country around the gigantic iron ore deposit of Kiirunavaara very little has been known until interest was raised in utilizing the ore technically and commercially, and, in fact, until that time it was rather difficult to arrange systematic investigations in this desolated region. Besides, the proportions of the ore mountain have, so to say, paralyzed the interest of the geologists in everything else, most of them being fascinated by the richness accumulated in the ridge of the mountain. Very few devoted their studies to the remarkably interesting surroundings.

"The first accurate, and, indeed, very important and useful survey of the iron ore deposits and of the district, was executed in 1875 by a commission in charge of the

Geological Survey. Later on K. A. Fredholm collected some very interesting data, which were published. In 1896, Professor Helge Bäckström and the author of this paper started a thorough investigation and published a short description of the more essential geological and petrographical features of the district; in 1897 the author made a study of the deposits from a practical point of view for the government, and lately very important and extensive reports have been published by O. Stutzer and P. Geijer.



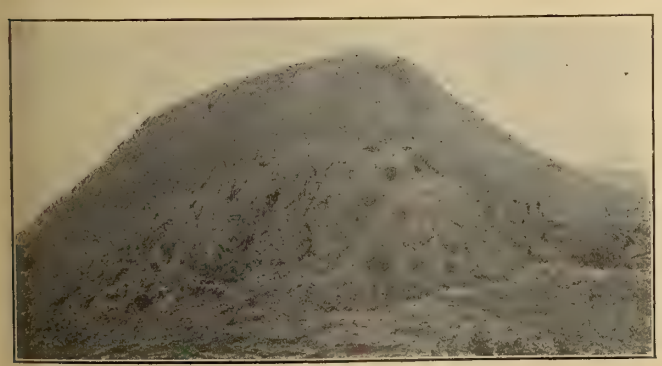
General View of Kiirunavaara Iron Ore Mountain

"The Kiirunavaara and Luossavaara iron ore fields are situated in Lappland, halfway between Torne River and Kalix River, about 90 miles north of the Polar circle, 186 miles from the port of Lulea at the Baltic Sea and 105 miles from Narvik at the Ofoten Fjord in Norway. Both these ports are connected by a railway, built for ore transport, but also connected with the railways of southern Sweden. The distance from Kiruna railway station to Stockholm is 876 miles.

"The preparatory work for the mining of the ore was started in 1898; in the following year, when the railway reached Kiruna, it could be continued on a large scale; in 1902 the railway was completed and prepared for extensive traffic, which commenced in 1903, when about 800,000 tons were exported.

"Kiruna is situated in a desolate country, quite uninhabited before mining was commenced, and only periodically visited by Laps, the nomadic tribes, that for many hundred years have been the only inhabitants of the district and still are numerous and comparatively prosperous.

"The climate is rather severe, the yearly average temperature being 29.3 degrees, and the winter, lasting from the beginning of October to the end of May, generally bringing huge masses of snow and very often a temperature of 4 to 31 degrees below zero. During one month, at Christmas time, the sun is below the horizon, but in the summer the midnight sun gives a bright illumination day and night.



Statsradstoppen Summit of Kiirunavaara Iron Or Mountain

"In the year 1900 the building of houses was started at the new place Kiruna, and since then a community has grown up, now containing about 7,800 inhabitants. From the central part of the town an electric railway is built for the workmen to the foot of Kiirunavaara, from where they are carried on an incline up to the mines.

"The iron ore mountain is on an elevated plateau consisting of vast moorlands and moraines. Several rather big, rounded, mountains and hills rise in the neighbourhood. The Kiirunavaara and Luossavaara are the highest, the former reaching a height of 2,453 feet above sea level and 853 feet above the flat valley between the two mountains. The whole district lies in the birch region and most of the tops rise above the tree limit.

"The ore mountains, forming the central part of the district, consist of igneous rocks, syenites, and porphyries, the ore lying in the latter, and this whole igneous district is bounded on both sides by sedimentary rocks. These are in the west a series of conglomerates, resting on more or less metamorphosed igneous rocks, temporarily called soda-greenstones, all grouped together under the name of the 'Kiirunavaara complex.' The series bounding the ore-bearing porphyry district in the east is called the 'Hauki complex,' after the hill Haukivaara. It consists of quartzites, conglomerates, phyllites, beds of igneous rocks and of a relatively thick formation of quartzitic sandstone. East of these rocks there is another area of ore-bearing porphyry.

The Iron Ore.

"In the area here described there occurs commercially valuable iron ore in Kiirunavaara, in the mountain ridge itself and in some minor deposits to the south-east of the great ore body, in Luossavaara as a comparatively large deposit commencing far down on the southern slope of the mountain, and extending across the top down upon the northern slope, and as a small deposit upon the eastern slope of the mountain, and finally in Tuolluvaara. There are, besides, minor deposits of low grade magnetic iron ore in a small area between the lakes Syvajarvi and Nokutusjarvi, and there appears numerous long but narrow strata of low grade hematite in the rocks of the Hanki complex.

"The Kiirunavaara ore deposit commences in Luossajarvi and continues towards the south, as far as is known, with a length of somewhat more than 5 kilometres (3 miles). The mountain ridge itself, with a length of about 3.5 kilometres (2 miles), consisting exclusively of iron ore, is divided into 11 more or less strongly marked hills. When the survey and mapping of the mountain was executed in 1875 by a commission appointed by the government, these hills were given names after the persons who in some way or other took part in the work.

"Although the iron ore generally is intersected by innumerable joints, it has resisted the erosion very much better than the surrounding rocks, which is the reason why the ore forms an elevated ridge in Kiirunavaara and a well marked top in Luossavaara. In the former mountain the ore dips to the east about 54 degrees. The hanging wall has been eroded more than the foot wall and for this reason we do not get the right width of the ore body by a direct measurement. It has, however, been possible to find the dimensions near the surface with the help of cross sections constructed according to the angles of dip found by diamond drillings.

"In the about 3,000 metres (10,000 feet) long mountain ridge, where the boundaries of the ore body are very well known, its horizontal width is on an average 96 metres (315 feet) and the thickness, at right angles to the hanging and foot walls, 78 metres (256 feet) ac-

cording to measurements made on 56 section-lines, taken 50 metres (164 feet) apart. There is no exception from the rule that the ore body is heavier in and around the highest tops and narrower in the lower parts of the ridge. The maximum thickness has been found in a cross section through the hill Geologen, where the horizontal width is 196 metres (643 feet) and the thickness about 164 metres (536 feet). In the highest peak, Stratsrädet, in a tunnel right across the ore body, 138 metres (453 feet) above the level of the lake, the horizontal width is 188 metres (617 feet). In the lowest parts of the ridge the width of the ore varies between 40 and 56 metres (131 and 184 feet).

"The horizontal area of the ore body, including the deposits south-east of the ridge as well as the deposits in the lake, has, by adding areas of horizontal sections, each of a length of 50 metres (164 feet), taken at the outcropping of the hanging wall, been calculated to be about 436,000 square metres (4,692,104 square feet).

"The question as to the depth which this deposit reaches is of equally great interest from a theoretical as from a practical point of view, but unfortunately we are lacking material for a safe estimate of the same. In order to obtain information as to the quantity and quality of the ore, a great number of diamond borings were made to a total length of nearly 6,000 metres (19,680 feet), and important conclusions may be drawn from the results of these borings.

"Below the level of the Lake Luossajärvi the boundary between the hanging wall and the ore is struck at eight different points of which three lay respectively 146.7, 205, and 236.7 metres under that level. The boundary between the ore and the foot wall has been struck at six points, of which two lay at a depth of 106.8 and 114.3 metres. The greatest known depth of the ore is in the claim Zenobia, where the drill hole finished in ore 300.6 metres below the lake, and thus 548 metres (1,797 feet) under the mountain's highest top. Here the ore must have a considerably greater breadth deep down than in daylight.

"The borings, as well as the mining, have proved that the dip of both the hanging wall and the foot wall is very variable, but, if the averages for all observations are calculated, it becomes practically equal. Thus these borings confirm the supposition first arrived at, that the walls of the ore body are very uneven and consequently that such variations in the thickness as occur in the surface also may occur in the vertical direction. In other words, we must not from the incidental decrease in thickness draw the conclusion that the ore rapidly wedges out. On the contrary there seems to be a very strong reason to believe that the ore body continues to a great depth, an assumption which has been strongly confirmed by the survey of Carlheim Gyllenshold.

Luossavaara Ore Deposit.

"The ore deposit in Luossavaara, which is quite separated from that of Kiirunavaara, has a length of about 1,200 metres (3,936 feet) and reaches its greatest width at about 50 metres (164 feet) in the top of the mountain. The ore dips about 65 to 70 degrees east. Those diamond borings, which have hitherto been carried out, indicate a decrease in thickness of the ore body in depth.

"In the hill Tuolluvaara there are a number of ore deposits scattered round. The largest of them has a horizontal width of up to 30 metres, and dips about 60 degrees southeast. The horizontal area of the outcrop of all the more valuable ore bodies has been estimated to be about 14,800 square metres (159,307 square feet). According to the results of some deep drill holes, the largest should wedge out 230 metres (754 feet) below the surface, but there are strong reasons to believe that it has a pitch to the southwest and probably continues to a greater depth.

Character of the Ore.

"Another more interesting peculiarity is the richness of the ore. The ore, consisting almost exclusively of magnetite, is remarkably free from all non-metallic constituents, except apatite. Hematite occurs intermixed to a larger extent in the hill Professorn and in some parts of Luossavaara; as small, irregular lumps, crystals and very numerous thin crack-fillings in the magnetite, the mineral is found everywhere, but perhaps most commonly in the hills Geologen, Bergmastaren and Kapten in Kiirunavaara; and also in Tuolluvaara.

"Among other minerals, occurring sparingly, may be mentioned pyroxene and uralite, tourmaline, talc, and asbestos. Calcite and pyrite are rather common in cracks at greater depths, especially in the hill Professorn; rutile is found in thin sections of very pure magnetite in the hill Vaktmastaren, and titanite as idiomorphic crystals in the ore, for instance in the southernmost hill Jagmastaren and more commonly in Luossavaara . The amount of titanic acid in the ores is generally not as much as 0.5 per cent., the sulphur percentage averages 0.05 or less.

"Apatite is also present, but in the most varying proportions. In the northernmost hill, Vakmastaren, now mostly quarried out, and also in the most southern hills, Porfessorn and Jagmastaren, there is ore with as little as 0.16 per cent. of apatite in such quantities as to permit mining on a large scale. In the intermediate parts of the mountain the percentage of phosphorus is generally high, sometimes rising to 4 or 5, corresponding to 21.6 to 27 per cent. of apatite. Even the mode of occurrence is very variable. Sometimes the mineral in large quantities is so finely disseminated in the magnetite that it cannot be discovered without the microscope. At other times it is found as smaller grains, as fine veins or filling of cracks, or as irregularly formed masses, in many cases bed-like, up to 0.3 metres in width and 10 to 15 metres in length.

"In some parts of the Kiirunavaara wedge and especially near the foot wall in the hills Statsradet, Geologen, and Kapten, the ore is laminated and consists of very thin layers of apatite alternating with thin sheets of iron ore. This produces a remarkably fine stratified structure, which no doubt is one reason why some geologists have made up their minds that the ore body must be of sedimentary origin.

"In other cases the structure of the apatite masses more resembles that of ordinary mineral dikes.



Reindeer.

"The ore in Kiirunavaara and Luossavaara is always extremely compact and hard and shows microscopically in general no crystalline texture. The Tuolluvaara ore has a fine-grained crystalline structure. In the first-named mountains, but especially in Kiirunavaara, there is a very conspicuous jointing, which has the effect that the ore, when blasted, splits in small, often rhomboid-like pieces."

In order to show the chemical composition of the ore, some representative analyses are given below:

	1	2	3	4	5	6	7
Fe_3O_4	76.01	91.50	65.31	96.10	68.73	89.39	90.05
Fe_2O_3	4.58	0.94	5.83	0.76	26.33	2.85	4.60
MnO	0.93	0.20	0.15	0.13	0.22	0.12	0.12
MgO	0.75	1.45	1.15	0.62	0.54	1.94	1.83
CaO	8.92	2.22	14.04	0.60	0.60	0.81	0.42
Al_2O_3	0.79	0.81	1.26	0.20	1.38	0.48	0.34
TiO_2	0.13	0.21	0.05	0.50	0.30	0.17	0.11
SiO_2	1.80	1.74	1.04	1.02	1.94	3.66	2.14
P_2O_5	6.713	1.28	10.97	0.016	0.122	0.19	0.016
S	0.050	0.018	0.036	0.026	0.014	0.045	0.059
Total	100.673	100.368	99.836	99.972	100.172	99.655	99.685
Fe	58.25	66.92	51.37	70.12	68.20	66.72	68.43
P	2.931	0.561	4.789	0.007	0.053	0.085	0.007

Analyses 1-4 are of Kiirunavaara ore, 5 of Luossavaara, and 6 and 7 of Tuolluvaara.

Origin of the Ores.

"The question of the genesis of these enormous iron ore deposits naturally has attracted the attention of geologists. The theories expressed essentially follow two lines: the pneumatolytic-hydrothermal, proposed by Bäckström, 1898, and supported by De Launay in 1903; and the magmatic, first suggested by Hogbom and defended by Stutzer and lastly by Geijer."

The Gellivare Iron Mountain.

The ore bodies of Gellivare, while smaller than those of Kiruna, are of large size, as will be seen from the following notes taken from Prof. Hogbom's guide book on "The Gellivare Iron Mountain":

"All the economically important iron ores occurring in Lappland are enclosed in syenitic rocks, which occupy a considerable area extending from the vicinity of Lake Torne Trask in the north to Gellivare in the south. Besides the syenitic rocks a number of granite and gabbro massives play an essential part in the composition of this area. Furthermore, dikes of granites, pegmatites and basic rocks are very common, and here and there sedimentary complexes appear as scattered remnants, pressed down in the syenite rocks.

"The iron ore field of Gellivare is located in a zone of syenitic rocks which may be regarded as a southern ramification from the north Lapponian syenitic area. In the south this zone is bounded by a gabbro massive forming the conspicuous Gellivare Dundret. To the northwest a granite area (the Linaalf massive), and to the north a complex of quartzites, amphibolites and mica schists (Nautanen schists) bound this syenitic belt. In the midst of the same the mountain Malmberget ('the Ore Mountain') rises, surrounded on all sides by moraine and swamp covered lowlands, under which the contacts between the syenitic rocks and the adjacent rocks just mentioned are hidden.

"The ore deposits of Gellivare are all situated in this mountain, which therefore rightly has been named the Malmberget.

"The Malmberget rises with its highest point, Walkomman, 616 metres (2,020 feet) above the sea, or about 300 metres (984 feet) above the surrounding lowlands. The summit of Walkomman is covered by birch woods and reaches beyond the pine forest boundary which runs on a level of about 540-550 metres (1,800 feet). Even the eastern part of the mountain, the Kungsryggen, with a maximum height of 580 metres (1,900 feet), reaches a little beyond the same forest boundary. The mountain extends east and west and has a length of 6 kilometres (3.7 miles). Two lower offshoots are directed to the south, the Kaptenshojden branching out from the Kungsryggen and Parvavaara from the Walkomman.

"The main ore belt, with a length of about 4 kilometres (2.5 miles) from Walkomman in the west to Tingvalls Kulle in the east, following in the western part the southern slopes of the mountain, where it is marked by a series of mines and dumps, easily visible when approaching Malmberget with a train from Gellivare. The eastern part of this ore belt runs on the northern side of the Kungsryggen and cannot be seen from the south. The mines situated on the eastern slopes are likewise not visible from this side. A group of mines is situated on the southern slope of the Kaptenshojden and attract the attention when the train approaches the station of Malmberget."

Historical Notes—Production.

"The first accounts of the iron ore of Gellivare date from the beginning of the eighteenth century, and already in the middle of the same century mining and iron production on a small scale had been tried. The ore was transported by reindeer to some small blast furnaces in the neighbourhood. Later on (1799-1810) the eminent scientist and patriot, S. G. Hermelin, who was in many ways a pioneer for the colonization of this remote country, made energetic, but quite fruitless, attempts to start an iron industry on a greater scale. After the Hermelin period the mines changed hands many times and considerable capital was consumed, but, because of the high percentage of phosphorus and also because of lack of communication, the output was insignificant and the work was repeatedly stopped. It was not until the invention of the 'Thomas method' and the building of the Gellivare-Lulea railway (1888) that a new era began for this great Lapponian ore field. Since 1903 the main part of the same has been in the hands of the Trafikaktiebolaget Grangesberg-Oxelosund, which also works the mines of Kiruna and Grangesberg. Since 1907 the Government has been a partner in the association, and, by a contract, in force until 1933 (eventually 1938), the production of ore for export is fixed at 18.75 (or 22.50 to 1938) million tons, distributed over the period 1907-1933 (1938).

"The shipping harbour for the Gellivare ore is Lulea and the export goes chiefly to Westphalia (via Rotterdam) and to Silesia (via Stettin); a minor part goes to England, America and other countries.

"Besides the Grangesberg Company, another company, Bergverksaktiebolaget Feeja (since 1898) works a mine

in the Gellivare ore field, viz.: the Koskull Kulle mine, with an annual production at present of about 200,000 tons, which is exported to Witkowitz (Austria).

"The total annual output of the Gellivare ore field averages at present 1.2 million tons, and the hitherto exported quantity reaches about 16 million tons. For the Swedish iron industry, which is chiefly based on iron ores with low percentage of phosphorus, the Gellivare ores have only been used to a very small extent. A furnace at Karlsvik, near Lulea, produces some ten thousand tons of iron from the Gellivare ore (magnetic separation, briquetting, by the Grondal method).

The Ores.

"The average chemical composition of the iron ore from this ore field appears from the analyses here given. The most striking features are the high percentage of iron, the low amount of intermixed silicates, and the variable, often rather high percentage of phosphorus. The figures are averages of considerable quantities of ore. A much higher percentage of phosphorus is found in more limited parts of an ore body, for instance up to 4 per cent. and more in the Walkomman ore; and, on the other hand, the ore may be here practically free from apatite and silicates and consist of almost pure magnetite.

"Mineralogically, as appears from the analyses, there can be distinguished several varieties of ores, according to the kind and amount of the intermixed minerals. With regard to the iron ores per se two types occur, the magnetite ores and specular hematite ores, of which the former are predominant. Intermediate forms between these types are also found, the ore minerals often being mixed; but, on the whole, the types are tolerably well separated. As to the distribution of the kinds of ore, there is no general rule. Sometimes the hematite ore is located in the hanging, sometimes in the foot wall of the magnetite, or it is enclosed in the same, or it forms independent bodies. The different modes of occurrence are illustrated by the Walkomman, Linne, Baron, Hermeline, Skäne, and Oskar mines. There are circumstances that indicate that the hematite or specular iron is secondarily formed from the magnetite; but whether that is always the case is doubtful. It can be said in favour of a secondary origin that the wall rock of the hematite is often somewhat decomposed, but there are also contacts, which show the same characteristics as the magnetite ore contacts."



Lapplander Church, Gillivare

	1	2	3
Fe_3O_4	94.70	78.84	75.29
FeO	0.32	14.33	13.20
MnO	0.15	0.15	0.13
CaO	0.75	1.71	3.66
MgO	0.79	0.50	0.80
Al_2O_3	0.79	0.44	0.66
SiO_2	2.06	2.51	3.07
TiO_2	0.47	0.16	0.21
P_2O_5	0.03	1.08	2.63
S.	0.03	1.03	0.03
Total	100.18	99.75	99.67
Fe	68.87	67.12	63.76
P.	0.013	0.466	1.148

The analyses represent the average composition of some thousands of tons of ore from each of three mines.

The Ore Bodies.

"Most of the ore bodies have a roughly lenticular shape, and they are distributed over the field so as to form several ore-bearing belts.

"The ore supply has been estimated at 270,000,000 tons for the whole ore field, considering the depth to be 1,600 feet below the datum level of Walkomman, or 1,250 below the present average surface of the ores. The quantity, here, consequently, is only about a third of that of the ore deposit at Kiirunavaara.

"The shape, size and dip of the ore bodies have been decisive for the mining methods in practice. Hitherto, open-quarrying methods have been prevailingly used, but on account of the dip of the ores, these methods must at deeper levels be replaced by underground mining. If no regard is taken to the necessary removing of the hanging wall, the relative output of ore is essentially dependent on the intermixed dike rocks and varies in the different mines generally between 60 per cent. and 90 per cent. If the necessary blasting away of the hanging wall is also taken into consideration, the percentage of ore sinks considerably and does not for the field taken as a whole much exceed 55 per cent. of the total, nearly the half of which, consequently, consists of sterile rock and ore containing too little iron to be at present valuable."

. . . . . .

The Government is harnessing water falls in order to supply the railway and the mines with electric power. At first 50,000 h.p. is to be developed. A total of 300,000 h.p. can be developed if required. The railway will be operated by electric power for a distance of about 150 miles from the water falls. Railway operators in Canada, where conditions are so similar in many ways to those of Sweden, should be able to gain some useful information from this Swedish railway.

As stated above, iron ore from Kiruna and Gellivare is shipped to various countries, including the United States. A few years ago ore was shipped from Gellivare to Sydney, N.S., and coal cargoes were sent to Sweden in return.

It was interesting to see American machine drills in use at these mines. The ore trains carry just half the quantity those on the Mesabi range do.

The mining towns contain on the whole a better class of houses and are much cleaner than those in most North American mining fields. Everything considered, one is inclined to say that the miners in Northern Sweden are at least as well off as are their brethren in the better

class mining camps on this continent. Drill runners get about $2.00 a day, and ore-loaders about $1.50. Their expenses are, however, considerably lower than they would be in America. For instance, they pay, at Gellivare, only about one dollar a month rent for a house, but this is shortly to be raised to $3.50. Master-mechanics and other employees of similar standing who have served the company for 20 years or more are given a pension of $250 a year. Allowances are made to men who are incapacitated through injuries, and a system of insurance similar to that in Canadian mines is in force for the employees. The government inspector, I was told, visits the mines at Gellivare once a year.

Space has not permitted reference to many interesting points in connection with the geology, the ore bodies and the methods of mining at these great mines. Readers who wish details should consult the splendid volumes on "The Iron Resources of the World," edited and published by the Swedish committee of the Congress.

Kiruna to Narvik

During this stage of the excursion we had an opportunity of visiting very interesting geological localities, where we saw pre-Cambrian and later rocks, and one very striking thrust plane. This part of the trip, moreover, appealed to the members of the party owing to its being under Arctic conditions. The tree line came down to the railway in places, and the glacier-covered and snow-capped mountains, together with the more level treeless tracts, presented a scene which will long be remembered by the members of the party. Dawson City is south of latitude 64. The railway on which we travelled, the most northern in the world, passed through latitude about 68.50. At Narvik we were shown the town, which has been built up in a somewhat desolate region (though attractive in summer) in a few years owing to its being the shipping point for the ore from Kiruna. We visited the docks and saw the methods employed in sampling and loading the cargoes. By the way, some members of the party discovered that white bear skins were very cheap in Narvik and a number were purchased.



Railway in Lappland

While on the trip from Kiruna to Narvik we were under the leadership of Dr. P. J. Holmquist, another Swedish geologist for whose scientific attainments and personal qualities we had the highest respect and admiration.

Narvik to Trondhjem to Stockholm.

From Narvik we took a steamer down the coast of Norway to Trondhjem. I shall not attempt to describe the scenery of this coast. Its fiords, mountains, glaciers and islands together form one of the most celebrated regions of the world for the tourist, and it has been well described by many writers.

Leaving Trondhjem by train for Stockholm, we passed through an interesting country. Space, however, prevents my referring to this part of the journey, except to say that one town we passed through is famous among English-speaking travellers because its name is H——.

Lest what I have already written weary my readers, I shall close without describing the sessions in Stockholm or the excursions of the Congress. In another number of the JOURNAL I will take up these subjects.

Before closing, I wish to say that we were most favourably impressed with Sweden as a country and with its people. Canadians, especially, can learn much from Sweden as regards the industries of agriculture, mining



A Scene on the Coast of Norway

and forestry. It is also justly celebrated for its educational institutions.

At another time I hope to have the opportunity of expressing more fully in writing my high appreciation of the kindness shown to us, and of giving an account of the splendid organization the Swedish geologists had for the Congress.

The next Congress is to be held in Canada, on the invitation of the Dominion, the Province of Ontario, and the Canadian Mining Institute.

THE PREVENTION OF MINE EXPLOSIONS

(Continued from last issue)

Where current at a potential of more than 650 volts is employed for transmission underground, it should be transmitted by means of a completely insulated cable; and where a lead or armoured covering is used, such covering should be grounded.

In all mines having electric installation special precautions should be taken against the setting on fire of coal or timber. Enclosed fuses or cut-outs are recommended, and each branch heading should be so arranged that the current may be cut off when necessary.

No live electric wire should be permitted in that part of any mine in which gas is found to the amount of 2 per cent.

In all mines producing gas in dangerous quantities, as indicated by a safety lamp which will detect 2 per cent. of gas, the working places should be examined for gas by a qualified man, using such a lamp, immediately before any electric machine is taken or operated there.

H.—Precautions against Miscellaneous Accidents.

(1) In all new construction, shaft lining and superstructures about the entrance of the shaft (or slopes or drifts) should be built as far as practicable of non-combustible materials.

About the entrances to mines every possible precaution should be taken to prevent fires or the injury of the equipment for ventilation and haulage. Ventilating fans should be placed at one side of the mine opening, and hinged doors or light timbering should render easy the escape of the explosive force in direct line of the shaft or slope.

Proper precautions should be taken for immediately preventing the entrance into the mine of heat and gases and for facilitating the escape of the men in case of surface or shaft fires.

(2) The surface equipment for handling the coal should be so arranged as to prevent coal dust from entering the mine shaft.

(3) In all new mines, and in all old mines as far as practicable, suitable main roads should be provided for the men separate from the main haulage roads.

(4) In connection with the system of ventilation it is recommended that in the more frequented roads connecting the intake with the return air coures, two doors be provided, these doors to be placed at such a distance apart that while one is open the other is closed.

(5) In view of the large number of accidents from falls of coal or roof, under the existing practice with single props, more attention should be given to the introduction in mines where the roof is bad of better systems of timbering, such as have been long in use with economy and safety in many well managed mines.

(6) In undercutting coal by hand, the premature fall of the coal should be prevented by sprags or other suitable supports.

(7) We believe that the difficulties and dangers encountered in the working of coal seams which are thick and steeply pitching, or of which the coal is highly inflammable in character or subject to firing from spontaneous combustion, and in mines where the subsidence of the surface must be avoided, may be successfully and economically overcome in many cases through the adoption of the flushing system of mining—that is, the filling with sand or other similar materials of the space from which the coal is removed. This system originated in the United States and is now successfully practiced in portions of Germany, Austria, Belgium, and France.

I.—Mine Supervision and Inspection

(1) We cannot too strongly emphasize the fact that thorough discipline about the mine is absolutely essential to safety, and that thorough discipline can be brought about only through the hearty co-operation of the operators, the miners, and the State.

(2) We are of the opinion that the responsibility for safety in the mine should primarily rest with some person, such as the manager or superintendent, clothed with full authority; and that such person can greatly facilitate the attainment of safety through the employment of a sufficient number of foremen, and also of one or more inspectors whose special duty it shall be to see that the regulations are strictly enforced.

(3) The State cannot exercise too much care concerning the experience, technical training, and selection of its inspectors. Their positions should be made independent of all considerations other than that of efficiency; and their continuance in the service should be co-existent with good behaviour and proper discharge of official duty.

J.—Training for Mine Firemen, Inspectors, etc.

We are of the opinion that the cause of both safety and efficiency in coal-mining in the United States would be greatly aided through the establishment and maintenance in the different coal regions of special schools for the training of fire bosses, mine foreman, superintendents, and inspectors. The instruction in such schools should be practical rather than theoretical.

The work of these schools would supplement most effectively that of the colleges already established in many parts of the country for the more thorough training of mining engineers.

THE DOLCOATH'S NEW SHAFT

After many years' work, the new vertical shaft at the Dolcoath mine has been completed to a depth of 3,000 feet. This shaft is circular and is lined with bricks from top to bottom. The hauling and pumping arrangements have still better ventilation, which is much needed in the lower levels of the mine. The system of rail guides is being adopted in the shaft, on which two cages will run, and these cages are so designed that they will automatically tip the wagons each of 30 tons capacity, put in them. The making of connections to the Williams shaft entailed a great deal of work which interfered with returns. Perhaps in the course of many years this shaft may warrant the large expenditure, but it has been a tedious and costly undertaking more suited to a coal than a tin mine.

The practice of filling old stopes with sand is becoming more general. At one German colliery about 1,300 tons of sand per day is washed through iron pipes into the stopes. The wear on the pipes is enormous. White porcelain and glass linings have been tried. The former is the better, though both wear out within a few months. At one mine no lining is used, the pipes being patched by means of oxy-hydrogen flame.

THE BRIQUETTING OF IRON ORES

By Chevalier C. De Schwarz (Liège).

(Paper read before the Iron and Steel Institute.)

General Remarks.—The question of briquetting iron ore is one which becomes of increasing importance every year, not only owing to the fact that iron ore in general, and lump ore in particular, are becoming more and more scarce, at least in Europe, but also because of the severe conditions imposed by modern blast-furnaces; not only in regard to the chemical composition, but also to the physical condition of the ore.

The use of improved and more effective explosives in the iron mines, as well as the fact that iron ores have to be transported over long distances and frequently reloaded before they reach their destination, tend to increase the percentage of small and dust ore, to the disadvantage of blast-furnace working which—on account of the greater height of the furnaces themselves, the high pressure of blast, and the use of blast-furnace gases for gas engines—require an ore which is not too fine nor too dusty.

The blast, being of comparatively high pressure in modern blast-furnaces, will naturally blow out a considerable portion of the fine ore, which will mix with the escaping blast-furnace gases, causing well-known inconveniences. This is the more objectionable, as the blast-furnace gases are now, almost everywhere utilized for driving gas-engines, for which purpose the gas must be almost entirely free from dust.

The fine ore, during its downward passage in the blast-furnace, advances quicker than the lump ore, charged at the same time; consequently it is not exposed long enough to the beneficial reducing influence of the carbon monoxide gas arising from below. It therefore leaves the zone of reduction in the blast-furnace imperfectly freed from oxygen, and, as a consequence, clogs together as soon as it reaches the zone of carbonization, causing scaffolding, and even explosions.

A considerable number of methods for briquetting iron ore have been brought out, but none as yet that can be applied generally with success. A few of the methods introduced into practice have proved successful, but only for certain kinds of ore, or in local circumstances and conditions. Some methods which have yielded favourable results with a particular kind of ore, have entirely failed with other ores. Experience has also shown that the method to be adopted must be modified to suit the nature of the ore, not alone with reference to its physical condition, but more especially with regard to its chemical composition. Most of the different methods which have been tried for briquetting fine-grained ore have proved to be too expensive, not alone with reference to initial outlay and cost of manufacture, but also, indirectly, on account of the great reduction of the contents of iron in the ore which occurs owing to too great an addition of building material.

The conditions for successful briquetting are:

1. The iron ore briquettes must have a certain resistance against mechanical influences. They must resist a pressure of not less than 2,000 pounds per square inch, and, when dropped from a height of 10 feet on a cast-iron plate, they must not fall into dust although they may break into pieces.

2. They must resist heat. Heated to 900 degrees C. they may commence to sinter, but they must not disintegrate into small fragments.

3. They should be capable of being placed in water for a certain time without softening.

4. They must resist the influence of steam at 150 degrees C. without crumbling.

5. They must possess a certain amount of porosity in order to allow the carbon-monoxide in the blast-furnace to penetrate the interior of the briquette and to exercise its beneficial reducing influence.

In order to test the briquettes for porosity, they are, after being dried, placed for about twenty-five minutes in water, during which time they ought to absorb not less than 12 1-2 to 16 per cent. of water, according to the nature of the ore.

6. The binding medium, if any is used, should not contain noxious substances (sulphur, arsenic) to such an extent as to be injurious to the quality of the pig-iron produced.

7. The cost of producing briquettes should not exceed the difference in the prices between lump ore and fine ore.

The different systems of briquetting ore can be divided into those in which a binding medium is used and those in which no binding medium is used. The former may again be divided into methods employing inorganic and organic binding materials respectively.

Briquetting Without a Binding Medium.—In most of the cases, where no binding medium is used, the briquettes have to be heated at considerable expense, but there are exceptional cases where no heating is necessary notwithstanding that no binding medium is employed. This case presents itself where the iron ore contains a certain percentage of clay, because in such cases it contains in itself a binding medium. Clay iron ore and bean ore are instances.

At Kertsch, in Russia, where bean ore is briquetted, the latter is mixed with 8 per cent .of water and made into briquettes under a pressure of about 5,600 pounds per square inch. At Ilsede, in Germany, where clay iron ore is used, it is mixed with the waste of the iron ore washing plant and with other powdery waste products coming from the rolling mills and containing sufficient iron. The mixture, which is not allowed to contain more than 6 per cent. of water, is heated to about 75 degrees C. and pressed into briquettes, the pressure being about 4,000 pounds per square inch. In both the above cases no heating of the briquettes is necessary, and no binding medium is used.

The results obtained at Kertsch and at Ilsede naturally suggest the addition of common clay to other iron ores (containing no clay) as a binding medium in order to make briquettes by means of a cheap medium, and without going to the expense of heating the briquettes. However, it has been found that—in order to achieve the desired result—it is necessary to add a comparatively large percentage of the clay to the ore, thus indirectly reducing its contents of iron to too great an extent. Common clay contains, moreover, a high percentage of silica, requiring extra additions of limestone. The practice of using clay as a medium has therefore been abandoned, and it is only employed in cases where ferruginous clay is at disposal.

In some cases it has been sought to avoid the use of a binding medium, as well as the heating of the briquettes, by employing very high pressures, rising gradually to 11,000 pounds per square inch, for making briquettes; but although the briquettes made in this way have been very firm and offer great resistance to mechanical influences, they expand when exposed to heat and fall to pieces; besides which they are too dense, and this considerably interferes with their reducibility.

Of all systems of briquetting iron ores without a medium, by heating the briquettes after they have left the press, the Grondal process, so called after the name of the inventor, has proved to be the most successful for magnetic ore.

The following is a short description of this process: the raw ore, containing 27 to 58 per cent. of iron, is broken up by means of a stonebreaker and then ground to sand in a ball-mill. From this sand the pure magnetic ore, the so-called "concentrate," is extracted by means of magnetic separators.

The "concentrate," containing from 67 to 71 per cent. of iron, is moistened and made into briquettes about 6 inches square and 2 1-2 inches thick, with rounded edges. No addition is made.

The briquettes are then laid in three rows edgeways upon small iron wagons and transported into a furnace heated with generator and blast-furnace gases. Heated and compressed air is supplied by means of a Korting blower in such quantity as to produce a highly oxidizing flame, whereby the magnetic ore (Fe_3O_4) is oxidized to peroxide of iron (Fe_2O_3). The sulphur is considerably reduced during this operation.

The following comparative table gives the chemical composition of the raw ores, concentrates, and briquettes in different cases:

Names of the Place	Raw Ores. Fe per Cent.	S per Cent.	P per Cent.
Flogberget	27.3	0.31	0.003
Herrang	40.2	1.21	0.003
Lulea	58.2	0.11	1.23
Strassa	46.8	0.03	0.015
Cornwall, U.S.A.	30.6	1.60	0.012

Concentrates. Fe per Cent.	S per Cent.	P per Cent.	Briquettes. Fe per Cent.	S per Cent.	P per Cent.
67.4	0.04	0.003	65.3	0.007	0.003
67.3	0.17	0.002	65.5	0.003	0.007
71.1	0.015	0.005	69.3	0.005	0.005
69.2	0.015	0.003	67.1	0.005	0.003
69.9	0.036	0.003	67.9	0.010	0.005

One furnace, about 150 feet long and 5 1-2 feet wide, produces, on an average, 200 tons of briquettes in a week, the cost of production being given as 3s. 4d. per ton of finished briquettes, exclusive of general expenses and royalties.

The briquettes are hard and porous, and quite suitable for the blast-furnace; but the cost of production appears to be rather high, in consequence of which the Grondal process has not, except in Sweden, been much adopted. In Sweden there are at present twenty-seven Grondal furnaces at work, with a total output of about 300,000 tons of briquettes per year.

The reason why the Grondal process is of special value to Sweden lies principally in the fact that the working of the blast-furnaces in that country is almost entirely based on the use of charcoal. The slag of charcoal-furnaces being—for well-known reasons—acid, it does not absorb sulphur, consequently nearly all the sulphur in the iron ore goes into the pig-iron instead of into the slag. This is also the reason why the blast-furnace owners in Sweden object to use any iron ore containing more than 0.015 per cent. sulphur. From the above comparative table it will be seen that the raw ore contains considerably more sulphur than the above-mentioned limit, and it is therefore absolutely necessary to reduce the percentage of sulphur in the raw ore, not only by means of the magnetic separator, but also by heating the briquettes to a high temperature (given at 1,400 degrees C.) and in an oxidizing flame.

Although the percentage of iron in the briquettes is somewhat reduced, owing to the transformation of magnetite (Fe_3O_4) into peroxide of iron (Fe_2O_3), this advantage is more than compensated for not only by the expulsion of sulphur, but also by the fact that peroxide of iron (Fe_2O_3) is much more easily reduced and requires considerably less fuel in the blast-furnace than black oxide of iron (Fe_3O_4).

Considering that charcoal is becoming more and more scarce from year to year, and, as a consequence, more expensive, the question of economizing fuel is of special importance to Sweden.

Experience has shown that briquettes made of Fe_3O_4 (magnetite) require in the blast furnace 300 pounds more charcoal per ton of pig-iron than those made of Fe_2O_3, equal weights and percentages of iron being taken in each case. This difference in the consumption of charcoal represents a reduction in the working expenses of about 6s. 6d. per ton of pig-iron in favour of Fe_3O_2 against Fe_3O_4. The success of the Grondal process, notwithstanding its high cost, is therefore justified for Sweden, as well as in such other countries in which charcoal, together with sulphurous ores, have to be employed.

Considering that the melting point, and therefore the sintering temperature, of magnetite, is comparatively low, the briquettes made of "concentrates" (Fe_3O_4) begin to sinter and to harden at a temperature of from 800 degrees to 900 degrees C. However, as already mentioned, the temperature is raised to about 1400 degrees C., in order to expel as much sulphur as possible. It may also be mentioned that the process of converting the Fe_3O_4 into Fe_2O_3, being an oxidation process, is accompanied by a development of heat, thus economizing fuel to a certain extent.

The suggestion has been made of using briquettes made of "concentrates" directly in the open-hearth furnace, as a decarburizing and, at the same time, enriching addition to the metal bath.

The use of iron ore in the open-hearth furnace for that purpose is already well known, but such ore must be comparatively rich in iron, and it must not contain noxious substances to such an extent as to interfere with the quality of the steel produced. From the chemical analysis, given in the foregoing comparative table, it will be seen that the "concentrates" (and therefore the briquettes made therefrom) quite fulfil these conditions, the percentage of sulphur in the "concentrates" varying, with the exception of those from Harrang, between 0.015 and 0.04 per cent. Considering, further, that, as a rule, only 25 per cent. of iron ore is used in the open-hearth furnace, the contents of sulphur in the ore added will be indirectly reduced to one-fourth (0.004 per cent. to 0.01 per cent.) in the finished steel, which is not high enough to interfere with its quality. In the case of briquettes made, as suggested, from concentrates, for use in the open-hearth furnace, it would not be necessary to heat them up to 1,400 degrees; it would

also not be necessary to oxidize them from Fe_3O_4 to Fe_2O_3, and to make them porous. For use in the open-hearth furnace they can be pressed at a considerably higher pressure whereby they would become more compact, which is more advantageous for use in the open-hearth furnace, because they will then be specifically heavier, and therefore sink deeper in the bath, instead of floating upon the surface for a long time, like red or brown iron ore, which, with the exception of specular iron ore, is comparatively much lighter in weight.

As Fe_3O_4 commences to sinter at a temperature of from 800 degrees to 900 degrees C., the briquettes made of "concentrates" will become hard at this temperature, and need not be heated above it. This advantage, together with the fact that they need not be porous (and therefore not changed from Fe_3O_4 to Fe_2O_3), makes the briquettes considerably cheaper and richer in iron when used in the open-hearth instead of in the blast-furnace.

In order to avoid the cost of briquetting, an attempt has been made to agglomerate the fine-grained ore in a rotary furnace. This method appears to be of special value in cases where the agglomeration can be combined with the roasting of the ore, should the latter be necessary or advantageous, as, for instance, when spathic ore, brown iron ore, or iron ore with a high percentage of sulphur is to be agglomerated.

The fine-grained ore to be agglomerated in a rotary kiln is mixed with coke-dust (which can generally be procured very cheaply) in order to reduce the oxygen in the ore. The Fe_2O_3 in the ore can thus be partly changed into FeO, which would enrich the ore in Fe, and, at the same time, reduce the temperature necessary for agglomerating.

Considerable difficulties have, however, been experienced with this method of agglomeration. First, it has been difficult to regulate the temperature in the rotary furnace in such a way that the necessary sintering should take place without melting. Secondly, it has been found that the ore, as soon as it commences to agglomerate, adheres to the inner fireproof lining of the rotary furnace, thus causing scaffolds, which have to be be removed at considerable expense.

These difficulties are more frequently experienced in cases where coal-dust firing is employed for heating the rotary furnace, because, in these cases, the ashes of the coal, consisting chiefly of silica and alumina, mix with the ore and cause scaffolds, besides indirectly reducing the contents of iron in the agglomerated ore. The use of gas instead of coal-dust firing may therefore prove advantageous in this case, partly because the temperature in the rotary furnace can be more easily regulated according to requirement, and partly because no ash becomes mixed with the ore.

Briquetting by Means of a Binding Medium.—The use of slaked lime as a binding medium for fine-grained ore has been known for many years, and it has also been found that briquettes quite suitable for blast-furnace use can be made when the slaked lime is mixed with some granulated basic slag. Compared with other methods this process of briquetting is rather expensive and also considerably reduces the percentage of iron in the briquettes, because from 7 to 8 per cent. of binding material, containing no iron, has to be used. Besides this, the briquettes have to be exposed for a considerable time to fresh air in order that the calcium oxide in the briquette may absorb sufficient carbon dioxide, because hydrate of lime as such would lose its water in the upper portion of the blast-furnace, and the briquettes would therefore crumble to dust. The transformation of CaO into $CaCO_3$ also means another indirect reduction of the percentage of iron in the ore, not to mention that a great amount of space and extra labour are required for stacking and keeping the briquettes, in order that this transformation takes place. This method of briquetting ore has therefore not found extensive application.

Burnt lime, either alone or mixed with clay or ashes, has also been tried, but without success. This may easily be understood from the fact that—owing to the presence of steam and carbonic acid in the upper portion of the blast-furnace—burnt lime absorbs water and carbonic acid, thus changing into hydrate of lime. These reactions—being accompanied with a certain evolution of heat—cause "upper heat," a serious inconvenience known to every blast-furnace manager. Besides these there are other disadvantages attending the use of lime. Gypsum, as well as cement, has also been tried as a binding medium. The former contains too much sulphur, and neither resists the influence of heat, although the briquettes withstand humidity as well as mechanical influences.

More success has been achieved by using as a binding medium a mixture of sand and slaked lime. Equal parts of these materials are mixed and ground into fine powder, and then intimately mixed with the dust ore. After being moistened the mixture is pressed into briquettes, charged into boilers, and exposed for some hours to the influence of superheated steam under pressure, after which the briquettes are ready for the blast-furnace. About 6 per cent. of the above-mentioned binding medium is required.

This method of briquetting iron ores depends on the fact that the silica in the sand—owing to the influence of superheated steam—is converted from the insoluble into the soluble condition, ready for combination. This method has given very good results in respect of the quality of the briquettes produced, but it has not found very general practice on account of its high working expenses as well as its high initial outlay.

Another method of briquetting, based on the same principle, consists in the use, as a binding medium, of basic blast-furnace slag, which was exposed to steam pressure as mentioned before. However, as nearly 10 per cent. of this medium is required to obtain good briquettes, it has been found that the percentage of iron in the ore becomes too much reduced.

Spathic ore, mixed with lime, is also successfully used as a binding medium, provided that the briquettes are exposed to steam pressure for a certain time. This process is based on the fact that hydrate of lime and carbonate of iron (spathic ore), when intimately mixed and exposed to steam pressure, become converted into hydrated ferrous oxide and carbonate of lime (limestone). The former, being of a gelatinous nature ,serves as a binding medium and changes, later on, into hydrated sesquioxide of iron. This process is carried out in the following manner: A mixture of two parts of spathic ore with one part of lime, reduced to powder, is prepared. Of this powder 15 per cent. is added to the ore to be briquetted, the whole moistened—whereby the lime is converted into hydrate of lime—and made into briquettes under a pressure of about 6,000 pounds per square inch. These briquettes are packed—edgewise—on wagons, after which they are charged into boilers where they are exposed to a steam pressure of eight atmospheres for a period of 4 1-2 to 6 1-2 hours. In case spathic ore alone is to be briquetted an addition of 6 per cent. of lime is sufficient. In the latter case cylin-

drical briquettes of about 5 1-2 inches diameter and 4 1-2 inches in height are generally made.

The briquettes made according to this method are very good, but expensive, besides which that plant requires a comparatively high initial outlay.

Great success has been obtained in briquetting blast-furnace flue-dust, which is principally due to the fact that this by-product already possesses hydraulic properties, because—like cement—it contains lime, alumina and soluble silica ready for combination. In addition to this it has been found that by adding certain salts, such as chloride of magnesium, chloride of calcium, green vitriol ($FeSo_4 + 7H_2O$), or acids, such as sulphuric or hydrochloric acid, those hydraulic properties can be raised to such a degree that very suitable briquettes can be made from the dust.

Of these additions chloride of magnesium ($MgCl_2$) has been found to be, generally speaking, the most suitable, because it is cheap (being a by-product in the manufacture of certain artificial manures), and because it does not contain any noxious substances. Owing to the high temperature in the blast-furnace, the chloride of magnesium is decomposed into magnesium and chlorine. The former enters into the blast-furnace slag as MgO, and the latter combines with hydrogen to form hydrochloric acid. The acid further combines with the free lime to form chloride of calcium, which is finally absorbed by the water used for washing the blast-furnace gases. In some instances it has been observed that the iron portions of the furnace top become slightly attacked, which is ascribed to the presence of sydrochloric acid not fully neutralized.

This process of briquetting, called after the inventor the "Schumacher" process, has given very satisfactory results, not only with reference to the quality of the briquettes produced, but also as far as cost of production and initial outlay are concerned. It must, however, be pointed out that the blast-furnace flue-dust used for briquetting, must be used almost immediately after having been removed from the catchers, and that, like cement, it must be protected against humidity before briquetting. The installation for briquetting flue-dust should therefore be situated in the close proximity of the blast-furnace from which the flue-dust is taken.

It is to be regretted that this process can only be used for briquetting blast-furnace flue-dust. With the exception that in some instances where the chemical composition of the flue-dust is particularly favourable to the purpose, an addition of about 40 per cent. of purple ore to the flue-dust has been found to be admissible; the latter thus acting, as it were, as a binding medium to the former.

Another method of briquetting flue-dust consists in the use of basic blast-furnace slag, after having been exposed to steam pressure. Owing to the influence of compressed steam the silica in the slag changes from the insoluble to the soluble variety, and combines with the lime in the flue-dust to a kind of cement, which acts as a binding medium. If the lime in the flue-dust is insufficient, another 4 to 4 1-2 per cent. is added. The briquettes made in this way are quite suitable; but taking into consideration that from 8 to 12 per cent. of binding medium, containing no iron, has to be used, the contents of iron in the briquettes is too much reduced to make this method profitable.

Organic matters, such as the waste lye, resulting (as a by-product) from the manufacture of sulphide cellulose, and molasses have been used for briquetting flue-dust as well as other iron ores. In the former case, the lye is concentrated to a syrup, thus constituting a kind of pitch, called "Zellpech" ("cellulose-pitch") in Germany, where it is used. On an average, about 6 per cent. of this binding medium is intimately mixed with the flue-dust or ore, and pressed into briquettes under a pressure of not less than 9,000 pounds per square inch. The briquettes made with "cellulose-pitch" are suitable, but, as the binding medium is very expensive (40s. a ton), the financial success of this method is rather doubtful.

The use of molasses as a binding medium was tried for briquetting the ferriferous residues of the aniline manufacturing process, as well as for briquetting flue-dust—this process being as follows: One part of cheap molasses, by volume, is mixed with two volumes of silicious sinter ("Kieselguhr"), 0.4 parts by volume of carnallite and 100 parts by volume of the ore, to be briquetted. The briquettes are allowed to dry in the open, after which they are charged into the chambers of an annular furnace, such as is used for burning ordinary bricks. Here they are heated up to 1,000 degrees C., when they begin to sinter and to harden.

This method of briquetting is accompanied by high working expenses and considerable initial outlay. The employment is therefore only justified when the by-product of the aniline manufacturing process, containing about 67 per cent. of iron, is to be made into briquettes.

As before mentioned this process was also tried for briquetting blast-furnace flue-dust, but it was abandoned, probably on account of the too high cost.

Besides the above-mentioned methods of briquetting fine-grained ores, or blast-furnace flue-dust, etc., there are numerous other methods of briquetting with or without a binding medium. In the former case soluble glass (alkaline silicate), asbestos, basic slag, naphtalin, paraffin, resinous soap, as well as other inorganic and organic materials, are used, and in the latter case smelting is conducted in a reverberatory furnace. Treatment with liquid iron, or in an electric furnace, has been proposed and also tried in practice, but in all cases without result. As there is also no reason to believe that these methods will ever be tried again, the author does not consider it necessary to go into details about them.

Conclusions.—From what has been said it may appear that a universal method of briquetting fine iron ore, fulfilling the conditions enumerated in each case, has not been invented as yet, and probably never will be.

Taking the financial results of the different methods of briquetting into consideration, it is found that the methods of briquetting practised at Kertsch, in Russia, and at Ilsede, in Germany, appear to be the most economic, the working expenses, as reported, amounting only to one shilling per ton of briquettes. As already previously mentioned, this method can, however, only be applied successfully when the ore contains sufficient hydrate of alumina to serve as a medium.

The manufacturing expenses of briquetting by the Grondal process amount to 3s. 4d. per ton of briquettes, exclusive of general expenses, redemption, and royalties, for which at least 1s. 4d. will have to be added, thus resulting in a total expense of 4s. 8d. per ton of briquettes. This would be far too high to allow of the general introduction of this process. However, the Grondal process is of particular value for Sweden, where its use has become almost unavoidable in order to be able to utilize the iron ore of that country; besides, its use is, in Sweden, combined with a saving of 6s. 6d. per ton briquettes in fuel, thus resulting in a final saving of

1s. 10d. (6s. 6d. — 4s. 8d.) per ton in favour of the Grondal process. Similar results may also be obtained with this process where charcoal is used as fuel in the blast-furnace.

Of all the different methods employed for briquetting blast-furnace flue-dust, the "Schumacher" process has given the best financial results, the cost of briquetting according to that method, amounting to 1s. 8d. per ton briquettes only, without royalty.

The other methods of briquetting iron ore flue-dust and other ferruginous residues of other industries, as described before, have given less favourable financial results, the cost of briquetting amounting from 2s. 6d. to 3s. 9d. per ton briquettes. Besides this it must be mentioned that where a binding medium is used, on an average about 7 per cent. is required to be added to the ore, thus reducing considerably the percentage of iron. In several cases it has also been found necessary to stack the briquettes for several weeks in the open before they could be used, thus requiring a good deal of space and extra labour for transporting and handling.

Finally, it may be mentioned that at present an establishment for making briquettes is being erected at a Belgian works according to a new process recently introduced. According to this method from 2 1-2 to 4 1-2 per cent. of binding medium, costing about 16s. a ton, is used. The initial outlay for a plant turning out 5 tons of briquettes an hour, amounts to about £2500, and the manufacturing expenses, inclusive of general expenses, to 1s. 6d. per ton briquettes. The briquettes fulfil all the conditions enumerated previously, and can be used within twenty-four to thirty-six hours after having left the press, no heating or any additional work being necessary. By this method, not only fine ore, but also rolling-mill and forge-scale (Fe_3O_4) have been briquetted with success, the latter having been successfully used as an enriching and decarbonizing addition in the open-hearth furnace.

NORTHERN PARTNERSHIP GROUP, ATLIN MINING DIVISION, B.C.

Last month the CANADIAN MINING JOURNAL published a contribution by E. Jacobs on the Engineer group, Atlin, B.C. The subjoined description of the Northern Partnership group, formerly the Engineer group, is from a bulletin recently issued by the Bureau of Mines, British Columbia, and written by Mr. Herbert Carmichael, Provincial Assayer, who recently visited the property.

"This property is better known by its old name of the Engineer Group. The claims now included in the group are Engineer No. 1, Northern Partnership No. 1, Northern Partnership No. 2, Northern Partnership No. 3, Haddon, Big Engineer Fraction, Little Engineer Fraction, Plato, and Mickey. The owners are the Northern Partnership Syndicate, with head office at Atlin, B.C. The mines are situated on the east side of Taku Arm of Tagish Lake, ten miles farther up the lake than Golden Gate, in Atlin District.

"This property, then known as the 'Engineer Group,' was reported on by the Provincial Mineralogist in 1904; since then it has changed hands, having been purchased by the present owners in 1907. The country rock on this group of claims is slate, cut by igneous dykes and traversed by numerous quartz veins, some mere stringers and others up to 30 feet wide. A very considerable amount of surface prospecting and development of these veins has been done, consisting of numerous open cuts and shots put in at different points; in all cases this work has shown up clearly defined quartz veins, traversing the slate formation, cutting through both the country rock and the dykes before referred to. The general strike of the country rock is N. 65 degrees W., with a dip of 35 degrees to the northeast; the majority of the dykes seem to have a strike of 15 degrees farther north, but to have a much greater dip, being 80 degrees to the southwest. These dykes are clearly marked, as owing to their harder nature they have been left standing, while the softer slate rock has been eroded away. The main quartz veins seem to have a general strike of about N. 10 degrees W., and a dip of 70 degrees to the east, but there are numerous cross-veins whose dip and strike vary considerably. The actual mining done by the present owners has been confined to the smaller quartz veins from 6 inches to 2 feet wide; the ore from these veins yielding high values in free gold and tellurides. According to the statement of the owners, 800 pounds of the selected ore yielded 240 ounces of gold, and from the appearance of this ore, which is in places crusted with free gold, there does not seem any reason to doubt the statement.

"The larger veins are being opened by shots and cross-cuts and are said to give values from $20 to $100 per ton, but as yet none of this ore has been run through the mill, and until such test has been made it is impossible to form any safe idea of their value. The quartz looks good; the veins are clearly defined and have been traced for considerable distances; they can be easily worked, so there is a fair prospect that they will yield good, if not high, returns.

"From the shore of the lake the ground rises abruptly to a bench some 500 feet above the lake; this bench goes back some distance, when the mountains rise to snow-capped peaks 4,500 feet high. At 300 feet above the lake a quartz vein has been worked by two open cuts, one a little below the other and having a total length of 170 feet; in these cuts the vein is clearly defined and has an average width of about 2 feet 6 inches, the quartz carrying a considerable amount of calcite and showing free gold in both the quartz and the calcite, with specks of tellurides through the former. The ore is generally straight quartz with calcite, but in places it is a slate breccia which has yielded high values from the thin intersecting seams. The ore from these open cuts is being carefully sacked and hauled to the stamp-mill on the shore of the lake and forms the base of the present ore-supply.

"A short distance to the northwest a small cross-vein, running towards the vein just mentioned, is being worked by an open cut, and similar ore has been taken out. About 1,000 feet south of the large open cuts and at 100 feet lower altitude is what is locally known as the 'South Vein.' This is a brecciated quartz vein 6 feet wide with well-defined walls, but as yet no work has been done on it. A small cross-vein runs from this vein to the lake, and from the lake shore a tunnel is being started which will follow the strike of the vein, which at this point is some 18 inches wide and carries a very large proportion of calcite with free gold crusted in the solid calcite. Work was commenced on this vein as it showed high values, was close to the stamp-mill, and easy to work.

"On the Big Fraction claim, 2,000 feet north of the large open cuts and 500 feet above the lake, what may be called the main vein has been uncovered by a few shots. This is a quartz vein with a north and south strike and including an amount of slate breccia; the width of this vein is still undetermined, but may be taken as at least 30 feet, while it has been prospected by an open cut 1,000 feet farther north and traced still farther through several claims. It is proposed to run a

few tons of this ore through the mill to ascertain its value, which is at present unknown.

"About 100 feet back of the shore line and 100 feet above the lake is a quartz vein of undetermined width, but probably 8 to 10 feet wide; to cross-cut this vein the former owners ran a tunnel in 150 feet and did some 150 feet of drifting. They did not get in far enough to cut the ledge seen above, but cut a number of small stringers which they drifted on, in one place cutting through about 10 feet of quartz-slate breccia which may have contained values. The present owners intend pushing the tunnel till the vein is reached.

"A short distance to the south, where this vein outcrops on the lake shore, the former owners sunk a shaft said to be down 70 feet, but now full of water, and no data were obtainable from it. Close to this shaft on the lake shore a two-stamp mill was set up in March of this year and commenced running in June on the rich ore from the open cuts, yielding, as stated, 240 ounces of gold from 800 pounds of ore treated; lower grade quartz was being run through on August 5th, and said to be yielding $100 per ton.

The plant consists of two heavy stamps and a double-discharge battery running over two amalgamated plates; a vanner is being set up to save the concentrates, which at the present time are largely going into the lake. Power is furnished by a small engine and boiler, but when a larger plant is installed ample water power is to be had from a stream near the mill.

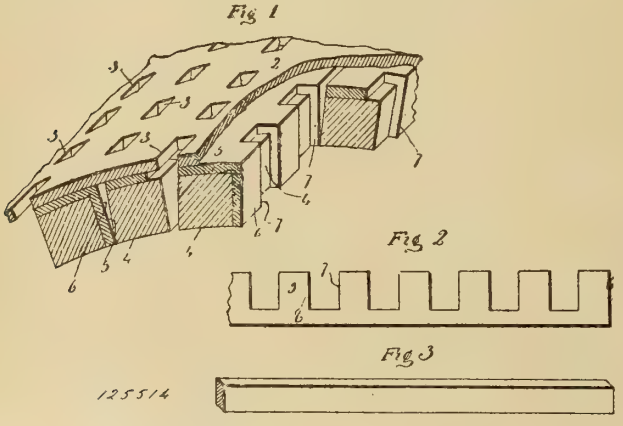
Summary.

The property contains a number of small quartz veins carrying high values in free gold, which give good returns under the present primitive method of working. There are larger veins, which, with a well-equipped plant and economical methods, would probably yield a large tonnage of lower grade quartz which would pay for treatment; these veins should first, however, be prospected and carefully sampled.

CANADIAN PATENTS.

Byran LaPort Morrison, assignor, and Joseph Wesley Ady, assignee of a third interest, both of Colorado Springs, Colorado, U. S. A., 10th May, 1910; 6 years. Filed 11th April, 1910. Receipt No. 181,835.

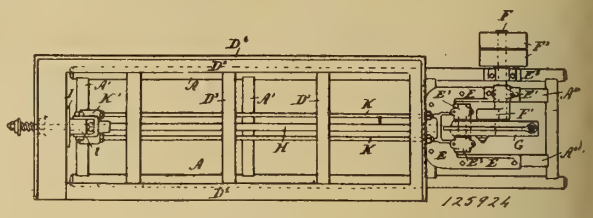
No. 125,514. Tube Mill. *Moulin à tubes.*



Claim. A tube mill comprising a barrel having a feed opening at one end and a driving head at the opposite end, the ends connected by a shell having a series of perforations, a lining comprising rectangular bars, notched strips between the bars and shell, said strips formed with flanges turned downward between the bars and having the notches therein registering with the perforations in the shell.

William Henry Roughsedge, Ottawa, Ontario, Canada, 24th May, 1910; 6 years. Filed 14th August, 1909. Receipt No. 173,328.

No. 125,924. Gold Saving Table.
Table à obtention de l'or.



Claim.—1. In a gold saving table the combination of a bed frame, a table with a top sloping longitudinally and transversely, having longitudinal rollways supported on wheels and axles journalled on said bed and having its transverse slope adjustable, a driving shaft journalled upon the upper end of said bed frame and having a crank, a bell crank lever pivoted adjacent to and operated by said crank, a pitman pivoted to said bell crank lever at one end and to the lower end of the table, a bumper head at the lower end of the table, a stop secured yieldingly to the lower end of the bed frame and connected to the upper end of the said frame by bolts against which stop the bumper head impinges, means of adjusting the transverse slope of the table, a table top mat having a plain rear space and plain lower end space and oblique and varying ridges and channels, a feed box at the upper end and rear of the table, a wash water box at the rear of the table, a launder at the front edge of the table and a receiver at the delivery end of the table, substantially as set forth.

PERSONAL AND GENERAL.

Mr. J. Mitchell Gordon has left the employ of the Fife Coal Company, Limited. His present address is in care of the Fanti Consolidated Mines, Limited, Tarquah, Gold Coast Colony, West Africa.

Mr. R. B. Lamb, mining engineer, made a professional visit to Gillies Limit on September 17th.

Dr. W. G. Miller returned to Toronto from Europe on September 16th.

Mr. J. H. Plummer has returned to Sydney from England much improved in health.

Mr. Frank Loring recently visited Porcupine.

Mr. G. M. Colvocoresses was in Toronto on September 15th.

Mr. J. W. Astley is shortly to open an office in Toronto. Mr. Astley was, until recently, consulting engineer to the Peterson Lake Cobalt Silver Mining Company.

Mr. J. T. Fee, formerly of Cobalt, is developing limonite deposits on the Mattagami.

Mr. J. B. Tyrrell has returned to Toronto from London, England.

Mr. E. T. Corkill has recovered fully from his recent illness.

Mr. T. W. Gibson, Deputy Minister of Mines for Ontario, visited Eastern Ontario mining districts early in September.

Mr. Critchley Parker, editor of the Australian Mining Standard, Melbourne, Australia, is touring Canada.

Mr. Herbert Carmichael, of Victoria, B.C., Provincial Assayer, has gone to England on a brief visit.

Mr. Clifford E. Smith is paying a professional visit to Tweed, Ont., where he is interested in iron pyrites properties.

Mr. M. S. Davys, managing director of the Kootenay Development Syndicate, and the Silverton Mines, Limited, both of which he organized in England, has returned to that country after a visit to West Kootenay district of British Columbia, in which he still has important mining interests.

Mr. W. C. Thomas, formerly manager for the Dominion Copper Company, which owned copper mines in the Boundary district, with smelting works at Boundary Falls, B.C., recently returned to British Columbia, and is now resident in Vancouver.

Mr. W. L. Coulson, of Vancouver, B.C., manager of the Canadian Collieries (Dunsmuir), Limited, lately examined some Rocky Mountain coal property, in Northwest Alberta.

Hon. Wm. Templeman, Dominion Minister of Mines, has returned to Victoria after having accompanied Sir Wilfred Laurier on his late tour through British Columbia.

Mr. Charles Graham has been examining the Nicola Valley Coal & Coke Company's Middlesboro' coal mines. He has been mentioned as likely to succeed Mr. James Gray as manager of the company's colliery in Nicola Valley, B.C.

Mr. O. S. James has resigned his position as chemist and assayer with the J. E. Wilkinson Company and is now open for engagement. His address is 227 George Street, Toronto, Ont.

Mr. D. P. Roberts, late chief electrical engineer for the City of London, Ontario, has been appointed by the Provincial Government inspector of electrical energy in British Columbia. This appointment interests mine and smelter owners, since purchased electric power is used at the larger smelters and some of the bigger metal mines in the province.

Mr. D. G. Macdonald, superintendent of the Dominion Lode Development Company, which is developing a quartz mine situated on the divide between Dominion and Lombard Creeks, Yukon Territory, is on a visit to his home at Oakland, California.

Mr. James F. Flynn, New York, has returned from an extended visit to Porcupine, during which he examined several properties and looked over the leading mines. Mr. Flynn speaks most encouragingly of the district.

A recent despatch from Washington says that President C. R. Van Hise, of the University of Wisconsin, is mentioned as a possible successor to Secretary of the Interior Ballinger. Dr. Van Hise is well known to Ontario mining men, as he has given considerable time to the study of the geology and ore deposits of this province. He and his associates have investigated the iron resources and the cobalt-silver deposits. In the United States he is well known for his work on pre-Cambrian geology and the Lake Superor iron region. Since becoming president of the University of Wisconsin, he has raised it to first place among the state universities. He is one of the leading apostles of conservation in the United States.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Halifax.—The new report forms being issued by the Department of Mines of Nova Scotia promise to do good work. The "Coal Depletion Statements," as they are called, are placed before every colliery manager and every manager is required to fill them out accurately. The information that will be collected by means of these sheets will provide an annual inventory of the province's coal assets. Mr. Hiram Donkin, Deputy Minister of Mines, is responsible for this innovation.

Largely through the efforts of Mr. H. C. Borden, the Moose River tungsten deposits are being rapidly developed. Manager A. A. Hayward struck a new vein some weeks ago. Since then the discovery has shown up very well.

The Dominion Coal Company's outputs show a substantial increase over those of last year. Last year, of course, was marred by the strike.

The discovery of oil near Lake Ainslie, Cape Breton, has been confirmed. Much more work will be necessary to determine its value. A new hole is being drilled.

Activity in gold is increasing in both the eastern and western parts of the province. In Halifax County, four old mines have been re-opened during the past three months. To the west at least an equal number of antiguas have been brought to life.

Several inspections of the tin-bearing granite near New Ross, Lunenburg County, have been made lately. Parts of the outcrop are exceedingly rich.

The infusorial earth deposit near Bass River, Cumberland County, once the scene of a thriving industry, is being worked by a group of Oxford (Cum. Co.) investors, apparently with satisfactory results.

ONTARIO.

Cobalt, September 17th, 1910.—A large number of men have been prospecting all summer on various lots in the Gillies Limit, and, although several promising veins have been found, nothing really important has developed. The only properties that have found good ore are the Waldman and the Wyandoh. The discovery of the Waldman vein was the reason for the much higher prices that prevailed at the last sale. This is the same vein that is on the Waldman, and is the only one so far from which ore can be shipped. The Yorke-O'Brien also has a vein carrying medium grade ore, but this was traced across from the Red Jacket.

A number of good discoveries have lately been made on the Townsite, which have greatly increased its value. Trenching operations have resulted in the discovery of four veins near the boundaries of the Buffalo and the City of Cobalt. Two of these show a good width of high-grade ore, and the others show good ore in places. An extension of the ore shoot on the fifty-foot level of the main vein has also been opened up. It is believed that the property will shortly be in such shape that regular shipments can be made.

At the Provincial mine, the workings from the old shaft have been abandoned and operations in the future will be carried on from the new shaft, which was put down near the boundary of the Savage property. At the 175-foot level a station has been cut and a drift started on the vein, which at this point carries small values in silver. A cross-cut will shortly be started to open up No. 7 vein, which is running parallel.

In the northeast cross-cut on the third level of the Coniagas, two small veins have been cut. Since the new addition to the mill started running regularly this property has been concentrating a greater tonnage than any mine in the district, about 175 tons per day now being treated.

At a directors' meeting of the Temiskaming Mining Company held a short time ago, a very encouraging report for the month of August was presented. During that month 251,963 ounces were produced, 30,000 of which came from the concentrator, while the remainder was from high-grade ore from the 450-foot level. The total cost for the month's production amounted to

$22,014.63. The output for the first seven months of the present year is 1,103,693 ounces.

A remarkable case of stealing occurred recently at the Nova Scotia mine. The company had in its safe a number of bars of silver bullion, valued at approximately $18,000, which it intended to ship on September 7th. On the night previous the safe was broken into in a very daring manner, and all the silver was removed. The company immediately offered a reward of $1,000 for the return of the silver, and the local police, besides a number of private detectives, were soon working on the case. Before their investigations had proceeded very far, however, there was a split among the thieves as to the division of the loot, and one of them turned informer. As a result seven men were arrested and the whole of the silver recovered. Some of the thieves turned out to be employees of the company, while one of the others has been known for years to be a high grader, and was among those arrested in the case with Dr. Wilkinson.

The August shipments amounting to 3,099 tons, constitute the largest output for any month of the present year, and show an increase of 800 tons over the corresponding period of 1909. The total shipments for the first eight months of 1910 are 20,957 tons, which were produced by twenty-eight mines. Bullion shipments up to date amount to 343,163 ounces, produced from five mines. The shipments from Gowganda and Elk Lake for the same period total 435 tons.

An important deal has just been put through, whereby Mr. David Faskin has purchased the control of the Cobalt Power Company formerly held by Beech Bros. Mr. Faskin is president of the Hydraulic Company, and these two concerns have in the past been closely identified. In fact, the first electric power distributed to the mines in Cobalt was generated by the Hydraulic Company at its plant at Ragged Chutes and sold at wholesale rates to the Power Company.

Surface trenching on the Badger has lately been the means of uncovering two new veins. They are both in the Keewatin formation and carry low values in silver. In order to determine their value underground a cross-cut will be run from the first level of the No. 5 shaft. During the summer a total of 6,000 feet of trenching has been done.

Progress is being made with the new concentrator at the Hudson Bay mine. The capacity will be about fifty tons per day and some features that are new to the mills of the district are being installed. The concrete work is all finished and a good part of the frame is already up. All the machinery is on the road and will be installed as soon as possible. The company hopes to have the mill in operation about the first of next year.

On lot No. 1 in the Gillies Limit a vein carrying quantities of galena has been found. In places the ore is practically solid and it assays up to thirty ounces of silver to the ton. The owners will endeavour to ship a carload to Perth Amboy. A shaft has been sunk fifteen feet on the vein, and the ore is showing strong in the bottom.

The Black Mines have run short of funds and an effort is now being made to raise more money to carry on the development work. The shareholders are being asked to make a loan of $25,000 to the company, which will bear interest at the rate of seven per cent. and be payable in one year. The loan will be secured by the company's plant and property.

The management of the Buffalo mine has decided to increase the capacity of the cyanide plant so that it will be able to treat seventy tons a day. The capacity of the concentrator is not being increased, but some minor changes have been made in the flow sheet that will divert more of the tailings to the subsidiary plant. It is expected that the labour and power costs can be reduced and that a better extraction can be made. The consumption of cyanide per ton will also be less when the necessary changes shall have been made.

Recent developments in the vicinity of the No. 1 shaft of the Trethewey have been the means of opening up a large body of milling ore. Not enough work has been done on it as yet to determine its limits.

The Bailey management has decided to erect a small smelting plant for the ore which they purpose mining shortly. It will consist of two oil-burning furnaces, each holding six large crucibles. No details are as yet available as to the capacity, cost of operation and process of treatment. The experimental work was done by Mr. E. A. Benson, the president, who states that he has obtained good results. The economic working of such a plant for a small tonnage, is, however, extremely doubtful.

The Crown Reserve has decided to cut out shipments of low-grade ore, and to increase the machinery in the ore house so that in the future only high-grade ore will be shipped. The new vein found down the lake has been drifted on for 100 feet and the working is in ore all the way. The drift on the Victoria vein has been extended another twenty-five feet and the face is still in good ore.

Gowganda.—The machinery for the Reeves Dobie mill is already on the road, and a considerable part of it is in Elk Lake, from which point it will be teamed to the mine. It is estimated that there are 15,000 tons of milling rock in sight and that the high-grade ore will be sufficient to pay operating expenses.

The management of the Millerett has also decided to put in a small mill, although it is probable that the machinery will not be taken in until the winter roads are in shape. Development work on this property is very encouraging and at the 185-foot level the vein shows a good width of high-grade ore. Another small shipment was made a few days ago via the Montreal River.

The Gates property has also made a shipment of twenty tons of high-grade ore. After losing their vein several times, a fine ore shoot was picked up on the 140-foot level. The mine shows every promise of becoming a regular producer.

Several discoveries of minor importance, chief of which is the one on a claim owned by Otisse and Currie, near Hubert Lake, have lately been made in the vicinity of Elk Lake. At a depth of 200 feet, a small aplite vein, carrying small values in silver, came into the Devlin shaft. Before continuing the shaft on this vein, however, a cross-cut will be run to cut the veins on which the shaft was originally started. A proposition to build a customs concentrator at Elk Lake came up before the council of that town a short time ago. Unfortunately there is no available tonnage in the district with which to supply it.

Porcupine.—This district has had its first snow storm, which occurred on August 25th, and since that time there have been some heavy frosts. The snow, of course, did not last, and it will probably be two or three months yet before it comes to stay. The rains have been very heavy and have seriously interfered with outside work.

On account of the stiff competition on the Kelso route, there has been a very material reduction in freight rates, and supplies can now be brought in for $2.75 and $3.00 per hundred weight. This will mean a very considerable saving to the operators, and will probably mean that more men will be employed.

There is activity in the Township of Shaw, and undeveloped claims have recently sold there for $4,000 each. Everywhere in the district, there is a strong healthy development, and the entire absence of wild-catting is one of the significant features. The most important work is being done on the Timmins and Dome properties. The former has a small prospecting mill that treats approximately one-sixth of the ore produced daily. The returns, however, are so large that they cover the entire cost of operating the property, which employs 135 men, and also leave a comfortable surplus.

On one of the claims in Shaw Township, the owner is panning the earth above the veins and is obtaining very good results.

The owners of the Swastika property have decided to install a five-stamp mill and a small cyanide plant. A small two-stamp mill has been in operation for some time and excellent results

have been obtained even though a large part of the values were not recovered.

It has been definitely decided to erect a stamp-mill of considerable size on the Dome property if proper transportation facilities are available. The size of the mill has not yet been decided upon. Although work was carried on under great difficulties, already 900 feet of underground development has been accomplished and the results are perfectly satisfactory to the owners. A considerable amount of diamond drilling was done, and the vein was cut at a depth of 300 feet, at which point it still continued to show free gold.

BRITISH COLUMBIA.

The British Columbia Bureau of Mines has issued Bulletin No. 1, 1910, being a "Report on Certain Mineral Claims in Atlin, Bella Coola, and Nanaimo Mining Divisions," by Mr. Herbert Carmichael, provincial assayer. The claims concerning which information is given are as follows: In Atlin division, the Northern Partnership Group, formerly known as the Engineer Group; in Bella Coola division, Sure Copper Mountain group and Bella Coola Chief group; in Nanaimo division, the Great Granite mines, Great Gold group and White Swan group, all on Valdes Island, and the St. Joseph group, on Lasqueti Island. While some useful information is given concerning the several properties mentioned in the first and last above-mentioned divisions, it is not clear what good purpose is served by the inclusion in this departmental publication of the page relating to claims in Bella Coola division, the most important of which were not visited by the officials.

It is respectfully submitted that this published result of an official visit to what is supposed to be a possible mining district is of little practical use. However, the redeeming feature of this bulletin is found in the fact that the information given relative to the Engineer or Northern Partnership group is of a nature that will enable those interested in the matter to judge for themselves what warrant there was, if any, for the statements widely published a few weeks ago relative to the intention to erect on the property a 100-stamp mill. As is customary with British Columbia government publications, this report is well printed and illustrated.

Cariboo.—Information has been received of the registration in London, England, of the Lightning Creek (British Columbia) Hydraulic Mining Company, Limited, with an authorized capital of £150,000, in shares £1 par.

Rain has fallen lately, but not in sufficient quantity to allow of hydraulicking operations being resumed. It now looks as if there will not be any more hydraulic placering this season.

Attention has recently been called to the fact that the recorded production of gold from Cariboo district had, by the close of 1909, exceeded an aggregate of $40,000,000. While the value of the average annual production in quite recent years has not been much more than $300,000, there is reason to expect a considerable increase after the large new hydraulic plant for the Quesnel Forks district shall be in operation. Seven or eight years ago an official report gave an estimate of the available low-grade gold-bearing gravels in this section as being 2,500,000,000 to 3,000,000,000 cubic yards, which at ten cents per yard gives a possible $300,000,000 worth of gold awaiting recovery here.

East Kootenay.—Before control of the Crow's Nest Pass Coal Company passed to the Great Northern Railway and allied interests, it was customary for the tonnage of coal produced to be published weekly in the Toronto Globe. For more than a year, though, similar information has not been regularly obtainable, the Nelson, B.C., correspondent of the Dominion Labour Gazette, included in his report, published in August, the following statement: "The tonnage mined by the Crow's Nest Pass Coal Company, at Coal Creek and Michel, for the month of June is reported at 116,447 tons, while the payroll for the same period amounted to $203,400." That tonnage would give a daily average production of 4,479 tons of coal for 26 working days. Recently, however, the Fernie Free Press has stated the daily average production for part of August to have been more than 5,500 tons a day. If the latter be correct, it is evident that there was a substantially large increase of output in August over the average daily production for June. In the summer of 1909 announcement was made at Fernie, by the then manager, of the intention of the coal company to considerably enlarge its production of coal, but this was not done so soon as promised. Lately, however, the forecasts then made seem to have been, in some measure, realized.

Ainsworth.—The recently organized Kootenay Silver-Lead Mines, Limited, has commenced work at the Highland mine and concentrating mill. Mr. H. Shell, late of Denver, Colorado, is manager, and has about 30 men in mine and mill. Silver-lead ore and concentrate are being shipped to the Consolidated Company's smeltery at Trail.

It is stated that the Highlander mine will soon be worked again. It has been idle several years. Much underground work has been done in this mine in past years, the main tunnel having been driven more than 2,600 feet, and drifts run from it on the veins intersected. When in operation, pumping and hoisting from winzes was done by compressed air delivered from the Taylor hydraulic air compressor on Coffee Creek, about two miles south of the mine. It is stated that the first drill every driven by compressed air derived direct from falling water, under the Taylor patents, was started in operation in this camp in April, 1900. A wire tramway connects the mouth of the tunnel with the company's concentrator near Kootenay Lake. About 700 tons of lead concentrates and 100 tons of hand sorted ore have been shipped; average contents, 67 per cent. zinc lead, 4 per cent. and 22 ounces silver.

[Note.—"Highland" and "Highlander" are separate properties.]

Nelson.—The Eureka mine near Nelson, recently again made a shipment of gold-copper ore after having been for a year or two on the non-shipping list. In 1907, 620 tons of ore was shipped, this giving an average assay value of 5.5 per cent. copper, besides some gold and silver. Since then the low price of copper has militated against production being continued.

Announcement has been made that a syndicate will take over the Silver King, Dandy and other mining properties, situated on Toad Mountain, near Nelson. During the last two years, until June last, the Silver King has been worked under lease by the Kootenay Development Syndicate, an English company, under arrangement with the liquidators of the Hall Mining and Smelting Company. Altogether, since 1896, more than 200,000 tons of ore have been extracted from this mine; the approximate total metal contents of this ore were 4,500,000 ounces of silver and 14,500,000 pounds of copper. While most of the known ore above water level has been taken out of the mine, it is believed there is still a considerable quantity that could be mined from the lower levels were the mine to be kept unwatered.

Rossland.—In connection with the recently reported leasing and bonding of Cliff and Consolidated St. Elmo properties by the Granby Consolidated Mining, Smelting & Power Company, it is of interest to note that in a preliminary report on Rossland mining district, by Mr. R. W. Brock, now director of the Geological Survey, there occurs this brief reference to this property: "The well-marked vein of the St. Elmo-Cliff-Monte Christo has produced several hundred tons of ore that averaged about $20, and a considerable tonnage of low-grade ore that has an excess of iron over silica, such as is desired by some of the smelters." Some development work is being done on the Cliff under the direction of Mr. W. Yolen Williams, of Spokane, Washington, who for several years superintended the development of the Granby Company's big mines in the Boundary district.

Information received from London is to the effect that Mr. A. J. McMillan, late managing director of the Le Roi Mining

Company, who has been appointed liquidator of the company in connection with its being voluntarily wound up, will return to Rossland from England during October.

Queen Charlotte Islands.—The Vancouver syndicate which some time ago bonded the Japanese group of gold-copper claims at Ikeda Bay, Moresby Island, has made a second payment of $30,000 (the first payment was $8,000), and has arranged with the vendors to accept $150,000 in stock in the new company, and a final payment of $12,000 in cash, to make up the purchase price of $200,000. The prospecting done with the diamond drill by the syndicate under the bond is reported to have proved the occurrence of two ore-bodies not previously discovered. One of these has been reached by driving a 50-foot cross-cut. Assay returns from the ore thus opened have ranged up to much higher value than the average of that shipped when the mine was producing two or three years ago. Total production to date is about 12,000 tons, of an average value of $11 to $12 in copper, gold and silver. The plan of further development contemplates provision for putting the mine in condition to ship an average of 100 tons of ore daily. The ore will be sent to the Tyee Copper Company's smelter at Ladysmith, Vancouver Island, for treatment, a favourable freight and treatment rate having been arranged.

GENERAL MINING NEWS.

NOVA SCOTIA.

Amherst, Sept. 22.—The Maritime Coal, Railway and Power Company, whose headquarters are at Montreal, and whose chief colliery is at the Joggins mines in this county, is making steady progress in developing the extensive coal fields owned and operated by the company. Its sea-going trade is steadily increasing, as is evidenced by the shipments for the week ending September 16th. During that week the company loaded ten schooners for ports along the Bay of Fundy. The schooners were as follows: The Adella, 100 tons; Emma T. Story, 60 tons; Annie Pearl, 60 tons; Abbie Vernor, 125 tons; Helen M., 110 tons; Abbie Keith, 180 tons; Laxvan, 140 tons; all of Windsor. The Dorothy, 90 tons for Digby; The Nettle, 125 tons for Briar Island, and the E. Mayfield, 100 tons for Partridge Island.

Sydney.—The Dominion Steel Corporation are calling for tenders for the erection of seven large buildings at the steel plant here, to be constructed immediately. Additions include boiler house, machine and railway shops, foundry warehouse, oil house, carpenter shop, repair shop, and finishing mill. The buildings will be entirely of concrete and structural steel. The company is also considering the advisability of building new general offices.

ONTARIO.

Cobalt, Sept. 26.—Two bullion shipments left the camp last week, one from the O'Brien, the regular shipment to England, and the other from La Rose. The total shipments of bullion now total 447,615 ounces, valued at $232,907. The two shipments which left this week were as follows: O'Brien—30 bars, weight 30,000 ounces; value, approximately $16,000. La Rose—31 bars, weight, 28,505 ounces; value, approximately $13,695. The total of the bullion shipments for the week is therefore 61 bars, weight 58,505 ounces; value, $29,695. The La Rose bullion was consigned to the La Rose Consolidated Mines, Limited, Broadway, New York.

Collingwood, Sept. 22.—Mr. J. R. Roaf, barrister of Toronto, met the Board of Trade last night and discussed a proposal to establish extensive iron works here. The new company is at present known as the New Iron Company, Limited. It is asking the town for certain concessions.

Hamilton, Sept. 22.—Yesterday Wm. Mulliss, publicity commissioner, announced that the Canada Steel Company would locate a steel mill in this city and that work in constructing it would start at once. It will cost $400,000 and employ about 300 hands. The company was organized by Toronto and Montreal financiers.

MANITOBA.

Winnipeg, Sept. 22.—O'Grady & Anderson, brokers, announced yesterday having completed the sale of the Cardill coal property at Edmonton for $300,000, the members of the purchasing syndicate wish their names withheld.

BRITISH COLUMBIA.

Nelson.—H. Y. Anderson, of Anderson Brothers, owners of the controlling interest in the Beatrice silver-lead mine between Camborne and Ferguson, left on September 21st for Camborne, his mission being to place a crew of men at work preparing the mine for re-opening. In addition to getting things in shape, the men will sack about 600 tons of ore now on the dump, in anticipation of the rawhide season. In due course, mining operations will be resumed on a large scale.

Nelson, Sept. 21.—Interest has been aroused in the Creston district by the discovery of placer gold deposits in the bed of the Goat River. Ira Beam, an old-time prospector and gold miner, who has passed through some of the greatest gold rushes in Western America, including the stampede to Nevada, is the discoverer of these claims.

Nelson.—That the Mother Lode and Clyde-Belt mines of the Sheep Creek gold camp are continuing to push development aggressively, by new cross-cut tunnels, is the latest news from that camp. In the case of the Mother Lode, William Watson, general manager, is now driving a cross-cut tunnel from a point slightly upcreek from the recent working to come under the old workings and tap the vein. It is about at the level of No. 2 tunnel. Good headway is being made with this tunnel, and the vein ought to be reached in a short distance. The Mother Lode, like the other leading properties, is focusing its energies on development, and no ore is being shipped, as it is the intention of John McMartin, owner of the property to equip the property with a mill this coming winter. Ever since Mr. McMartin has had the Mother Lode, it has been a question of straight tunnelling to crosscut the vein at successive levels and drifting to block out ore. Less than two months ago No. 5 tunnel crosscut the main vein, on which are all the principal workings, at a depth of 380 feet.

Victoria. Sept. 21.—Mr. W. Fleet Robertson, provincial mineralogist, has just returned to the capital from the second of the field expeditions of the present season, the mineral areas of the Lillooet district being on this occasion the scene of official investigations.

The provincial mineralogist and his party went in by way of Lytton to Lillooet, and thence ascended the Fraser River to the mouth of the Bridge River, following it up the north fork from the point where a formidable canyon forbids further progress. The north fork was held almost to its source and the mountain then crossed to the headwaters of Big Creek, where some promising claims at an elevation of approximately 7,000 feet came under examination.

From this point Mr. Robertson and his party crossed another summit to Tyaxon Mountain and proceeded down Alexander Creek to Bridge River, which was followed to Cadwallader Creek, the various embryo mines of the district being visited. A crossing was next made of the summit, and the party came down to the headwaters of McGill Creek, which was followed

to Anderson Lake, all the mines of that section being taken in by the way. Thence the route lay westward to the end of Anderson Lake, where Mr. Robertson and his associates picked up the Old Caribou road, used by the inbound miners before Ashcroft and the present day connection by that point had an existence.

MINING NEWS OF THE WORLD.

UNITED STATES.

Douglas, Ariz., Sept. 16.—Construction work is now going on at both the Copper Queen and Calumet and Arizona plants. At the Calumet and Arizona the flue-dust chamber is being considerably extended to accommodate the increasing capacity of the furnaces. The furnaces at the Calumet and Arizona now consist of three 500-ton and three 300-ton. Two of the large furnaces were originally only 300-ton capacity and were enlarged. It is the intention to make all the Calumet and Arizona furnaces of 500-ton capacity by rebuilding the three smaller ones. Material for the enlargement of one of these has now been ordered and the necessary extension of the foundation and other preparations for this work are now in progress. Some time ago plans were perfected for a new stack at the Calumet and Arizona, which will be needed before the output can be materially increased. This work has not yet been started, but is likely to be in hand in the near future.

San Francisco, Cal., Sept. 17.—The statement of the dividend disbursements for August, 1910, of California oil companies listed on the San Francisco Stock Exchange, have just been compiled by Frank C. Devlin, assistant secretary of the oil securities department of the exchange. This statement shows that thirty companies paid to stockholders the sum of $1,069,917.45 during the past month.

Central City, Colo., Sept. 22.—Another concentrating plant is to be erected in Black Hawk to treat custom ore and construction has been started by the Denver Milling & Reduction Company. The capacity of the plant is to be 100 tons daily, and it is expected to be in operation within two months.

Illinois.—Since January, 1908, the stocks of crude oil in the Illinois oilfields have been gradually increasing, and now have reached the record of almost 30,000,000 barrels. Last January they were 28,400,000 barrels; in January, 1909, they were 25,000,000 barrels, and at the commencement of 1908 the stocks stood at 14,000,000 barrels. A large increase in the production of the Illinois fields is recorded owing to the bringing in of several good producers.

Washington, Sept. 16.—The Klondike placer mining district in Alaska has produced $150,000,000 in gold since 1898, and mining experts estimate the amount yet to be mined will equal that already produced. Consul Cole, of Dawson, states that the gold output for 1910 will exceed that of 1909, when more than three and one-half millions was produced. Most of this gold, he states, was shipped to the United States. A small quantity went to the new Canadian mint. Consul Cole reports that rich deposits of copper ore have been discovered in the southern part of the Klondike district.

MEXICO.

Guanajuato, Mex., Sept. 20.—Guanajuato bullion and concentrates, judging by the last report, which is about an average, are piling up a total weekly value of $28,000, of which high grades and concentrates sent to the Aguascalientes smelter run to $146,000, leaving $135,000 as the value of bullion in bars handled directly by the Guanajuato banks and sent to the Mexico City refinery. A force aggregating nearly 500 men is engaged in development at San Cayetano, Guanajuato, where the Mejiamora has been unwatered and is being retimbered.

The Mexican Eagle Petroleum Company, which owns an exclusive concession granted by the Federal Government to explore and develop for oil the lagoons and rivers along the coast, will begin work of boring wells in Lake Tamiahua. This body of water has a depth of three to four feet. It extends from a point near Tampico, south nearly to the Tuxpam River, its length being more than 75 miles and its width four to six miles. It was upon the western border of this lagoon that the great well, which was destroyed by fire, was brought in by Messrs. S. Pearson & Son, Limited, three years ago. The Tampico-Tuxpam intercoastal canal passes through this lake.

Mexico City.—The Candelaria group of mines, situated about three kilometres from the town of Ahualulco, on the San Marcos branch of the National Railways in the State of Jalisco, have been purchased by J. B. Shale for a New York syndicate from Kirby Thomas, mining engineer of New York, and E. L. Porch, of San Antonio, Texas. The price is not mentioned. The new owners also own adjoining property and are beginning development under the superintendence of W. C. Leninger, who was connected with the Amparo Mining Company. It is planned to erect a mill as soon as the old workings are well reopened.

SCOTLAND.

It is announced that further boring operations on the new shale deposits located by the Pumpherston Oil Company, Limited, in the neighbourhood of its Seafield works have confirmed earlier expectations as to the importance of the discovery. The bores have served to prove a considerable area, and there is good reason for believing that the deposits are of much wider extent. So far as proved, the bed is of good workable thickness, and the quality is that of the well-known Pumpherston shale, which is famous for its richness. Mines are being sunk on the seam as rapidly as possible, but, of course, several months must elapse before the actual raising of the shale can be begun. The new discovery will prove a valuable addition to the shale resources of the company.

FRANCE.

Paris.—The usually well-informed Moniteur Des Interests Materieles sums up briefly what European financial people have been lately saying of the proposed international copper trust. The project, which was supposed to have been definitely abandoned last spring, is to be taken up this autumn again, so the story goes now, in virtue of an understanding arrived at between the Amalgamated Copper Company, the Guggenheims and the Rio Tintos Corporation. The known presence together in Europe of the interested parties has naturally been taken as a prelude to these reports. The capital of the new combination is said to be $200,000,000, but, as this represents the value of only a single year's production in the United States alone, it is added that "special arrangements" are to be made in America to eke out this enormous but insufficient capital. One Paris financial critic announces that the news of this understanding has come out just in time to help Americans get rid of a part of their superfluous stock of copper. For the rest, it remains to be seen whether this "copper story" is or is not eventually to go the way of its predecessors.

AUSTRALIA.

Melbourne, Sept. 13.—In the Victorian Legislative Assembly to-day a motion, brought forward by Mr. Murray, the Victorian Premier and Minister of Labour, in favour of the appointment of a wages board for coal miners was carried without a division.

A deadlock, followed inevitably by a strike, is threatened in the New South Wales coal mines. The consequences will be most serious.

SOUTH AFRICA.

Johannesburg.—Despite one or two poor crushings due to exceptional conditions, the August returns from the Witwatersrand mines made a good showing, and the aggregate profits of the controlled undertakings at £967,000 represent a record for the year. The position of the companies keeping gold in reserve is also an improving one, the total of 47,634 ounces now held being the highest this year. The expansion in output has been pretty general, the outstanding features being the results obtained by the Rand mines and Gold Fields groups.

COMPANY NOTES.

The directors of the Lake Superior Corporation, in issuing their annual report for the fiscal year ending June 30th, 1910, state that the result of the year's operations of all the subsidiary companies of the Lake Superior Corporation shows a surplus, subject to depreciation and other charges, of $1,194,735.22.

The output of the steel plant, as compared with the previous year, is as follows:

	1908-9	1909-10
Pig iron, tons	130,268	153,528
Steel rails, tons	158,465	201,615

The report, by Mr. T. J. Drummond, gives the following in regard to the Helen mine:

"This company owns and operates the Helen mine. Heretofore considerable tonnage of Helen ore has been sold annually to outside firms, and considerable profit realized therefrom. Your directors, however, felt in view of the increasing requirements of the steel department that it was inadvisable 'for the present to continue the sale of this ore, which is especially suitable for our own requirements. All sales of Helen ore to outside firms have therefore been stopped, and, while this has meant a reduction in realized profits to the mining department, as also in returns to the Algoma Central Railway, we feel confident that this unsold ore lying in the mine will prove a more valuable asset than possible profits from sales meantime.

"We have also been endeavouring to ascertain, as far as possible, the extent of the ore deposits in the Helen and adjoining properties, beyond the proving and development work already completed, and in this connection the board has obtained a report from Dr. John E. Hardman, S.B,. M.E., of Montreal, which is regarded as eminently satisfactory."

The pulp mill produced 29,107 tons of ground wood pulp during the year.

With regard to new installation, the report has the following:

"As you are aware, this has been essentially a construction year. New and extensive installations are being made, especially in connection with the steel plant. We have had the usual delays and disappointments in regard to dates of completion, but the work is progressing favourably and in a workmanlike manner. We naturally have not received any results from these new installations as yet, and are not likely to obtain very much benefit before, say, the spring of 1911, but from then on the economies that will be effected in operation and the increase in output should add very materially to our net earnings.

"These new installations include a blast furnace with a rated capacity of 400 tons per day, a 12-inch and an 18-inch merchant mill, a complete installation of by-product coking ovens with sufficient capacity to care for our immediate needs in the matter of coke, a new gas blowing engine system, which will care for all our blast furnaces and create sufficient surplus power to operate the new Merchant Rolling Mills.

"Our open-hearth department will also be extended. Further provision has been made for the handling of coal and ore, etc., by additional docks and coal and ore-handling machinery of the best and most economical type. When this work is completed the directors confidently believe that, so far as the steel department is concerned, the plant will be unsurpassed in efficiency by any on the continent.

"Your directors, in pursuance of their policy of securing to the Steel Company an adequate supply of raw materials, have, during the year, added to the company's limestone properties by the purchase of the Fiborn limestone quarry in the State of Michigan, which quarry contains sufficient limestone of a high fluxing quality to last for an indefinite period.

"Your directors have also recently acquired, and are now operating the Cannelton Coal and Coke Company, which owns nearly 6.000 acres of coal lands in West Virginia."

CANADA IRON CORPORATION.

Recent reports of the year's operations of the Canada Iron Corporation were misleading in that no explanation was made of the fact that it was a period of construction with the company, and that the new plants under way were not sufficiently advanced to be productive.

The president, Mr. T. J. Drummond, in his report, pointed out, however, that the fixed charges, including interest on bonds paid and accrued to May 31st, had been cared for, leaving a surplus of undivided profits carried forward of $149,427.01.

The president also pointed out that the sales department had secured a larger volume of business than the year before, and concluded with the statement that the general showing was very gratifying in the face of the unavoidable interruption to operations that occurs during the construction period.

During the year which ended May 31st, the following work was achieved: New blast furnace at Midland, Ont.; new pipe foundry at Three Rivers, Que.; docks and terminal facilities at Port Wade, N.S.; docks and terminal facilities at Newcastle, N.B.; Northern New Brunswick and Seaboard Railway, 20 miles; developed and equipped mines at Bathurst ,N.B.; developed iron mines at Torbrook, N.S.

In addition to this, the company did considerable work on the foundry plants in Ontario, Quebec and Nova Scotia.

The company's prospects are regarded as very satisfactory, and in the current fiscal year gratifying earnings are inticipated from the new plants.

The usual semi-annual dividend of 3½ per cent. was declared on Dominion Steel preferred. It is payable October 1st to holders of September 17th.

DIVIDEND ON TRETHEWEY.

The Trethewey mine has declared a dividend of 10 per cent., being their first payment this year. Last year 25 per cent. was paid in two payments toward the end of the year. The present dividend is payable October 15th to shareholders of record September 30th.

KERR LAKE REPORT.

Kerr Lake report for fiscal year ended August 31st, shows: Total income, $1,528,983; increase, $146,693. Dividends paid, $1,050,000; increase, $550,000. Surplus, $148,220; decrease, $480,827.

STATISTICS AND RETURNS

DOMINION COAL.

The shipments of the Dominion Coal Company for the year show a very substantial increase over 1909, as is indicated by the following figures:

Shipments, 8 months, 1910	1,972,344
Shipments, 8 months, 1909	1,701,362
Increase, 1910	270,982

CONSOLIDATED FIGURES FOR AUGUST.

The Consolidated Mining & Smelting Company's statistical statement for August, 1910, is as follows:

Metals Produced.

Gold	10,194 oz.	$207,801
Silver	175,286 oz.	93,780
Copper	346,944 lbs.	43,331
Lead	2,787,301 lbs.	75,285
Total gross value		$420,197

	Per cent.
Value of gold	49.5
Value of silver	22.3
Value of copper	10.3
Value of lead	17.9
	100

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending September 17th and those from January 1st, 1910, to date:

	Ore in lbs. Sept. 17.	Ore in lbs. Since Jan. 1.
Buffalo	62,910	1,668,748
Chambers-Ferland	64,000	1,277,100
Coniagas	140,470	1,363,963
Crown Reserve	41,780	4,802,340
Hargraves	60,000	401,170
La Rose	296,040	8,489,381
McKinley-Darragh	47,700	2,893,329
Nipissing	190,040	8,683,767
O'Brien	40,000	928,410

Ore shipments for the week ending September 17th were 915,129 pounds, or 457½ tons.

Total shipments from January 1st to September 17th were 45,302,421 pounds, or 22,651 tons.

Following are the shipments from the Cobalt camp for the week ending September 24th and those from January 1st, 1910, to date:

	Sept. 24 Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver		180,617
Buffalo	53,900	1,722,648
City of Cobalt		482,875
Chambers-Ferland	64,000	1,341,100
Cobalt Central		293,286
Cobalt Lake		260,900
Cobalt Townsite	64,000	366,840
Colonial		193,480
Coniagas		1,363,966
Crown Reserve	201,820	4,994,160
Drummond		664,200
Hargraves		401,170
Hudson Bay		417,925
Kerr Lake		7,125,715
King Edward	42,110	263,406
La Rose		8,489,381
McKinley-Darragh	55,640	2,894,969
Nipissing	471,870	9,155,637
O'Brien		928,416
Peterson Lake		432,420
Provincial		65,000
Right-of-Way		1,249,237
Rochester		60,750
Silver Cliff	55,950	268,720
Standard Cobalt		194,902
Temiskaming		1,649,080
Trethewey	42,150	808,580
Waldman		63,992
Wyandoh		48,300

Ore shipments for the week ending September 24th were 1,051,440 pounds, or 525½ tons.

Total shipments from January 1st to September 24th were 46,381,672 pounds, or 23,190½ tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the returns of the ore production and movement for the week ended September 17th:

Boundary Shipments.

Granby	16,530	844,154
Mother Lode	8,653	246,858
Snowshoe	2,125	110,190
Nickle Plate	38	542
Jackpot	618	8,435
Rawhide	1,300	1,300
Other mines		8,834
Total	29,264	1,220,313

Rossland Shipments.

Centre Star	4,046	137,504
LeRoi No. 2, milled	300	11,100
LeRoi No. 2	200	22,934
LeRoi	176	11,396
Other mines		724
Total	4,722	183,658

Slocan-Kootenay Shipments.

St. Eugene, milled	2,775	102,675
Van Roi, milled	800	29,600
Queen, milled	420	15,540
Granite-Poorman, milled	250	9,250
Nugget, milled	110	4,070
Highland, milled	900	5,800
Wilcox, milled	75	300
Richmond-Eureka	22	3,054
Emerald	34	1,377
Sullivan	937	12,300
Ruth	36	422
Enterprise	23	44
Slocan Star	30	30
Other mines		38,124
Total	6,412	222,586

The total shipments for the week, including the estimated milling, were 40,398 tons, and for the year to date, 1,626,557 tons.

British Columbia Copper Company's Receipts.

Greenwood, B.C.

Mother Lode	8,653	246,858
Jack Pot	618	8,435
Rawhide	1,300	1,300
Other mines		8,650
Total	10,571	265,243

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	16,530	844,154
Other mines	.....	120
Total	16,530	844,274

Consolidated Company's Receipts.

Trail, B.C.

St. Eugene, concentrates	150	11,243
LeRoi No. 2, part concentrates	200	22,934
Queen, concentrates	39	505
Highland, concentrates	45	147
Centre Star	4,046	137,504
Le Roi	176	11,396
Snowshoe	2,125	110,190
Richmond-Eureka	22	3,054
Emerald	34	1,377
Sullivan	937	12,300
Ruth	36	422
Enterprise	23	44
Nickle Plate	38	542
Slocan Star	30	30
Other mines	.....	24,247
Total	7,901	335,935

The total receipts at the smelters for the week, including concentrates, were 35,002 tons, and for the year to date, 1,445,452.

TORONTO MARKETS.

Sept. 27.—(Quotations from Canada Metal Co., Toronto.)

Spelter, 5¾ cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 37¾ cents per lb.
Copper, casting, 13.25 cents per lb.
Electrolytic, 13.25 cents per lb.
Ingot brass, 9 to 12½ cents per lb.

Coke.

Sept. 23.—Connellsville Coke (f.o.b. ovens).

Furnace coke, prompt, $1.60 to $1.65 per ton.
Foundry coke, prompt, $2.10 to $2.25 per ton.

Sept. 23.—Tin (Straits), 35 cents.

Copper, Prime Lake, 12.62½ to 12.75 cents.
Electrolytic copper, 12.40 to 12.50 cents.
Copper wire, 14 cents.
Lead, 4.45 cents.
Spelter 5.62½ cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.15 cents.
Aluminium, 22 to 22.50 cents.
Nickel, 40 to 47 cents.
Platinum, ordinary, $35 per ounce.
Platinum, hard, $37 per ounce.
Bismuth, $1.95 per lb.
Quicksilver, $46 per 75-lb. flask.

SILVER PRICES.

	New York cents.	London pence.
September 8	52⅞	24⅜
" 9	53⅛	24½
" 10	53	24 7/16
" 12	52⅞	24⅜
" 13	53	24 7/16
" 14	53⅛	24½
" 15	53¼	24 9/16
" 16	53⅛	24½
" 17	53¼	24 9/16
" 19	53¼	24 9/16
" 20	53⅜	24⅝
" 21	53⅝	24¾
" 22	53½	24 11/16
" 23	53¾	24 13/16

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—September 27, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	15
Dominion Coal Company	..	..
Dominion Steel Company	..	..
Nova Scotia Steel	83	84
Granby	32	33
Consolidated Smelting	60	70
Crow's Nest Pass	80¼	..
Dominion Steel Corporation	64	64½

New York Curb—September 27, 1910.

British Columbia Copper	5⅝	5¾
Butte Coalition	18¼	18¾
Canadian Mines	6⅜	6⅝
Chino Copper	18⅛	18¼
Davis-Daly Copper	1 15/16	2 1/16
Ely-Consolidated	.28	.32
Giroux Mining	6⅝	6¾
Goldfield Consol.	8¾	9
Green-Canadian	6⅜	6⅝
Harcuvar Copper	none.	
Inspiration Copper	7⅞	8
Miami Copper	19¼	19½
New Baltic Copper	5½	6
Nevada Consolidated Copper	19⅝	19⅞
Ohio Copper	1⅝	1 1/16
Rawhide Coalition	.10	.11
Ray Central	2⅛	2¼
Ray Consolidated	18⅛	18⅜
Union Mines	⅞	1
Yukon Gold	3 13/16	3 15/16

Cobalt Stocks—September 27, 1910.

Amalgamated	.02¼	.04
Bailey	.07¼	.07⅜
Beaver Consolidated	.32⅜	.32½
Buffalo	1.85	2.10
Chambers-Ferland	.15¼	.15½
City of Cobalt	.23	.25
Cobalt Central	.06	.07
Cobalt Lake	.14¾	.15
Coniagas	4.50	5.00
Crown Reserve	2.81	2.88
Foster	.08	.10
Green Meehan	.02⅜	.02¾
Hargraves	.28½	.29
Hudson Bay	93.00	105.00
John Black	.01	.05
Kerr Lake	6.20	6.25
La Rose	3.89	3.94
Little Nipissing	.18⅞	.19
McKinley	.95½	.95¾
Nancy Helen	.04	.05
Nipissing	10.90	11.12½
Nova Scotia	.25	.28
Ophir	.24	.30
Otisse	.02¾	3
Peterson Lake	.21⅞	.22
Right of Way	.23¾	.24½
Rochester	.14¾	.14⅞
Silver Leaf	.07	.07¼
Silver Bar	.03½	.05½
Silver Queen	.05	.08
Temiskaming	.87¾	.88
Trethewey	1.32½	1.34
Watts	.02¾	.10
Wettlaufer	.60	.70

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto



ON TIME

One of the most important business transactions which sensible minded men should perform on time is that of making proper provision for those who are dependent on them for the necessities of life.

The only way to do this is by means of life insurance. The only way to do it on time is to act now while in health. The most satisfactory way is to insure at once in the

North American Life

ASSURANCE COMPANY

"Solid as the Continent"

HEAD OFFICE, - - TORONTO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

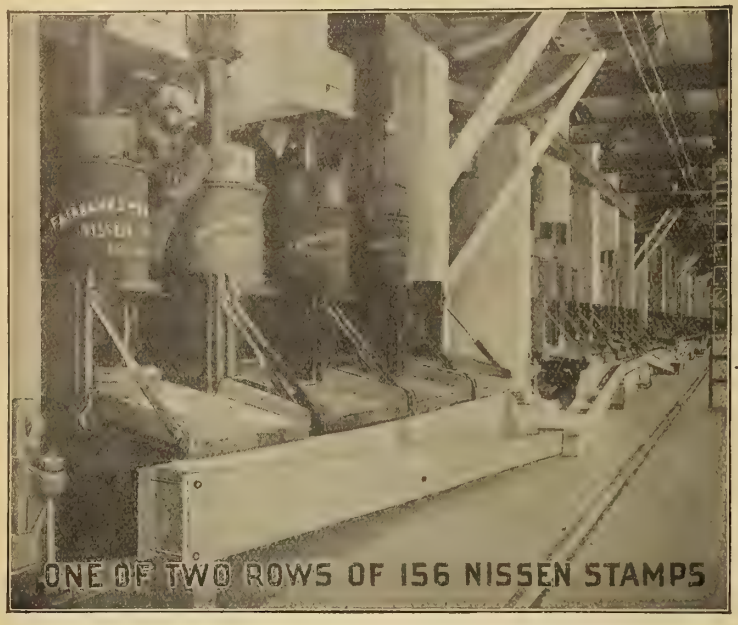
900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent
Board of Trade Bldg.
Montreal

J. S. CARTER, Gen. Agent,
450 Main St.
Winnipeg, Man.

I. E. SUCKLING, Gen. Agent,
S. E. Corner King & Yonge Sts.,
Toronto, Ont.



ONE OF TWO ROWS OF 156 NISSEN STAMPS

NISSEN STAMP MILLS

Will Save 50% of Your Power.

Owing to the maximum crushing efficiency secured, the power required to operate Nissen Stamp Mills is about half that of other mills of the same capacity output.

The Nissen Stamp in Cobalt

Read what a Supt. writes:

NORTHERN CUSTOMS CONCENTRATORS, LIMITED.
COBALT, ONT., December 31st, 1909.

The Canadian Fairbanks Co., Toronto, Ont.

Dear Sirs:—

In answer to your inquiry regarding the NISSEN STAMPS supplied by your firm. These stamps are running steadily on some of the hardest rock on the Continent, they are crushing 5.3 tons of ore per head in twenty-four hours. The feed rolled down to go through about a one inch hole. The screen used for the above tonnage was 30 x 30 mesh, 28 gauge wire, opening .018, With a coarser screen the tonnage would of course be larger.

The shoes and dies wear even, and the splash is well distributed over the screen.

The arrangements for keeping up the weight of the stamps is very good.

I can recommend the Stamps. Yours truly, (*Sgd.*) F. J. Bourne, Superintendent

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

MONTREAL, TORONTO, ST. JOHN, N.B. WINNIPEG, SASKATOON, CALGARY, VANCOUVER.

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Assays and Analyses

Twenty four hours after your samples reach us we will give you accurate results. Our laboratory is run on the lines of mine and smelter plants. We have specialists for each class of work and we will analyze or assay anything and do it for you well and quickly. Send for scale of prices.

We guarantee the accuracy of all work.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

Want Advt.

Mining Engineer, technical graduate wants position with Coal Co. in Western Canada. Experienced Surveyor, Assayer and Draftsman. Unmarried, age 26. Low initial salary, no objection if chances are good.

Address, Box 653,
Oshawa, Ont.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HITCHCOCK, C. H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

LONGYEAR & HODGE
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

RALPH A. MEYERS, E.M., B. SC.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc., and any work connected with the mining profession.

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

SUTCLIFFE & NEELANDS,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

WALTER E. SEGSWORTH
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

WILLMOTT, A. B., M. A., B. Sc.
MINING ENGINEER
494 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

S. F. KAVANAGH
Assayer
Minning Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors.
Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Goristine Bldg., Montreal.
Phone M-7515

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
404 Lumsden Bldg, TORONTO.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

FLAHERTY, R. H.
Examines and reports on Iron Lands. Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

G. W. DIXON
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building, Montreal

CAPITAL SECURED FOR
GOLD, SILVER, IRON
and other Mining Properties
Address F. C. SCHULTE
Sault Ste. Marie, Ont.

ORE BUYERS

FOR SALE
A few very good gold, silver and copper properties, on working options—Easy terms. Address
P.O. Box 973, Sault Ste. Marie, Ont.

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1075. Report on the Gowganda Mining Division 1908, accompanied by a map, by W. H. Collins.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology as applied to practical mining.* It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL
The Canadian Copper Company

Nickel for Nickel Steel
The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00 Foreign Countries in Postal Union $5.00

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

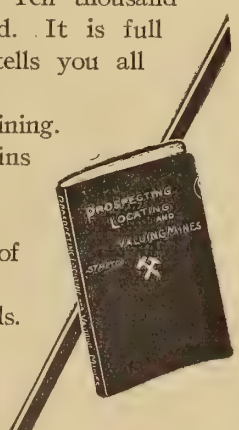


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,
TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co.....vi
Asbestos Mfg. Co., Ltd. outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D.,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd. xvi
Scott, O. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd,, Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST. JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatc If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertise kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
[illegible] Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,
John McDougall Caledonian Iron Works Co., Ltd.

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd.
John McDougall Caledonian Iron Works Co., Ltd.

Condensers—
John McDougall Caledonian Iron Works Co., Ltd.
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
John McDougall Caledonian Iron Works Co., Ltd.
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co. Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
John McDougall Caledonian Iron Works Co., Ltd.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
John McDougall Caledonian Iron Works Co., Ltd.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co. Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co. Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

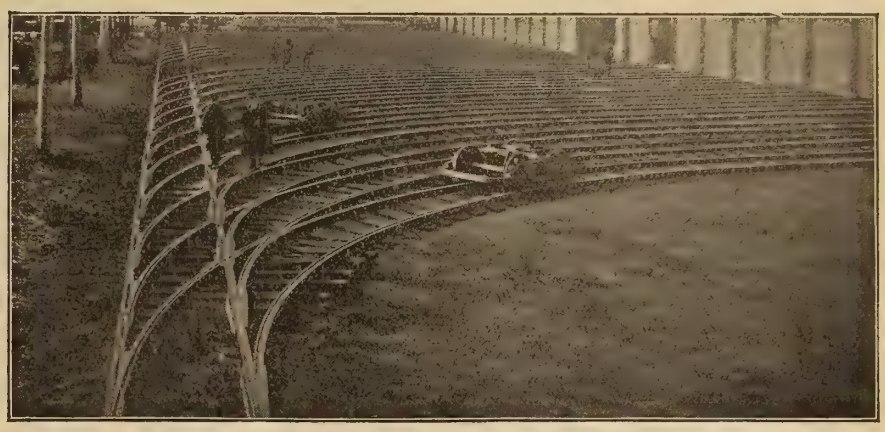
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Westinghouse

Type "H" Oil Circuit Breakers

Made in Two, Three and Four Pole Styles.

Although specially designed for industrial, mining and general motor applications being placed in any position convenient to the motor, they are also adapted to switchboard mountine. Type "H" Breakers can be used on both alternating and direct current circuits, and have a maximum capacity of 100 amperes at 500 volts. Their calibration range is from 80 to 160 per cent. of rated carrying capacity. While automatic in action it can be tripped by hand by means of a small lever on the side of the case.



Write for Circular 1096

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appear ance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

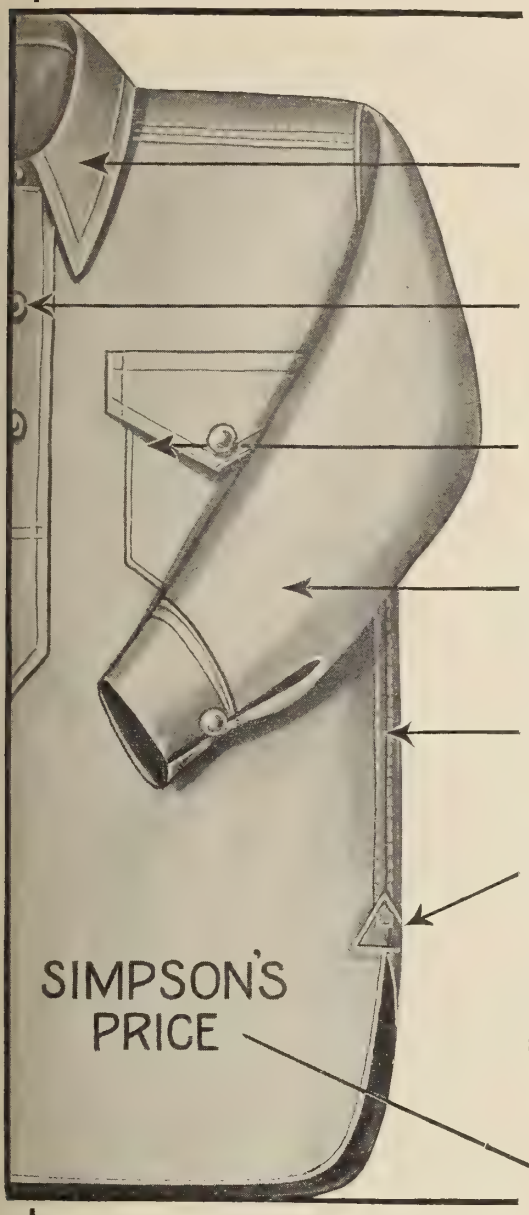
PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

KHAKI DUCK SHIRT

For Miners, Lumbermen, Prospectors, Surveyors



MADE THE SIMPSON WAY

NOTE THE DIFFERENCE FROM THE ORDINARY WAY:—

COLLAR will fit neatly, all ways, all the time. Is well interlined to retain its shape. Steels inserted to prevent curling points.

DOME FASTENERS of brass used throughout. No buttons to come off. No occasion to swear. A feature that will be appreciated by every man.

POCKET Two pockets, one on each side, with dome fastened flap. A splendid idea. Plenty of *pocket space* is a Simpson improvement.

SLEEVES are made large. Plenty of elbow room. Inter-lined wrist-band, dome-fastened. One of the strong points not to be overlooked, viz.—roomy sleeves.

DOUBLE STITCHED seams throughout, with extra strong thread insuring strong wear. This Simpson shirt is made stronger to wear where the most wear comes.

GUSSETS are made strong and double stitched, adding extra strength. You can be absolutely sure the seams will not rip at this point.

FABRIC extra heavy khaki duck. Wind-proof and shower-proof. Will stand the hardest kind of wear. Try it. Almost indestructible.

KG522 IS THE ORDER NUMBER
Sizes 14½ to 18

$1.00

THE POSTAGE IS 20c EACH
Order at Once

A SHIRT OF EQUAL VALUE WOULD SELL IN MOST STORES AT FROM $1.50 to $2.00

THE ROBERT SIMPSON COMPANY LIMITED

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

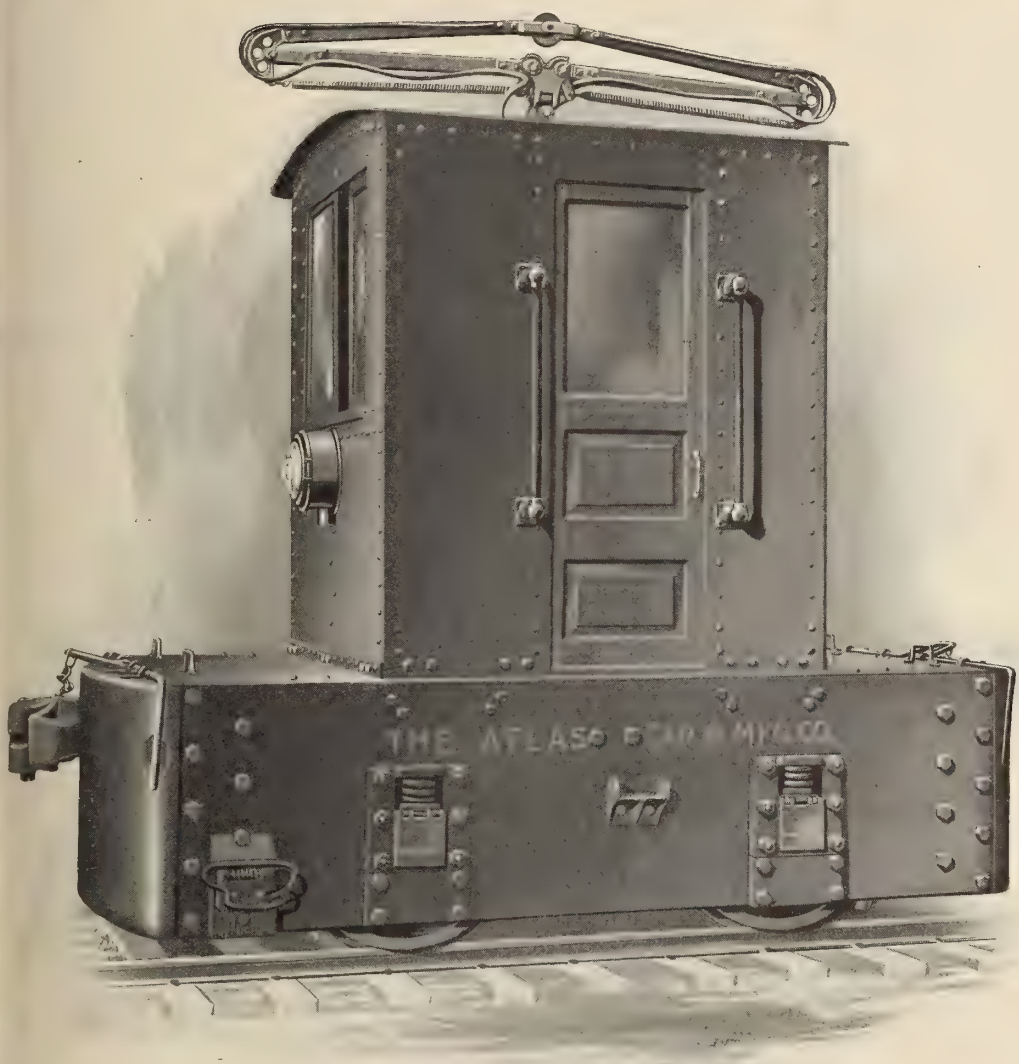
The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

VOL. 31 TORONTO No. 20

ELECTRIC LOCOMOTIVES



We can supply:

Plain Storage Battery, Combination Storage Battery, and Trolley or Third Rail, or Plain Trolley or Third Rail, Electric Locomotives of Regular or Special Design, for Surface or Underground Use.

Write for Bulletins 1090 and 1095.

MUSSENS LIMITED

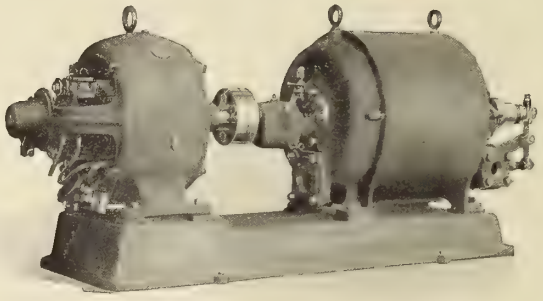
MONTREAL, 318 St. James St. | **TORONTO,** 73 Victoria St. | **COBALT,** opp. Right of Way Mine | **WINNIPEG,** 259-261 Stanley St. | **CALGARY,** Crown Bldg. | **VANCOUVER.** Mercantile Bldg

KERR STEAM TURBINE

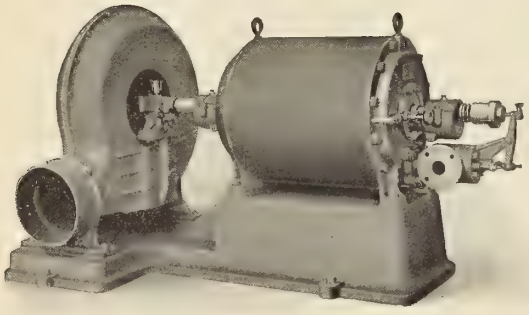
Built in capacities from 5 H. P. to 600 H. P.

COMPACT IN FORM
SIMPLE IN CONSTRUCTION
NOISELESS IN OPERATION
WONDERFUL IN EFFICIENCY

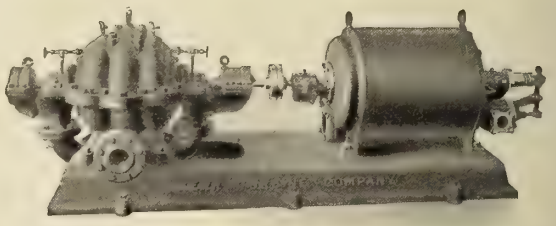
AN IDEAL PRIME MOVER



KERR TURBINE
DRIVING AN ELECTRIC GENERATOR



KERR TURBINE
DRIVING A CUPOLA BLOWER



KERR TURBINE
DRIVING A CENTRIFUGAL PUMP

Send for Descriptive Literature

The John McDougall Caledonian Iron Works Co.

LIMITED

Exclusive Agents in Canada for the Kerr Turbine Co.,

Works: 512 William Street, Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

BELLISS EXHAUST TURBINES

GIVE A STEAM ECONOMY OTHERWISE UNATTAINABLE

Many installations including repeat orders for His Majesty's Dockyards giving absolute satisfaction.

Builders: Belliss & Morcom, Limited

BIRMINGHAM, ENGLAND

Canadian Agents: LAURIE & LAMB

211 and 212 Board of Trade Building, Montreal

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just because it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO. LIMITED

COBALT, ONT.
P. O. Box 310

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

SPEED

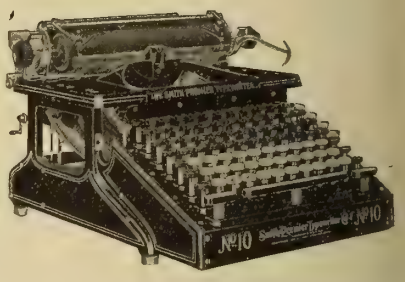
A single motion is quicker to make than two.

Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of the

easy action
light running **Model 10**

Smith Premier

The Smith Premier Typewriter Company, Inc.
Syracuse, N. Y.



Canadian Representatives:
National Typewriter Co., 87 Victoria St., Toronto
Wm. H. Hall & Co. 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 1157 Holis St., Halifax, N.S.



UPPER HOLES

in Canadian, American and Mexican Mines are being drilled faster and more cheaply with Sullivan New Stoping Drills than with any other tool.

"Class D A 21"

Ask for reasons; They are in Bulletin 660 D.

Air Compressors, Rock Drills,
Hoists, Diamond Drills, Coal Cutters

SULLIVAN MACHINERY COMPANY,

Cobalt,
Birmingham, Ala. Butte Denver El Paso
Joplin, Mo. Knoxville New York Paris, France

Nelson, B.C.

150 Michigan Avenue
CHICAGO, ILL.

Claremont, N.H
Pittsburg Salt Lake San Francisco Seattle
Spokane St. Louis Sydney, Australia

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg

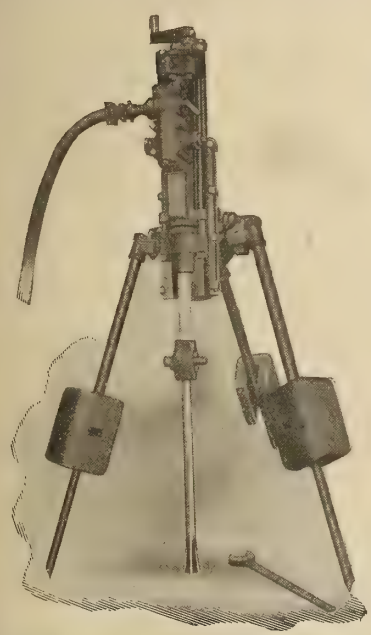


BEST FOR MINE BUILDINGS

Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.



Rock Drills of Quality

The magnitude of our business proves that the vast majority of buyers buy on the basis of quality and not of price.

High-grade materials, special treatment of steel parts, limit-gauge test to assure interchangeability, inspection of parts and rejection of defective materials, are essential elements of quality which help to make **RAND ROCK DRILLS** the best investment.

Sole Agency for B. C. Steel in Cobalt Territory.

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



Price $350.00

We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

The Deister Concentrator Co., Ft. Wayne, Indiana, U.S.A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
REST, - - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Every Branch of this Bank is able to issue, on application, Drafts on the principal points in the following countries:

Africa	France	Peru
Arabia	French Cochin-China	Philippine Islands
Argentine Republic	Germany	Portugal
Australia	Great Britain	Roumania
Austria-Hungary	Greece	Russia
Belgium	Holland	Servia
Brazil	Iceland	Siam
Bulgaria	India	Siberia
Ceylon	Ireland	Soudan
Chili	Italy	South Africa
China	Japan	Spain
Crete	Java	Straits Settlements
Cuba	Malta	Sweden
Denmark	Manchuria	Switzerland
Egypt	Mexico	Turkey
Faroe Islands	Norway	United States
Finland	Panama	Uruguay
Formosa	Persia	West Indies

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd. Nova Scotia Iron & Steel Co. and all the leading English American, French, German, Belgian, etc Rescue Stations

3,000 IN USE

The Michaelsen Ore Crusher and Pulverizer

CHARLES O. MICHAELSEN, owner of Pat. No. 113991 is now prepared to furnish to the mining trade a new device in the line of an **Ore Crusher and Pulverizer.** This Crusher and Pulverizer is unexcelled in capacity, economy of power, economy of labor and repairs, and most essential of all, it accomplishes even pulverization.

MANUFACTURED BY

Northern Foundry & Machine Co., Ltd.

SAULT STE. MARIE, ONTARIO, CANADA

For further particulars address CHAS. O. MICHAELSON, care of Northern Foundry and Machine Co.

Specify Distinctly "STAG" BRAND Allen's Stag Brand



SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock

SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

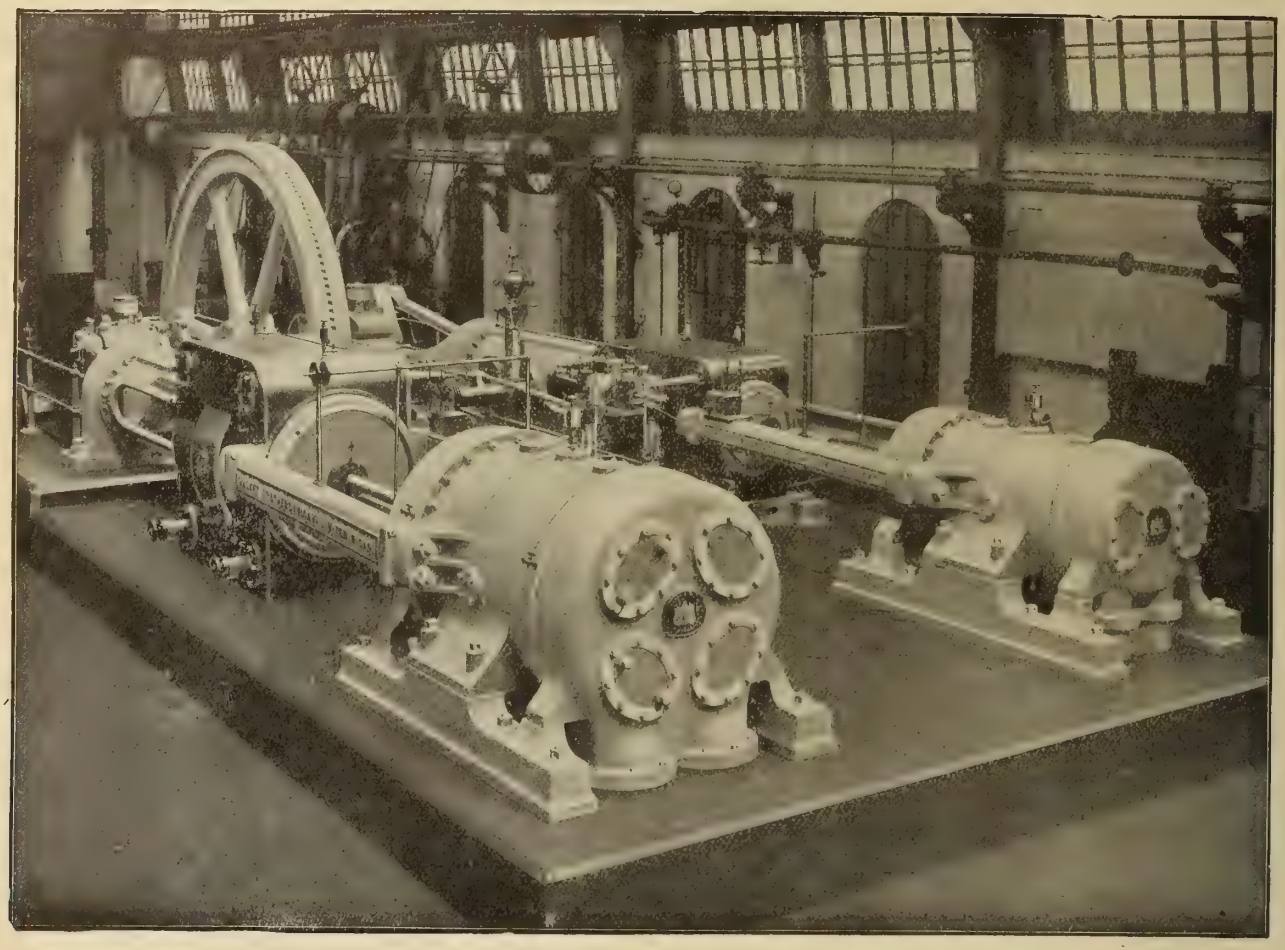
Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department **CANADIAN MINING JOURNAL**

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves, Walker's Latest Patents.

AIR COMPRESSORS

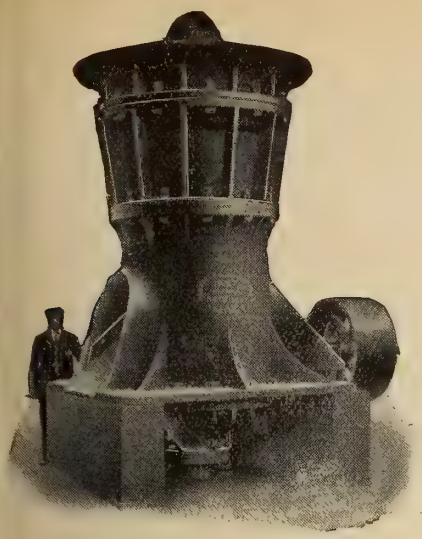
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



Heclon Rock and Ore Breaker. Hadfield & Jacks Patent.

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of
CRUSHING AND GRINDING MACHINERY
of every description.

HADFIELD'S Patent "ERA" MANGANESE STEEL

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, etc.,

Including
WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS,
ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield

Peacock Bros., 68 Beaver Hall Hill, Montreal, P.Q.

FOR DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

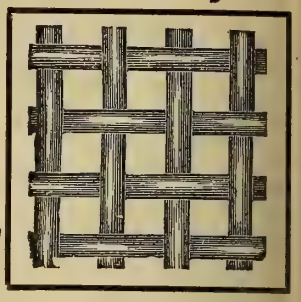
CORRESPONDENCE SOLICITED

THE BROWN MACHINE COMPANY, LIMITED

NEW GLASGOW — ENGINEERS — NOVA SCOTIA

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalogue 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Mine Hoisting Engine

Cylinders 22 inches diameter, stroke 42 inches, about 900 horse power; double drums 8 feet diameter, 5 feet wide.

Corliss valves, steam actuated clutches and brakes. The reversing gear, throttle, brake and other levers are grouped at a central platform.

This engine was completed within the past few months and is thorougly modern. Write for drawings, specifications and photographs.

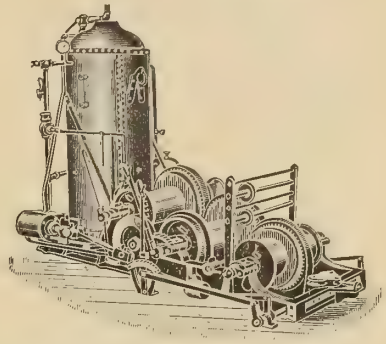
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF

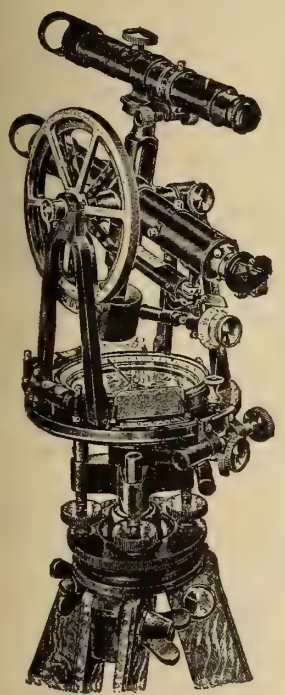


Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments
FOR
Civil, Mining Engineers & Surveyors



Maufacturers Instruments of Precision

also

Engineers and Draftsmens Supplies

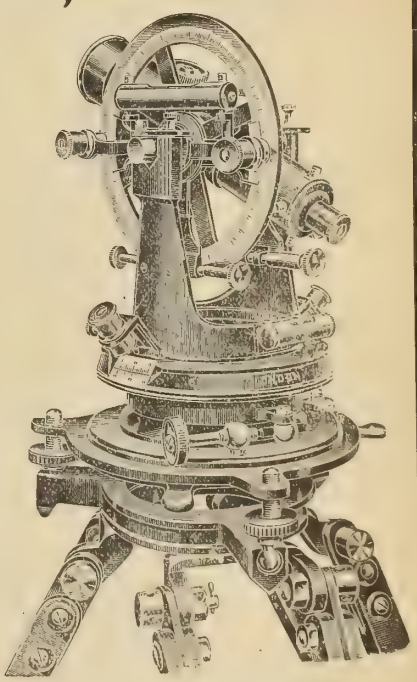
Eugene Dietzgen Co., Limited
TORONTO

STANLEY, LONDON

The largest manufacturers of Surveying and Drawing Instruments in the World.

Please send for our H 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

TRADE
STANLEY
MARK



Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

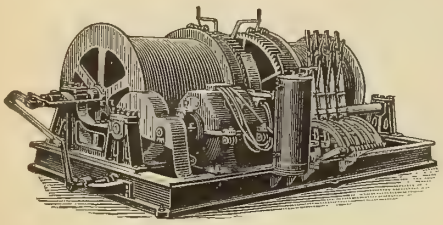
W. F. Stanley & Co., Limited
Great Turnstile, London, England

Flory Hoisting Engines

STEAM AND ELECTRIC

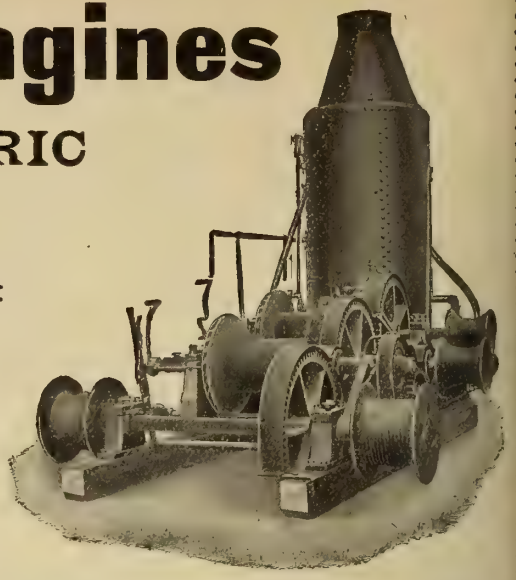
Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO., New Glasgow, Nova Scotia.
MUSSENS LIMITED, Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

ARE YOU GOING HUNTING?



There are more hunting grounds reached by the Canadian Pacific Railway than by any other line in America

SINGLE FARE FOR HUNTERS

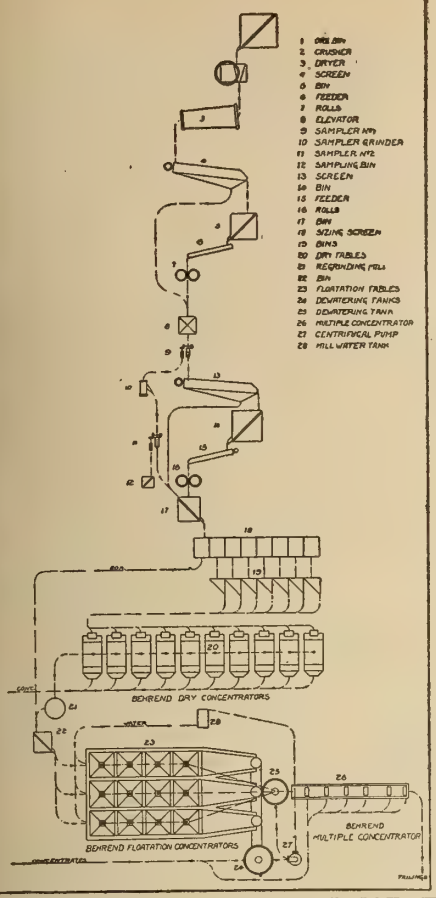
In effect October 20th to November 12th with a return limit of December 15th.

"Fishing and Shooting"
"Open Seasons—1910"
"Hints to Hunters"
"Sportsman's Map"

Handsomely illustrated publications of interest to Hunters. Ask any Agent of

Canadian Pacific Railway

R. L. THOMPSON, D.P.A. 67 Yonge St., Toronto



FLOW SHEET

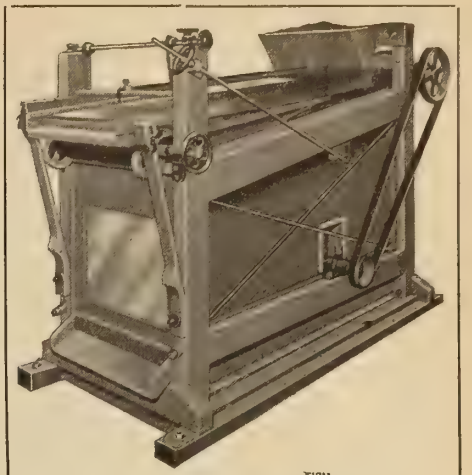
OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM

OF



PATENTED JAN. 21, 1896
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED

32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



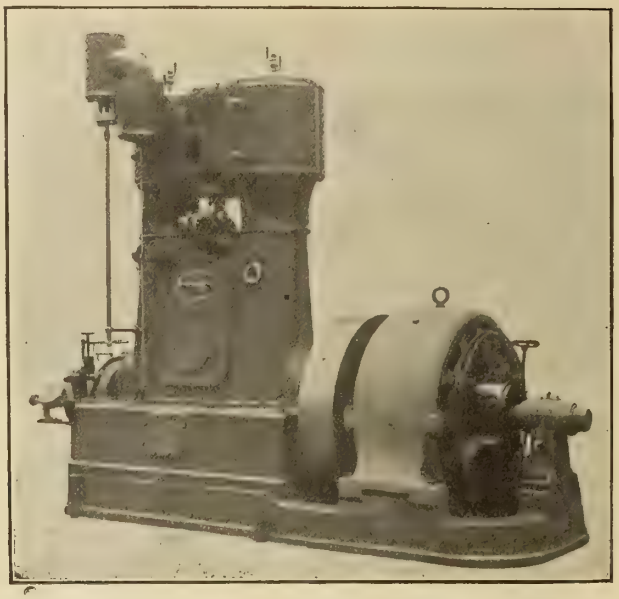
Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - - 710 Torrey Bldg.
Denver, Col. - - - 225 E. Maple St.

When wanting goods write nearest office.

BRUCE PEEBLES & CO., Ltd.

Peebles-Howden Marine Set



Dynamos and Motors for all Conditions of Service.

Reliability and Economy Guaranteed

VANDELEUR & NICHOLS

DINEEN BUILDING, TORONTO. Eastern Representative, A. P. BURY, Montreal.

The Davis Handbook of the Cobalt Silver District

by H. P. Davis

Illustrated with Photographs

PRICE

Paper Cover = = $1.50

Stiff " = = = $2.00

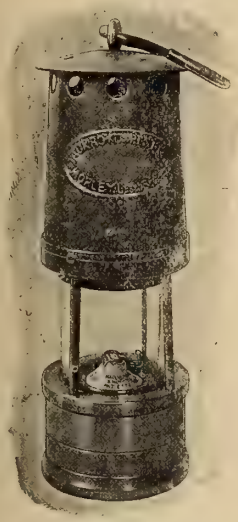
¶ The first section of this volume is an outline on the Goelogy, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general infromation necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = *Canadian Mining Journal* = *Toronto*

A PROPER SAFETY LAMP
SHOULD BE SAFE, STRONG, SIMPLE AND EASY TO MANIPULATE IN THE LAMP CABIN —OURS FILLS THIS BILL.



"Hailwood's Improved Safety Lamp."

By means of Expensive Special Accurate Machinery we produce nothing but the very best possible lamp.

Don't continue risking your Mines with worn out unsafe old style lamps but possess an installation of our goods and follow the example of the majority of the best Colliery Concerns in existence by obtaining from us a complete installation of Oil Lamps, Electrically Ignited and Magnetically Unlocked together with Cabin Lamp Lighting and Unlocking Machines, Oil-filling Machines, Underground Fool Proof Lamp Re-lighting Machines.

ACKROYD & BEST, LTD.
MORLEY, NR. LEEDS, ENGLAND
For Prices and Particulars address:—
ACKROYD & BEST, LIMITED
No. 2 Arrott Power Buildings, Barker Place
PITTSBURGH, PA., U.S.A.

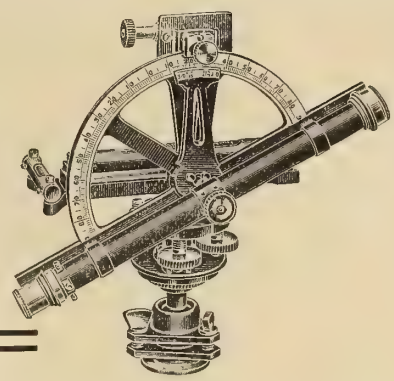
JENA
GLASSWARE
THE BEST IN THE WORLD
Sole Agents for Canada
LYMANS, Limited
(ESTABLISHED 1800)
Laboratory Apparatus and Chemicals
MONTREAL

DIAMOND DRILLS
We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.
138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY
Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Jayes' Mining Level

Specially designed for accurate levelling and for taking angles of inclination in mines. Equipped with a ball and socket motion for rapid levelling—can be levelled anywhere in 15 seconds. A great time-saver and invariably accurate. With telescope attachment or sights.

A well-built and minutely accurate instrument with advantages too numerous to explain herein

Catalogue F sent free.

Joseph Casartelli & Son
Scientific Instrument Makers
43 MARKET STREET
MANCHESTER, ENG.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co, Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL P.Q.

Beath's Steel Kegs

Beat any Shipping Package in the World. Unequalled for Shipping Concentrates, Oxides and in fact everthing requiring protection in transit.

They're **Light, Cheap and Strong.**

Write for Samples and Prices

W. D. BEATH & SON, Ltd. Toronto

The South African School of Mines and Technology, Johannesburg.

Owing to the present Principal and Professor of Mining of The South African School of Mines and Technology having been appointed Consulting Engineer to one of the Witwatersrand Minning Houses, the Council invites applications for the joint position, or alternatively for the chair of Mining alone. The salary attached to the chair of Mining is £1500 per annum. This would be increased by £250 per annum if the Professor were also appointed Principal of the School.

Particulars with regard to the School and the vacant posts may be obtained on application to:—

The Registrar, McGill College and University,

Montreal, Canada.

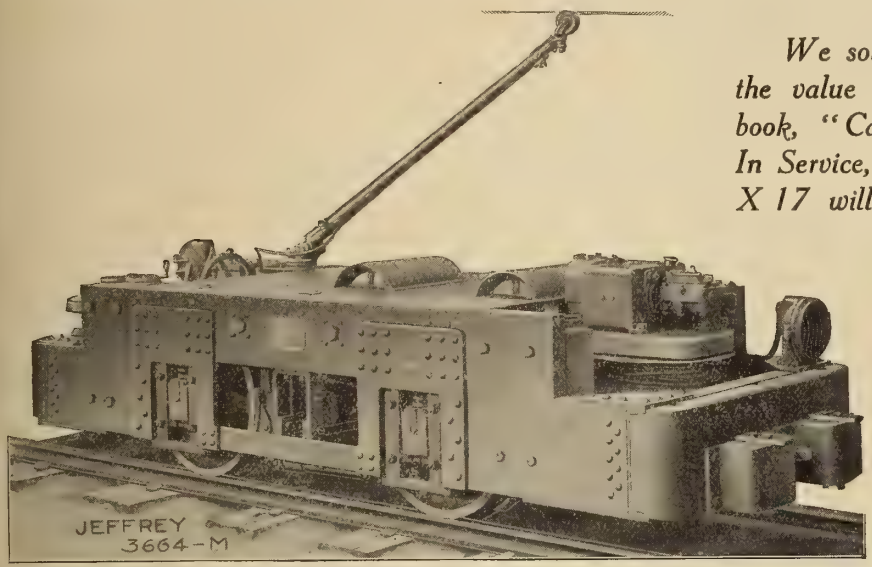
Applications must be sent so as to arrive in Johannesburg not later than the 30th November, 1910. They should be addressed to:—

THE SECRETARY,
P. O. Box 1176,
Johannesburg.

Continuous Operation In Mine Haulage Means Low Cost Per Ton Output

JEFFREY LOCOMOTIVES are selected as an actual necessity to maintain the desired tonnage.

Their superior design and construction is acknowledged by operators familiar with their mechanism.



We solicit an opportunity to demonstrate the value of our Locomotives. Illustrated book, "Care of Electric Mine Locomotives In Service," X 12, and the Jeffrey Catalog X 17 will be sent on request.

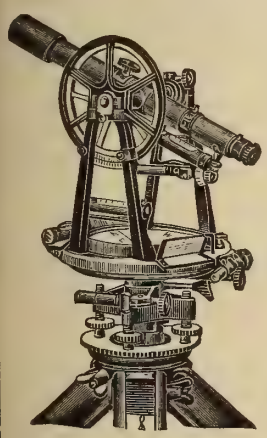
The Jeffrey Mfg. Co.

Canadian Office and Works

MONTREAL

Toronto Office, 174 King Street East

Main Office and Works, Columbus, Ohio



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES :

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

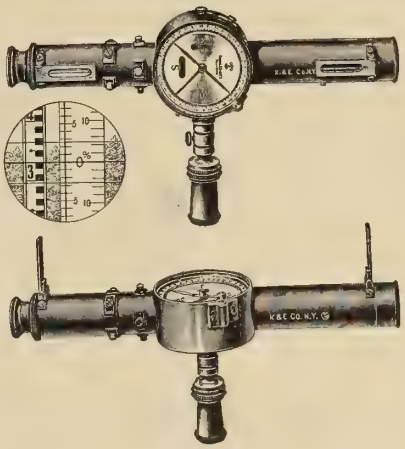
HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196

An Ideal Instrument

For Preliminary Surveying



THE STADIA HAND TRANSIT

The Stadia Hand Transit gives more accurate and quicker results than any similar portable instrument. It is thoroughly well made and will meet the requirements of those who are engaged on preliminary work, or on the sub-division of larger surveys made with a regular transit.

No. 5375

In measuring vertical angles, the sighted point and both scale readings (slopes and degrees) appear together in the field of view (see cut.) Compass bearings can be taken by use of the telescope on level ground or by the folding sights on sloping ground.

Send for complete Catalogue.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

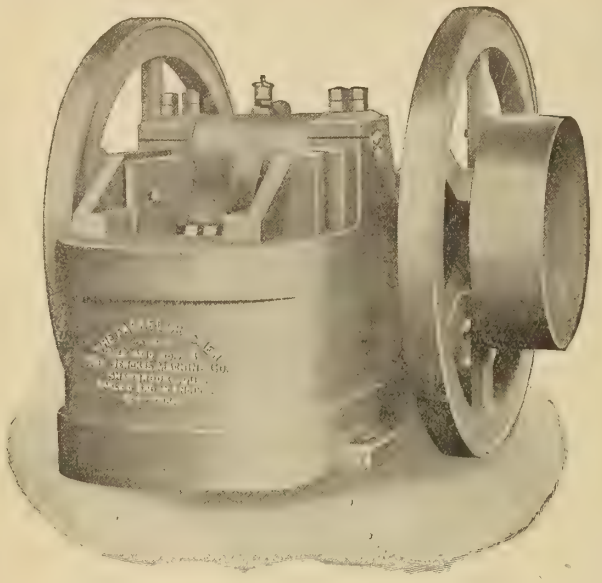
General Office and Factories,

HOBOKEN, N.J.

New York, Chicago, St. Louis, San Francisco

Mathematical and Surveying Instruments

Drawing Materials Measuring Tapes



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

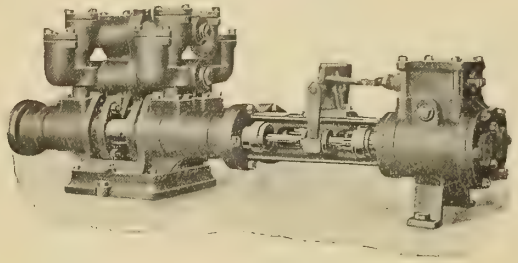
Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices:

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver

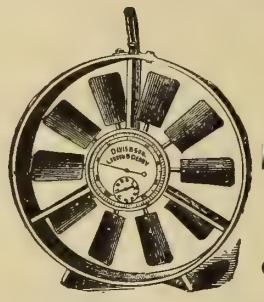
Power & Steam Pumps, Condensers, Travelling Cranes, Etc.

Write for Catalogue



THE SMART-TURNER MACHINE COMPANY, Limited

HAMILTON, CANADA



DAVIS DERBY.

ANEMOMETERS
WATER GAUGES
HYGROMETERS

(STOCK AT MONTREAL)

SEND FOR CATALOGUES

PEACOCK BROTHERS

68 BEAVER HALL HILL

MONTREAL

Write for pamo.4M

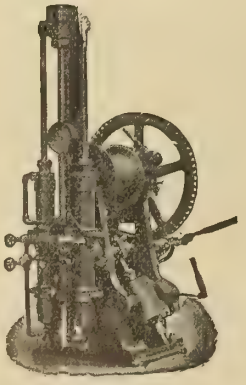
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, Oct. 15, 1910 No. 20

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 613
(a) Amalgamated Asbestos 613
(b) The Nineteenth Annual Report of The Ontario Bureau of Mines 614
(c) Mining Accidents in Ontario During 1910..... 614
(d) Coal Mining in Alberta During 1909 615
(e) Editorial Notes 615
Canadian Mining Institute 616
The Porcupine Trail, by Reginald E. Hore 617
The Kent Gas Field, by G. R. Mickle 623
Special Correspondence—South Africa 626
Practical and Economical Mining, by Neil A. Nicholson.. 627
Our European Letter 629
New Mines Branch Experimental Plant 630
The Consolidated Mining and Smelting Company of Canada, Limited 631
Waterborne Packing of Stopes in the Transvaal, by Rowland Gascoyne 635
Personal and General 636
Special Correspondence 636

AMALGAMATED ASBESTOS.

Destructive criticism of established industries is no part of our aim. When, about eighteen months ago, the Amalgamated Asbestos Corporation, Limited, was organized with a total capitalization of $25,000,000, the CANADIAN MINING JOURNAL drew immediate attention to certain unhealthy features. Amongst the points that we dwelt upon were the overcapitalization of the company, and the extravagant nature of the statements made by the promoters. Our criticisms were not well received. Several newspapers were loud in their counter cries. These same newspapers are now equally loud in their condemnation of the action of the Amalgamated in passing the last dividend and in issuing a future call upon the underwriters of the bond issue. Violent communications are appearing almost daily in columns that were once devoted to exploiting the merits of the whole scheme.

Now we have no intention of adding our voice to the chorus of the discontented. In fact our advice to them is to sit tight and look squarely at conditions as they are. Nothing can be gained and very much may be lost by disturbing the peace now. The reasons are apparent.

In the first place, whilst it is admitted that Amalgamated Asbestos has been over-financed, there is no question that physically the properties are in much better shape than ever before. Economies large and small have been effected. Mechanical equipment has been enlarged and improved. Mill products have been standardized, and every effort is being made to extend the market. We believe, also that in general the administration has been rendered much more efficient and much less expensive.

However painful to the shareholder may be the absence of a dividend, we are firmly convinced that payment of that dividend would be exceedingly bad business. In the early stages of any such huge enterprise it is unwise to begin disbursements. The Amalgamated is not yet two years old. For some time yet all earnings should be returned to the mines and plants.

While we do not for a moment wish to pose as an apologist of the promoters, yet we must say that we feel no sympathy whatever for those who are trying to block the present management in its attempt to make the best of a difficult situation, a situation created in part by the highly-coloured representations of a specialist who was an accredited officer of the Federal Mines Branch.

The future of Amalgamated Asbestos depends altogether upon close and efficient management and upon unremitting attention to the development of the market. We see no reason why that market cannot be greatly enlarged. But the process of securing new consumers

is long and costly. Hence shareholders should be content to dispense with dividends until such time as they can be paid without injury to the business.

The present condition of the market has been induced by the unwise desire to make a fine showing. Over-production has adversely affected prices. It is certainly not yet possible to market the present outputs. How soon it will be possible is a matter of conjecture. And this is the crux of the whole question. Over-production is a costly expedient. It is not worth while. The time has come to lend every energy to mining, milling, and marketing. Of these three the last named is, just now, by far the most important.

Greatly overdone as has been the amalgamation of Canadian enterprises, it is wrong to condemn sweepingly the principle of consolidation. Consolidation without the injection of superfluous water brings many and decided advantages, especially in such an industry as asbestos mining. Amalgamated Asbestos had more than a fair injection. But the water is there and must remain there until removed by catastrophe or by gentle evaporation. The latter method is to be preferred.

THE NINETEENTH ANNUAL REPORT OF THE ONTARIO BUREAU OF MINES.

Part I. of the Nineteenth Annual Report of the Ontario Bureau of Mines has just come to hand. It contains the usual exhaustive and clear statistical review from the pen of Mr. T. W. Gibson, Deputy Minister of Mines. Mr. E. T. Corkill, Inspector of Mines, reports upon and analyses in close detail the mining accidents that occurred during 1909. Mr. Corkill also reviews the mining operations of the year and the development of water powers in mining districts.

The Kent gas field is the subject of a short paper by Mr. G. R. Mickle, Mine Assessor. Mr. G. C. Mackenzie continues his valuable researches in the concentration of iron ores. His present contribution "Concentration of Low Grade Magnetites," contains several exceedingly useful treatment determinations on Ontario ores. Mr. Mackenzie's general conclusion is that the process of magnetic separation is well worthy of serious and immediate consideration by operators in this province. This conclusion is based upon continuous and systematic investigations covering several years.

Dr. E. S. Moore writes of the Lake Savant iron range area. Although no rich ore has been encountered here as yet, Dr. Moore expresses the opinion that the range is worth prospecting.

"Nepheline Syenites of Port Coldwell" is the title of the concluding paper, of which Mr. H. L. Kerr is the author. This is an academic dissertation upon the petrographic characteristics and the geologic associations of the above mentioned rocks.

The Nineteenth Annual Report is profusely illustrated and is accompanied by three coloured geological maps, —respectively, of Lake Savant Iron Range, District of Thunder Bay, and Porcupine Gold Area—and one map profile from Toronto to the Archean-Palaeozoic boundary on the Hudson Bay slope. Along with the Porcupine map are several detail maps.

Our readers will welcome the announcement that Part II. of the Annual Report, which will appear later, is to consist of a revision of Dr. W. G. Miller's classic Report on the Silver Regions of Northern Ontario. This will not only be brought up to date, but will also be much more comprehensive than before. South Lorrain, Montreal River, and Gowganda will be dealt with in addition to Cobalt.

. . . . .

In several respects we notice improvements in the Ontario Report. The illustrations are well chosen and more numerous than heretofore. The statistical tabular statements are more complete. Particularly is this the case in Mr. Corkill's painstaking summary of mining accidents. The review of mining is creditably complete considering that this work also falls upon Inspector Corkill's shoulders. In fact, the whole volume is instructive. But we must once again express our conviction that it is foolish and futile to throw the inspectoral work of the whole of Ontario upon one individual.

There is no room to doubt the past and present need of more rigid inspection. It is a physical impossibility for one man to cover Ontario adequately. It is also most unjust to expect any faithful and competent officer, —and both of these adjectives apply to the present inspector— to cover, in detail, a field like Ontario. The province can well afford to appoint a staff of paid assistants for the work.

MINING ACCIDENTS IN ONTARIO DURING 1910.

The Ontario Bureau of Mines Report for 1910, referred to generally in another column, deals more thoroughly than usual with mining accidents.

We note in reading the inspector's report that 34.7 per cent. of the fatalities are classified as resulting from accidents due to danger inherent to the work itself; 10.2 per cent. from accidents caused by defects in the mine workings; 8.2 per cent. from accidents through fault of fellow workmen; 40.8 per cent. due to accidents through fault of injured persons. The remaining fatalities, 6.1 per cent., are not susceptible of classification.

According to this analysis, at least 59.2 per cent. of the fatalities that occurred during 1909 were preventible. In other words they were due to carelessness on the part of workmen, or to negligence on the part of operators. But the latter is not seldom a contributory cause. And whilst it is impossible to prevent carelessness altogether, it should be quite practicable to reduce it to a minimum. It is not appropriate here to discuss the proportion of blame that falls upon the operators. But we can assert without fear of contradiction that accidents would have been fewer had the operators done their whole duty.

During 1909, Ontario's mining industry grew notably. It is growing every day. Much new territory is being opened. Hence the newer districts are dotted with numerous small workings. Inspection of these is difficult, but absolutely necessary. And regular inspection of all established mines is equally essential. A toll of 49 lives is too large. The annual expenditure of a few thousand dollars in salaries for assistant-inspectors would be amply justified if but two or three lives were saved; but it is probable that the decrease in fatalities would be larger than this.

Nothing but praise is due the work being done at present. The potent truth is that there should be provision made for ten times more of it. This is not the first time, nor shall it be the last time, that we shall refer to this question. We hope that when next we touch upon it, however, it will be to congratulate the Government of Ontario on augmenting its absurdly small appropriation for the inspection of mines.

COAL MINING IN ALBERTA DURING 1909.

Somewhat belated is the Annual Report of the Coal Mines Branch of Alberta. Nevertheless it is highly interesting.

According to figures here presented the output of coal in 1909 was 2,174,329 tons, an increase of 17.85 per cent. over 1908. This increase would have been still larger had not three-quarters of the production been shut off for three months owing to strikes.

Since 1905, Alberta's output has multiplied by three. There are now 121 operating mines, of which 32 were opened during 1909. During that year, also, eight mines were abandoned.

The quantities of lignite, bituminous, and anthracite mined during the past year were respectively, 763,673 tons; 1,197,399 tons; and 213,257 tons. The production of coke was 87,812 tons; and the production of briquettes, 89,785 tons.

The average number of persons employed underground was 3,893; whilst the average number employed overground was 1,314. The total fatalities numbered nine, two overground and seven underground. It is pleasing to note that the number of fatalities is smaller than ever before in proportion to the number of tons of coal mined. In 1908, there was one fatal accident for each quantity of 167,721 tons mined. During the past year 241,592 tons were mined for each life lost. This improvement is directly attributable to the installation of safety lamps and to the use of permitted explosives.

The Report includes a record of additions and improvements to existing plants, and brief notes regarding new ventures. It also presents a useful directory of operating companies. The concluding pages give the examination papers for managers', fire-bosses', and pit-bosses' certificates.

EDITORIAL NOTES.

The Commonwealth of Australia is providing for a note issue of £7,000,000. Against this issue a gold reserve of 25 per cent. is to be maintained. Issues beyond the sum mentioned must carry a gold reserve of 100 per cent.

The Montreal Herald, for October 1st, contains a most readable account of the Timmins mine, Porcupine. Mr. Alex. Gray is the author.

Mr. F. A. Sundt, professor of metallurgy, University of Chile, Santiago, is the author of an exhaustive monograph on mining and metallurgy in Chile. Mining engineers who can construe Spanish will find this monograph most instructive.

Mining and Scientific Press makes the suggestion that mining engineers follow the example of doctors and develop a system of small fees for office consultations. Difficulties beset any such attempts. Yet we are persuaded that in the hands of decent professional men, some such idea could be realized. Once put into practice it would eliminate the importunate questioners who are forever seeking free advice.

In the opinion of Mr. George E. Collins, expressed in a lecture delivered at the Colorado School of Mines, the virtual abandonment of contract work in Gilpin County mining resulted in a marked decrease in the average efficiency of labour, and a corresponding increase in the cost of mining. The advance in daily wages, and the increase in cost of living, have affected mining costs relatively little.

Next year's meeting of the International Geological Congress is to be held in Canada. The Dominion Government, and the Canadian Mining Institute have joined in extending invitations. Would it not be seemly for Nova Scotia, Quebec and British Columbia to go and do likewise.

A correspondent informs us that the mineral exhibit at the St. John (N.B.), Exposition was in no sense representative. It appears that the provincial government could not see its way clear to spend a respectable amount upon the exhibit. Until this unprogressive attitude is changed, New Brunswick, despite her known mineral potentialities, will remain dormant.

Our Prince Rupert, (B.C.), exchanges show the same symptoms that broke out in Toronto papers when Cobalt was young. Shrieking brokers' advertisements of mining shares are making their appearance. We deprecate these yellow spots.

The extent to which taxation of industrial concerns is carried in Germany is indicated in a recent consular

report. In one instance quoted, an iron manufacturing company pays 33 per cent. of its dividend (formerly paid entirely to its shareholders) to the government. Nineteen per cent. the government devotes to sickness—accident—and invalid-insurance. The remaining 14 per cent. is paid as government taxes. In the case of the Krupp Company, a sum equal to 93 per cent. of its dividend is appropriated by the government. We wonder how this system would work in Canada!

The British Columbia mineral exhibit, now being displayed at Spokane, is probably to be made a permanent feature. This will do away with the constant loss of money, effort, and material that ensues when the collection has to be gathered afresh as occasion requires.

CANADIAN MINING INSTITUTE.

Election of Officers and Council, 1911.

The attention of members is called to Section 32 of the by-laws, which reads as follows:

32. "Not later than the 1st of November of each year the secretary shall notify all members of offices falling vacant at the end of the next annual meeting, and call for nominations to such offices. The list of such nominations shall close on January 1st following. All nominations for offices shall bear the signatures of not less than ten members in good standing. In the event of the secretary failing to receive nominations for all vacant offices, the council shall complete the list."

Pursuant to the above, notice is hereby given that offices as under will fall vacant at the end of the next annual meeting, March, 1911, and nominations for the same will be received by the undersigned from November 1st, 1910, to January 1st, 1911, inclusive:

President, vice-presidents (2), councillors (10).

The retiring officers are:

President—

Dr. Frank D. Adams, Montreal, Que.

Vice-Presidents—

Dr. A. E. Barlow, Montreal, Que.

Mr. J. Obalski, Montreal, Que.

Councillors—

Mr. R. W. Brock, Ottawa, Ont.
Mr. J. Stevenson Brown, Montreal, Que.
Mr. Thos. Cantley, New Glasgow, N.S.
Mr. Arthur A. Cole, Cobalt, Ont.
Mr. C. J. Coll, Stellarton, N.S.
Mr. John Donnelly, Kingston, Ont.
Mr. H. E. T. Haultain, Toronto, Ont.
Dr. Milton L. Hersey, Montreal, Que.
Dr. J. B. Porter, Montreal, Que.
Mr. J. B. Tyrrell, Toronto, Que.

(N.B.—All or any of the retiring officers or councillors are eligible for re-election.)

The following gentlemen will continue to serve on the council for the year 1911:

Vice-Presidents—

Mr. A. B. W. Hodges, Lima, Peru.
Mr. R. W. Leonard, St. Catharines, Ont.

Councillors—

Mr. Selwyn G. Blalock, Moyie, B.C.
Mr. R. W. Brigstocke, Naughton, Ont.
Mr. Robt. A. Bryce, Cobalt, Ont.
Mr. John A. Dresser, Ottawa, Ont.
Mr. Chas. Fergie, Montreal, Que.
Mr. R. T. Hopper, Montreal, Que.
Mr. G. G. S. Lindsey, Toronto, Ont.
Mr. James McEvoy, Toronto, Ont.
Mr. J. J. Penhale, Sherbrooke, Que.
Mr. O. E. S. Whiteside, Coleman, Alta.

Including the past-presidents, who are ex-officio members of the council, it will be noted that representation by provinces, according to the above list of officers and council already elected to serve for the year 1911, will be as follows:

Quebec, 4; Ontario, 7; British Columbia, 3; Nova Scotia, 0; Alberta, 1.

The retiring officers and councillors represent:

Quebec, 6; Ontario, 5; British Columbia, 0; Nova Scotia, 2; Alberta, 0.

H. Mortimer Lamb,
Secretary.

Secretary's Office,
Rooms 3 and 5, Windsor Hotel,
Montreal, Que.
September 15th, 1910.

PORTLAND CANAL DISTRICT, BRITISH COLUMBIA.

Mr. R. G. McConnell, of the Geological Survey Branch of the Canada Department of Mines, has returned to Ottawa after having spent the field-work season of 1910 in making investigations in the Portland Canal district of British Columbia. Included in his party were an assistant geologist and a topographer, and much data was obtained for use in preparing topographical and geological maps of the area examined.

Interviewed when passing through Vancouver, B.C., at the end of September, Mr. McConnell was reported to have said:

"There is not a very large area of mineralization in the Portland Canal district, but it is yet a little premature to pass any final opinion respecting the possibilities of mining there. With only two noteworthy exceptions, most of the work done has been of a superficial character. Owners of claims have been chiefly occupied during the past season in cutting out roads and trails, prospecting the surface of their ground, and getting in supplies for the ensuing winter's operations. This preliminary work in a new camp is inevitable.

"I visited various camps and saw some promising prospects. Conditions in the Salmon River district, farther inland, are much the same as in the Portland Canal country. At Salmon River I also saw a number of good showings, but no orebody has yet been outlined or proved up. The value is principally in gold, silver, and lead. I was shown some fine specimens of gold ore, which, according to report, had been found this season across the divide, in Nass River district.

"It was unfortunate that sensational and untruthful reports about the discovery of rich free-milling gold ores on Bitter Creek, were sent broadcast last June. Such practices should be severely condemned, as they tend to injure the real merits of the country. As a matter of fact, the existence of free-milling ore on Bitter Creek has not yet been established. It is true that specimens of free gold in small quantities were found in one or two spots. Similar exaggeration took place concerning the so-called gold placers on Bitter Creek, which has been staked from end to end. If the gold is there, nobody has yet tried to get it out."

All commercial cyanide contains more or less sodium cyanide, and so-called 125 per cent. cyanide is the nearly pure sodium compound.

THE PORCUPINE TRAIL

Written for the Canadian Mining Journal by Reginald E. Hore, Houghton, Mich.

Porcupine, Ontario's newest gold camp, is 130 miles north of Sudbury and on the edge of the great clay belt. A line drawn from the mouth of Moose River, James Bay, to the mouth of the Whitefish River, Lake Huron, passes through Porcupine 200 miles from the former and 170 from the latter point.



Kelso, Mileage 222, T. & N. O. Ry. The Jumping Off Place for Porcupine.

In summer the camp is reached 43 hours after leaving Toronto on the Cobalt Special. From Cobalt to Porcupine takes 25 hours. Daily trains with Pullman service pass at Kelso, within 25 miles of Porcupine Lake, and the balance of the journey is made by stage, motor boat, canoes and afoot.

Leaving Cobalt in mid-afternoon, and stopping at Englehart for supper, you reach Kelso in the early evening, having opportunity on the way to note the extensive improvements in the Northern Ontario hinterland. The rugged scenery of the pre-Cambrian formations at Temagami and Cobalt is succeeded near Haileybury by gently sloping fields underlain by Niagara limestone. To and beyond Englehart numerous farms have been cleared and cultivated, with results that promise well for the country's future. Further north there is another stretch of rocky country, which extends eastward to Larder Lake and Quebec. Then follow clay and sand flats covered with spruce, jackpine and poplar. Beyond Kelso the steel extends across broad muskegs to Cochrane and the Transcontinental Railway, 147 miles north of Cobalt.



On The Kelso Road Showing Old Trestle Built by Tie Contractors and Now Used as Highway Bridge.

At Kelso you must jump off in the gravel ballasting,

for no platform has yet been built, and an old day coach on the siding is the station house. Fortunately, however, hotels have been built within a few paces of the rails, and here you will find a good meal and a clean bed.

The Kelso Road.

The regular stages leave Kelso for Frederick House River at 7 a.m. It is customary to occupy your seat and start with the stage, but you soon have occasion to become more intimately acquainted with the famous clay belt. The road is over remarkably level forest-clad country. The first few miles is clay, then follows a few miles of sand and a second long stretch of clay which extends to the lake. The clay is covered by only a few inches of vegetable mould, and being very poorly drained, can hardly be expected to afford a good road-bed except in very dry weather. The sand has even less cover, but is fortunately comparatively hard, and makes a good natural road. Unfortunately there is an absence of such glacial moraines as in many localities afford a supply of gravel. The clay and sand are remarkably uniform in composition, having been well sorted by and laid down in water, probably in the glacial Lake Ojibway.

Thick forest covers both clay and sand areas. The trees are small, mostly under 12 inches. Black spruce and jack pine are the most abundant conifers, though balsam, fir and cedar are plentiful in some localities. The latter, owing to lack of milled lumber, is in great demand at the camps. Poplar and white birch are conspicuous, and stand out distinctly from the dark evergreens. The largest trees, few of them over 18 inches, are the poplars.

During the construction of the T. & N. O. Railway this section was cut over for ties, and, indeed, the present highway follows, for some distance, the old road into the tie camps. A relic of the construction days is the narrow gauge tramway trestle, one-half mile west of Kelso, and which some of the teamsters now drive over rather than descend into the little valley.



On the Kelso Road—The Stage on a Newly Laid Corduroy.



Golden City. Looking Down the Main Street to Porcupine Lake.

A large portion of the country traversed by the Kelso road was burned over a few years ago. The fire was naturally more disastrous on the dry sand plain, which now presents with its blackened sticks, a very desolate appearance. The first disagreeable impression is soon dissipated, however, when you find that large patches of the ground are covered with prolific blueberry bushes.

It is two hours' journey westward along the forest-

walled road to the shore of Frederick House Lake—a sheet of muddy water lying in a shallow clay basin about twenty square miles in extent. A good natural road is furnished by the artificially exposed lake bottom, and the edge of the water is followed for about 3 miles to Crawford's Landing, at the head of the lake.

Frederick House to Hill's Landing

The stage line ends at Crawford's, and the river is ascended in gasoline launches. A run of eight miles southward is made on this gently-flowing stream, then the northwest arm of Night Hawk Lake is crossed and you ascend the Porcupine River to Hill's Landing, which is reached two hours after leaving Crawford's. To accommodate the passenger traffic there are three covered launches. Freight is carried in flat-bottomed pointers. Passengers from Kelso to Hill's are charged $3.50, and the freight rate is $1.25 per cwt.

Hill's to Porcupine.

From Hill's to Porcupine, traveller and freight go by different routes. The former gets a good dinner at the Landing and proceeds afoot, while the latter is taken up the river.

The river route is very circuitous and about 28 miles in length. The freight is taken on the motor boats to the first portage about one-half mile above Hill's; but for the balance of the trip canoes are used almost exclusively. With an average load, 1,100 pounds, in the 18-foot canoe, the trip up is made in 10 to 12 hours. The down trip takes three or four hours less. The freight rate from Hill's to Porcupine is $1.50 per cwt.

The trail from Hill's to Porcupine is about 7 1-2 miles; but fortunately, for the walking is bad, two lakes are crossed on the way, and the walk thereby shortened to about six miles.



Timmins-McMartin Mine, Porcupine, Looking East. At Right is Hollinger Dome of White Quartz



Timmins-McMartin Mine, Porcupine. The "Shake" Cover has just been put on Shaft

The first three miles to Three Nations Lake is now best made over the new government wagon road. At present it differs from the Kelso road chiefly by being uniformly bad all the way, for it is all clay, and the clay is wet. Further west a more sandy plain will be crossed, and then the two roads will be about on a par. It is unfortunate that the roads are in such condition, but little else can be expected from such materials as are immediately available.

Mine Roads

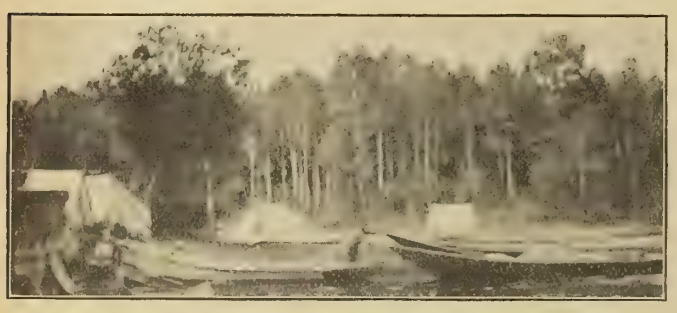
To take in supplies from Porcupine, the mine operators have cut roads across the spruce covered clay flats, and have thereby demonstrated very clearly some difficulties of transportation in the clay belt. When first cut out the roadway looks promising enough, with no steep grades to be negotiated and no muskegs to cross. After a little use and a few heavy showers, however, it is evident that the ordinary ungraded bush road cannot be relied upon even for occasional service. Once wet, the roads never become dry and firm again, and the effect of a really dry spell is but to make the clay more sticky. Under the conditions the best carrier is the pioneer's "jumper" which, loaded with but a few hundred pounds and sliding alternately in the mud and over the corduroy, quickly wears out an ordinary team. It is perfectly evident that the cost of taking in mining supplies in the summer is enormous, and in most cases should be prohibitive. The northern winters afford much more economical methods, and until steel is laid into the camp, and the clay roads dressed with crushed rock or gravel, the amount of material moved in summer will be kept at a minimum.

Power will be a less difficult problem than transportation. For preliminary operations, there is a plentiful supply of firewood and water, and the Mattagami River will doubtless be harnessed to develop power as soon as a regular demand is assured.



One of the Timmin's Veins. Miller Lake at left. Width of White Quartz about equals that of Wood Pile

As the road is not yet finished into Porcupine, it has been customary to cross Three Nations Lake and follow a trail thence to Bob's Lake. This trail runs across 2 1-2 miles of wet "clay belt" and over some small outcrops of grey schist. At the lake, as at Three Nations, a ferryman is on the lookout for passengers, and you are quickly carried across in his canoe. A mile westward on another wet trail brings you down the main street of Golden City to Porcupine Lake. It is but a few minutes' walk along the shore to the Shuniah Hotel, a remarkably pleasant stopping place at the north end of the lake. With average luck in making connections with the ferrymen, the trip from Hill's to Porcupine takes about three hours. When the road is finished, about one hour less should do. To reach any point on the lake, motor boats and canoes are available. It is a half-hour paddle from the Shuniah to South Porcupine, whence trails lead to several of the chief properties in Tisdale Township.



At Hill's Landing, Porcupine River, Showing "Pointers Used for Carrying Freight



At Crawford's Landing on Frederick House River



Dome Mine, Porcupine, Shaft No. 1 at Left. Test Mill at Right. Diamond Drill at Left Background, on the White Quartz "dome." Shaft No. 2 at Right Background. Quartz Outcrop in Centre.

The Rock Outcrops.

The rock outcrops in Tisdale Township rise but little above the clay flats. They evidently represent the higher knobs of a pre-Cambrian area, which was almost completely covered by silt and fine sand deposited from a large glacial lake. Near Porcupine the outcrops are small and isolated; but further west and south, they are more continuous. All are low, and afford no very favourable mill sites, so that pulp will have to be handled.

Many of the rocks are more or less schistose altered volcanics of varied compositions. They range in colour from light grey to dark green, while some varieties are yellowish. Intimately associated with the volcanics are grey and yellowish schistose carbonates. The series is in many respects similar to rocks at Temagami and Larder Lake, and is probably of Keewatin age.

There are also rocks which show distinct sedimentary bands of greywacke, grey quartzite, and altered shales. These are in some instances steeply inclined without being markedly schistose; but in most instances show secondary cleavage in the sediments, and the shaly member is usually represented by a very fissile slate or a mica schist. These rocks are probably Huronian, and resemble those of Sudbury and parts of Michigan more closely than they do those of the Nipissing silver fields.

A third distinct type of outcrop is a somewhat schistose conglomerate composed of light coloured pebbles of several types set in a fine grained grey coloured matrix. The conglomerate appears to overlie the schist series and underlie the greywacke, and probably represents a low horizon in the Huronian.

The Ore Deposits.

The Huronian and Keewatin series alike are impregnated with secondary quartz. In the distinctly bedded rocks there are seams of white and grey quartz conforming to the stratification, and there are also veins which strike obliquely across the bedding. In the schists there are veins which strike across the secondary cleavage, and also other fillings which conform to the schistose structure. Some of the gold-bearing quartz masses show very decided direction, and by stripping at intervals, veins 2 feet to 10 feet wide, have been traced for several hundred feet. Others are extremely irregular in shape, and their extent is known only so far as they have been com-



On the Porcupine River



On the Road from Hill's Landing to Porcupine



Kelso Road, a Typical Spot in the Clay

pletely stripped. There is in most cases a marked association of the gold-bearing quartz with schistose carbonate wall rock, and the quartz has to some extent replaced the carbonate.

The most extensive testing in the camp is being carried on at the Dome and the Timmins-McMartin properties, both of which should be important producers next year.

At the Dome there is a large oval-shaped mass of white quartz with enclosed fragments of pyritic grey schist. The whole mass, measuring 100 by 250 paces, is being systematically sampled. The light overburden has been almost completely removed and surface samples carefully taken. At depth the testing is being carried on by exploration shafts with cross cuts at the 60-foot level and also by diamond drilling. A Nissen stamp is crushing a sample of the rock broken, and the results obtained are said to be very satisfactory. It is stated that a 40-stamp mill will be installed this winter, and the operators expect to have, before the mill is ready, an estimate of the values contained in one million tons of quartz and pyritic schist.

The Timmins property shows quite well-defined veins, and is therefore not being tested in the same way as the Dome. The veins have been well exposed by surface stripping. Vertical shafts were sunk and the deposits proved



Shovel Sampling at the Dome Mine, Porcupine. Test Mill at Left. Camp Buildings in Right Background. Quartz Outcrop in Foreground.

to be steeply inclined. A considerable tonnage of ore is now being blocked out by drifting at the 100-foot level. A two-stamp Tremain mill is being used to test the ore, which has proven to be spectacular at depth as well as on the surface. Lack of power prevents development from proceeding as rapidly as might be desired, but already a remarkable amount of work has been done.

There are in Tisdale Township a number of large veins showing free gold, and good assays have in several instances been obtained from very unlikely looking "bull" quartz. It will be remarkable if some of these do not prove producers. In most cases the exploration this summer has been by stripping, and the care with which this has been done is as remarkable as it is unusual, reflecting clearly the effect of prospecting in Cobalt camp. Without power and supplies, few operators have managed to explore their properties to any considerable depth, and the extent of the deposits is therefore not yet known.

DICTIONARY OF METALLURGICAL AND CHEMICAL MATERIAL— 219 PAGES—PAPER COVER—PRICE 50 CENTS. PUBLISHED BY METALLURGICAL AND CHEMICAL ENGINEERING, 239 WEST 39TH STREET, NEW YORK, 1910.

This convenient and time-saving little volume is a model of conciseness. It gives the reader accurate descriptions of the different makes and special features of any of metallurgical or chemical apparatus and material. A directory of manufacturers is included. Supplementary sections are headed "Measuring Instruments and Laboratory Supplies," and "Professional Directory."

The average value per ton of coal produced in Great Britain was 7s. 6d. in 1906. In 1908, the average value rose to 8s. 11d. A similar rise in value took place in all the large coal-producing countries, including the United States. In the last named country the nominal average value of coal is lower than in any other, being reported for 1908 as 5s. 11 3-4d. The average values are influenced not only by differences of quality, but by differences in the accessibility of the seams, in methods of operation, in the cost of labour, etc.

Cobalt concentrating mills have a total daily capacity of about 1,200 tons of ore. 242 stamps are dropping. The largest individual installation is 52 stamps. Concentration ratios, so far as can be determined, range from 25 : 1 to 60 : 1.

THE KENT GAS FIELD

By G. R. Mickle.

(Reprinted from Nineteenth Annual Report Ontario Bureau of Mines.)

The most interesting and important event in connection with the development of the natural gas industry in Ontario in recent years is the discovery and delimitation of this field, covering portions of the townships of Romney, East Tilbury and Raleigh. The accompanying sketch shows the field forming roughly a triangle with the base resting on the lake.

Where and How the Gas is Found

Drilling operations commenced in what is marked as "Oil Territory" on the plan in the year 1905, and the operations were pushed southwards. In December, 1906, the first well was drilled in the area near the lake, which has since proved to be productive of the wells of greatest capacity. Operations continued throughout 1907 and 1908, and by May of 1909 the limits of the field could be determined with some exactness so far as the land area is concerned. The gas-bearing rock, without doubt, however, extends some distance under the lake, and the wells of largest capacity are found not far from the lake shore.

The gas exists in the Onondaga formation (Jour. Can. Min. Inst., Vol. X., p. 82) in a dolomite rock. Usually four pay streaks are present. Thus, in three wells, which may be taken as typical of the southern or most productive part of the field, the levels at which "gas pay" was found were as follows:

		Feet Depth.
(1)	First gas found at	1,120
	Second gas found at	1,210
	Third gas found at	1,305
	Fourth gas found at	1,345
(2)	First gas found at	1,145
	Second gas found at	1,240
	Third gas found at	1,355
	Fourth gas found at	1,380
(3)	First gas found at	1,145
	Second gas found at	1,305
	Third gas found at	1,375
	Bottom of hole	1,380

The Probable Supply of Gas.

The capacity of the wells in this field is much greater than is usual in Ontario. Thus the "open flow" measurement of the wells in the Haldimand field, near Selkirk, which has not been drawn upon for long and is therefore near its maximum, averages less than 200,000 cubic feet in 24 hours. Only about 4 per cent. of the wells show a measurement of 500,000 feet or over. In the Kent field, on the other hand, a number of wells have an open flow capacity up to 7,000,000 feet, and the average of 17 wells known to the writer is about two and a half million feet.

At the present time the gas is piped to the following towns or cities, besides supplying farm houses along the lines, viz.: Chatham, about 14 miles; Windsor, about 45 miles; Sarnia, 55 miles; Blenheim, 14 miles; Ridgetown, 23 miles; Tilbury, Merlin and several other smaller places on the way to Windsor and Sarnia. In all, something like a population of 50,000 people is served by natural gas from this field.

The Factors of Supply

The question naturally arises, How much gas will be produced here? The quantity of gas depends on four factors, viz.:

(1) The area over which the gas-bearing rock is found.

(2) The average aggregate thickness of gas-bearing rock.

(3) The rock pressure.

(4) The amount of pore space in the rock.

With regard to the area, as the field is fairly well delimited, and practically no dry holes are found, this can be calculated. In measuring this, as all the evidence points to the gas-bearing rock extending some distance under the lake, a line was drawn parallel to the shore line one mile out in the lake and this was included in the gas area shown on plan. A planimeter was then used to measure the area. It proved to be 34.6 square miles. The chances are greatly in favour of the field extending further than this under the lake, and later on when the pressure drops, as the supply of gas diminishes, this gas will find its way in, as it is inconceivable that there could be a pressure of say 50 pounds or less on the land area, and 600 pounds in the same strata of rock under the lake. The figure arrived at below, therefore, is probably too small. It cannot be too large.

The second factor, the average thickness of gas-bearing rock, can be approximated by observations taken in drilling, and noting by measurements of the flow of gas from time to time how much this increases as the hole advances. Thus a layer of gas-bearing rock will be struck and the flow measured every foot, say, till the measurement is constant. There will then be no further increase of the flow till another pay streak is struck. The aggregate thickness of these layers has been taken as 10 feet, which is a safe estimate given by drillers.

The third factor, the rock pressure, is measured direct by a pressure gauge. The conventional way is to open the well if closed before, or close it if open, for five minutes, and take the reading at the end of five minutes. It is evident that this is a severe test when applied, as it will be later on, to a calculation of the amount of gas which has flowed from the field between certain periods of time. The rock pressure is about 600 pounds per square inch (a trifle less as a rule), or about 40 atmospheres. As a cubic foot of gas means a cubic foot at normal atmospheric pressure, and the volume occupied by gas varies inversely as the pressure—i.e., double the pressure expressed in atmospheres and the volume is decreased one-half—it is plain that when the pressure on the gas is reduced, as it always is before using, to about the normal atmospheric rate, the gas will occupy forty times the space it did in the rock. So that the insignificant pore spaces in the rock, very often so small that they cannot be seen by the naked eye, are capable of storing a large amount of gas.

The amount of pore space in the rock is the only factor in the calculation which cannot be measured directly or approximated in any way. From observations in other fields, however, it is calculated that the pore space runs generally from 4 to 16 per cent. of the total volume of the rock. Taking 10 per cent. as the mean,

with the area, thickness and rock pressure mentioned above, we arrive at about 38,000 million cubic feet as the total probable output of the field.

This calculation admittedly depends on one thing which cannot be measured directly, but an independent check can be applied by an observation of the difference in rock pressure at two periods of time sufficiently far apart, and noting at the same time the amount of gas which has been produced. Thus from January 1908, to May, 1909, inclusive, the total amount of gas produced from this field, including the waste, was about 1,810 million feet; this is 4.8 per cent. of the total supply calculated above, whereas the actual drop in the rock pressure, which is a definite accurate measure of the loss of volume, is only about 3.0 per cent. It is not possible with any other mineral product to make a calculation of this nature. We must, then, conclude that either the area or the pore space or the thickness has been assumed as too small. Applying this correction gives about 61,000 million feet as the probable output. This, as emphasized before, cannot be too large and probably is too small, as any extension of the gas-bearing rock under the lake could not show its effect on the pressure till a considerable reduction of the gas supply, and consequently in the pressure, takes place. The amount given, about 61,000 million feet, is the minimum possible supply. The length of gas-bearing rock measured along the lake shore is 8 miles, an extension of that two miles more out into the lake—and there is no reason why it should not go ten miles—would increase the area by about 16 square miles, or about 50 per cent., and would probably increase the gas supply by the same amount. For the probable amount 70,000 million feet would doubtless be nearer an intelligent estimate than 61,000 million.

How Long Will the Supply Last?

The interesting question of how long this supply of gas will last is more difficult to determine, as it depends on the uncertain action of individuals animated by a variety of purposes, and not on any of the laws of nature. It will depend mainly on how well the gas is conserved; this in its turn is governed by legislation, and the manner in which the law is enforced. The greatest danger threatening the natural gas supply is the action of those drilling for oil. As mentioned in explanation of the operations of the Supplementary Revenue Act in 1909 elsewhere in this report, the gas area and the oil territory in the County of Kent are closely connected. The oil if obtained can be sold at once, whereas to sell the gas, long expensive pipe lines must be laid, franchise obtained from towns and cities, and then so much gas only can be sold each year. Moreover, the great expense of pipe line, increasing as the distance to which it is to be transported increases, prohibits taking the gas far to market. The individual interested in oil will, unless restrained, undoubtedly in the future as in the past sacrifice gas recklessly to secure a trifling amount of oil.

The use of natural gas for certain industrial purposes, e.g., as a substitute for coal under ordinary boilers to make steam, will tend, of course, to shorten the life of the field. Assuming that it was used only for domestic purposes, i.e., cooking, heating and lighting, the supply ought to last the 50,000 people who are now connected with the field thirty-three years at least, with a strong probability that it will exceed that period of time considerably.

The above calculation allows one million cubic feet per day throughout the year for each 10,000 of population. This is a liberal allowance. The city of Toronto, using artificial gas in many houses for cooking and heating and also for lighting, and to some extent for industrial purposes, with a population of 350,000, say, consumes about seven million feet per day all the year round, or 200,000 feet per day for each 10,000 inhabitants. This artificial gas is not equal to natural gas in heating efficiency, which varies according to the mode of manufacture; the kind supplied in Toronto is equivalent to only about two-thirds the same amount of natural gas. Thus, the efficiency of Toronto gas is 651.8 British thermal units per cubic foot (Dr. Ells' report on System of Lighting for Toronto, 1900), whereas the natural gas has an efficiency of about 1,000 B.T.U. (Poole, Calorific Power of Fuels). The town of Galt, with about 10,000 people and approximately 1,800 meters in use, the gas being consumed for cooking, lighting, and to some extent for heating, consumes about 280,000 feet per day (statement from Dominion Natural Gas Company). The best example is probably Chatham, which takes its supply of gas from this field. The average consumption per day for domestic purposes, as shown by the 2,000 meters installed, is 700,000 cubic feet (Volcanic Oil and Gas Company). The population is about 10,000 and gas is used freely. On this purely domestic basis of consumption, 30 per cent., or ten years, more should be added to the life of the field.

In 1894 a select committee of the Legislature was appointed to enquire into the production of natural gas in Ontario. After investigating the matter thoroughly this committee stated in its report:

"That as regards the economic uses of natural gas, witnesses are agreed that it is one of the most valuable of all fuels, and in view of the limited supply it appears desirable that its use as far as possible should be confined to the purposes of domestic fuel and in the production of the finer classes of manufacture."—(Journal Legislative Assembly, Vol. XXVII., 1894, Appendix No. 1, p. 6.)

Nothing has happened since to modify the conclusion arrived at then; in fact, the continued depletion of all fuel supplies emphasizes the soundness of this judgment. In calculating the life of the field, therefore, it seemed desirable to give it under the best possible conditions. The actual life will depend on how nearly these conditions are fulfilled.

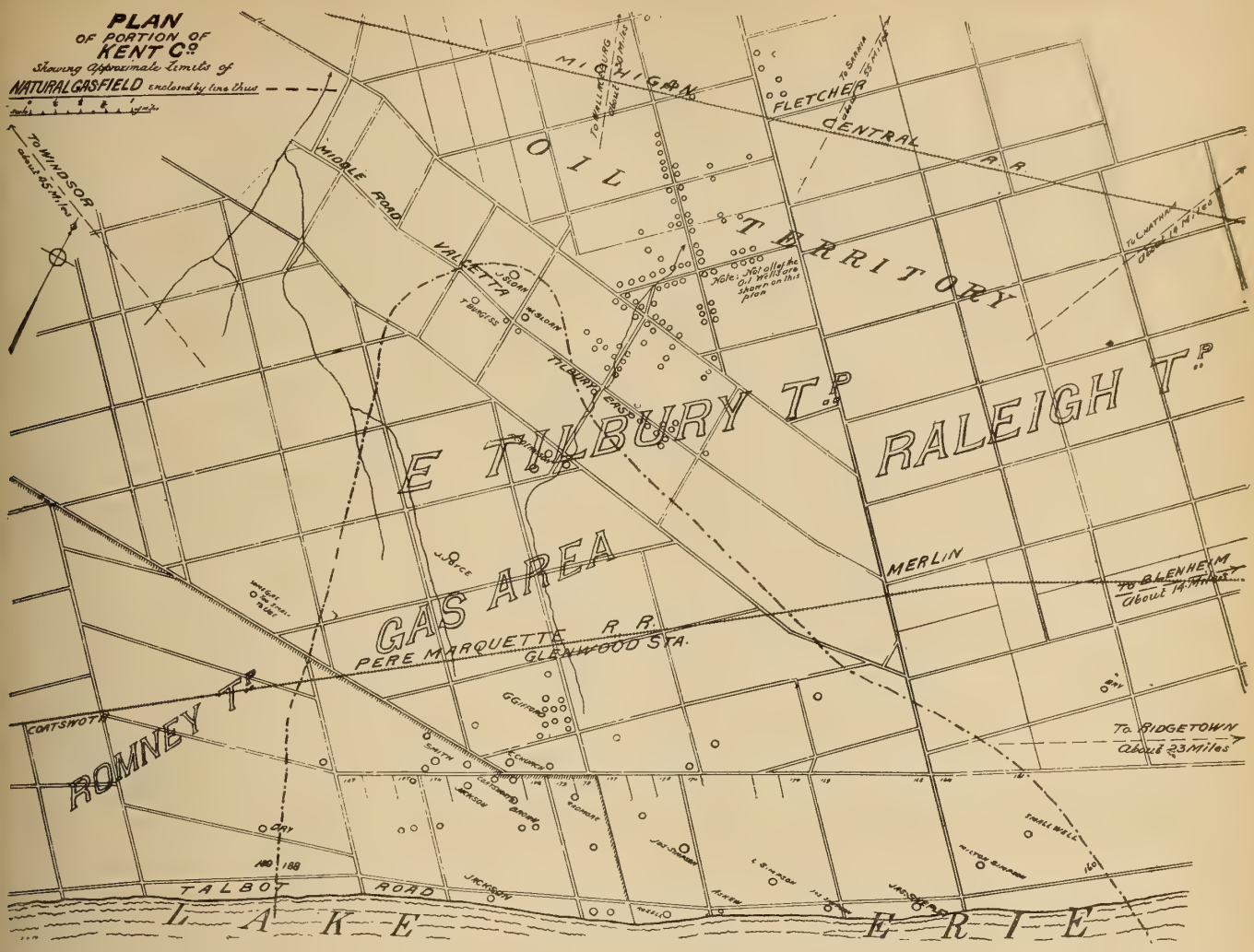
Relative Value of Oil and Gas.

As the units used in speaking of gas and oil are quite different, it seems desirable to reduce both to some common basis so that a comparison may be made between the two. Natural gas is employed mainly as a source of heat, the amount used directly for light being relatively insignificant. Oil, on the other hand, is chiefly known as an illuminant. Gas and oil will be compared both as heat producers and illuminants. The most rational method is to find the heating efficiency of each. When the two products are used for lighting under the most economical conditions, that is with a mantle, the light given is proportional to the heating power. What occurs is that the mantle is heated to a high temperature and radiates the light; where the naked flame is used the particles of carbon become heated and act as radiators.

Poole, "Calorific Power of Fuels," p. 251, gives the following data concerning various oils:—

	British thermal units per gallon.
Bothwell oil	173,400
Ohio, refined	164,736
Ohio, crude	172,800
Canadian Oil, refined (Dr. Ells' report quoted above)	154,585

Natural gas averages about 1,000 B. T. U. per cubic foot; thus Poole, p. 254, gives 1,050 as the mean for Ohio



gas, which is most closely allied with the gas in Kent. No determinations of the Kent gas for heating efficiency have been made, as far as the writer is aware. With 1,000 cubic feet as the unit for gas, this would give, of course, 1,050,000 B. T. U., and assuming the average efficiency of the oils given it will be seen that about 6.5 gallons of oil are equivalent to 1,000 cubic feet of natural gas. A barrel of oil (35 gallons) is therefore equal to about cubic feet of natural gas in heating power and, consequently, in illumination.

Coming to the question of the quantity of oil that will be produced, no such calculation of the amount in a given field can be made as was done with gas. The rock pressure as an indicator fails here. The oil being a fluid cannot find its way as readily through the rock. All we have to rely on is the actual result in production from wells drilled; where these are sufficient in number (several hundred in this case) and show the same general results, the evidence is strong enough to form a conclusion. As far as the strata already tested are concerned (i.e., to about 1,430 feet in depth) the information seems sufficient. Thus the production from the oil territory in question in East Tilbury, Romney and Raleigh is given in the Eighteenth Report of the Bureau of Mines, p. 33, as follows:

	Barrels.
1906 (first production in this year) ..	106,992
1907	411,588
1908	201,283
1909 (see present volume)	124,003
Total	843,866

It will be noticed that there has been a very rapid falling off in the oil production—about 50 per cent. in each year. For 1910 the amount will probably not exceed 50,000 to 60,000 barrels. The yield of well after well has declined in a way that must be painfully monotonous to the operators. The total production of oil, therefore, up to the end of 1909 is equivalent, on the basis explained above, to 4,556 million cubic feet of gas. As the minimum gas supply in the Kent field was calculated to be 61,000 million feet, the oil production to the end of 1909 is equivalent to only about one-thirteenth the estimated gas production. The probable yield of 50,000 barrels of oil for 1910, or 1,750,000 gallons, is equal to 270 million feet of gas, or less than the average production of gas for one week from that field during 1910. There may, of course, be oil in lower strata, but that is only a possibility.

Looking at the matter in another way, 6.5 gallons of oil are equal to 1,000 cubic feet of gas in efficiency, or 6,500 gallons of oil equal one million feet of gas. At the rate of five million feet per day, assumed above in calculating the life of the gas field, this is equivalent to 32,500 gallons of oil per day, or somewhat less than 1,000 barrels per day, more exactly 339,000 barrels per year, and, as was shown above, this can continue for thirty-three years at least.

Comparing the cost to the consumer of illumination derived from oil and gas respectively, it will be seen that he would have to buy refined oil for the same price as is paid the producer for crude oil delivered at the railroad, in order to have an equal amount of light for the same cost as from gas bought at the current rates in that locali-

ty. Thus $1.24 per barrel or 3.5 cents per gallon is paid for crude oil; multiplying this by 6.5 the number of gallons equal to 1,000 feet of gas, gives about 23 cents as against 25 cents per 1,000 feet ordinarily paid for natural gas from that field. Crude oil is of course not all burning oil. In this locality it consists of about 40 per cent. kerosene or illuminating oil, the balance being lighter products such as benzine, etc., and the lubricating oils.

The relation between illuminating power and oil consumption in everyday practice is very difficult to arrive at exactly by direct test. The art of using the oil to the very best advantage is not ordinarily as far advanced as it is in the case of gas. The illumination depends on the quantity of oil burned in a given time. Other circumstances have influence, however, as Argand burners, for instance, give more light from an equal amount of oil than flat wick burners. "The character of the wick, the dimensions of the chimney and the size and shape of the oil reservoirs are factors of only slightly less importance than the form of the burner." (Boverton Redwood, Petroleum and Its Products, Vol. II., p. 674.) Redwood states that the average consumption of oil per candle light per hour, using duplex Argand burners, is 50 grains, equivalent to 1,120 candle-hours per gallon of oil. With ordinary burners the oil consumption would be much greater. Artificial gas burnt without a mantle gives about 2,800 candle-hours per 1,000 cubic feet. No one would nowadays think of burning natural gas without a mantle. With the use of this about 2 1-2 cubic feet per hour of natural gas give 25-candle lights or 1 cubic foot gives 10 candle-hours, and 1,000 cubic feet give 10,000. Therefore 1,000 cubic feet of natural gas are equivalent to slightly less than 9 gallons of oil in illuminating power under ordinary circumstances. Of course, as the conditions under which oil is burnt are perfected, the relations will approach those explained before, where 1,000 cubic feet of gas were found to be equal to 6.5 gallons of oil.

Special Correspondence South Africa

Mine Ventilation on the Rand.

(Written for the Canadian Mining Journal.)

The subject of mine ventilation is just now receiving considerable attention on the Rand and at last there seems some hope that the scourge of miner's phthisis so long prevalent on these fields is in a fair way of being reduced to a minimum.

It is unnecessary to give figures showing to what extent this disease is rampant amongst miners on the Rand, they have been so frequently quoted that repetition is unnecessary, save to say that it exists to a much larger extent amongst the gold miners on the Rand than in any other mining district of the world. So evident was this that three years ago the Transvaal Government appointed a commission to enquire into the Mining Regulations and report in what way they required amendment in order to combat this and other evils, and their report has just been issued. As far as ventilation is concerned the Commission recommend the adoption of a quality standard in place of a quantity standard for the mines, apparently on the ground that they consider that the quantity of air laid down by the present Mining Regulations the same as in Australia and New Zealand, viz.: 70 cubic feet of air per minute per person underground is one that the mines ought not to be expected to carry out, a conclusion quite unwarranted by the prevailing underground conditions on these fields.

It has always puzzled engineers with experience of mining in other British colonies to understand why in the respect of ventilation the Mining Regulations in the Transvaal have always been a dead letter, no attempt having hitherto been made to carry them out although hundreds of lives have been lost indirectly through suffocation below ground, and indirectly many hundreds more through miner's phthisis brought on by the lack of ventilation below ground in direct contravention of the Transvaal Mining Regulations.

At a crowded meeting of the Chemical, Metallurgical and Mining Society of South Africa, held on Saturday, Mr. S. Penlerick read a paper on "Ventilation and Health Conditions on the Mines of the Witwatersrand." Mr. Penlerick is one of the general managers of the East Rand Proprietary Mines, where a system of fan ventilation has just been introduced. It was pointed out by Mr. Penlerick in his paper that dust, tuberculosis and dynamite fumes were the principal causes of disease amongst the miners on the Rand.

Dust and fumes from explosives, said the writer of the paper, the former caused by rock drilling, blasting and handling the rock could only be rendered harmless by an abundant supply of fresh and clean water and ventilation efficiently applied and distributed throughout the working places. As for water, the "James Water Blast" or some similar device was quite satisfactory, but on the East Rand Proprietary Mines they simply connect the 3-4-inch water pipe to the 2-inch air pipe, fitting cocks on each behind the junction, at a convenient point for operation, taking care that no water got into the air pipe except when the water blast was required, whilst an ordinary hose pipe was all that was necessary for spraying rock in the process of being filled and handled underground. He considered that neglect to use these appliances on the part of the miners should be made a criminal offence, and punishment meted out accordingly.

Ventilation would remove all the very fine dust, and he was distinctly of the opinion that wet and dry bulb temperature observations should be taken at least once a month in all development drives and working stopes and systematically recorded in a book kept for that purpose. He quite agreed with the recommendations of the Mining Regulations Commission that the proportion of carbon dioxide should not exceed twenty volumes per ten thousand of air, or one volume of carbon monoxide to ten thousand of air, whilst no determinable amount of the oxides of nitrogen should be allowed to be present.

Mr. Penlerick then went on to describe the ventilating fans brought into use at the East Rand Proprietary Mines, which are as under.

Angelo mine; Sirocco double inlet; diameter, 10 feet 6 inches; width, 8 feet 6 inches; output, 300,000 cubic feet per minute; W.S., 3 inches.

Cason mine; Barclay's double inlet drum pattern, diameter, 16 feet; width, 8 feet; output, 350,000 cubic feet per minute; W.S., 4 inches.

The Sirocco fan produced a total return air current of air at the shaft of 317,000 cubic feet of air per minute with a 3.25-inch water gauge—whilst the Barclay fan produced 179,000 cubic feet of air at the Cason upcast shaft with a 1.3. inches of water gauge. The difference in intake amounts of air recorded at the different shafts were: Cason, 101,400 cubic feet; New Comet, 90,000; Angelo, 140,000, and the Farrar shaft at the

Driefontein section, 140,000 cubic feet of air per minute.

The results of the application of fan ventilation to the East Rand Proprietary Mines were to reduce the average condition of the atmosphere of the mines from .493 per cent. of CO_2 to .127 per cent. of CO_2 and CO from .012 to .005 whilst the average temperature of the atmosphere of the mines was reduced by 2 degrees to 3 degrees F.

The total expenditure of capital in erection of the two fans, including cost of fans, motors, equipment of upcast shafts bratticing, doors, pipes, etc., was no less a sum than £25,000, whilst the running cost, including maintenance, came out less than a penny per ton milled.

It is clear from the above that if the recommendations of the Mining Regulation Commission regarding ventilation are to be carried out, every mine on the Rand will have to be ventilated by fan, or other artificial means, and not be left to depend on natural ventilation aided by the exhaust air from the drilling machines.

The paper gave rise to a long discussion. Dr. Irvine who has long been an advocate of better mine ventilation on the Rand, urged that the paper showed that it was possible to have good ventilation, and laid once and for all the bogey of bad underground conditions now prevailing in the Rand mines. He would not take away the blasting certificates from miners found to be suffering from tuberculosis, as recommended by the Commission, but would refuse to give certificates to fresh applicants unless they produced medical certificates proving that they were free from that disease.

Mr. Penlerick in reply to a question said that the East Rand Proprietary Mines had been repaid many times over for the capital outlay involved in the ventilation scheme.

Mr. Gascoigne complimented the author on the up-to-date methods of ventilation, and pointed out that the other mines would do well to work as much as possible on the same lines. Fresh air underground was as essential as water for dust laying operations. Compliance with the law should be insisted upon and he ridiculed the idea, as stated by the Commission, that 70 cubic feet of air per minute per person could not be provided. He pointed out that proper distribution was necessary, and congratulated Mr. Penlerick upon taking his intake air to the lowest point and providing shafts solely for upcast purposes, an essential condition other mines on the Rand seemed disposed to ignore.

Mr. Judge thought detonation produced more dust underground than the machines.

Dr. Macauley pleaded for the adoption of mechanical ventilation from one end of the Rand to the other on the lines introduced at the East Rand Proprietary Mines.

Dr. Porter, a member of the Mining Regulation Commission, defended the report of the Commission against the attacks made against it and the Government against the complaints that the report had been delayed in view of the elections. He agreed with Mr. Judge as to the origin of dust underground, but pointed out that in Johannesburg the deaths from pneumonia compared favourably with those resulting from the same cause in England and Wales.

Further discussion was adjourned.

Rowland Gascoyne,
New Club, Johannesburg.

PRACTICAL AND ECONOMICAL MINING

By Neil A. Nicholson, Deputy Inspector of Mines, Sydney Mines, N.S.

(Paper read before the Mining Society of Nova Scotia.)

A new era in the history of coal mining is rapidly developing in Nova Scotia, and the hand-pick, wherever conditions are favourable, is being supplanted by machines for under-cutting coal. Where coal-cutting machines cannot be used, improved methods of mining have been adopted which tend to greater economy and better results.

The larger coal companies, such as the Dominion, and the Nova Scotia Steel & Coal Companies, having coal-fields lying at easy angles and therefore favourable to machine mining, have equipped their collieries with the most modern and improved coal-cutting machines, and in common with many of the smaller coal companies, have adopted the latest methods of handling, cleaning and assorting coal on the surface in preparation for the market.

The principal reasons for the installation of mining machinery are, to reduce the cost of production, to increase the output, and to obtain the largest percentage of lump coal.

The introduction of machinery into the coal mine has not reduced the number of men employed, but as in other trades, the stimulus of labour-saving devices has greatly helped the industry, and a scarcity of miners rather than a surplus now exists.

If we make a comparison of, say, one machine colliery with a hand-pick, or a number of hand-pick collieries, the advantages of coal-cutting machines will be fully demonstrated. Dominion No. 1 colliery, Cape Breton, during the year 1909, employed underground 463 men. The output for the year was 544,499 tons. The hand-pick collieries of Cumberland combined, only produced 508,202 tons in the year 1908, yet they employed underground 1,806 men.

While mining machines are of great value in coal getting, they are a most important factor in the rapid development of the collieries.

The introduction and extended use of coal-cutting machines in thin "seams," or beds have made the working of these profitable and placed many of them on a competitive basis with the thicker seams. The British Royal Commission on Coal Supplies in their report stated that in the year 1900 about 17.7 per cent. of the total output of the United Kingdom of Great Britain was obtained from the seams of less than three feet thickness. If seams less than three feet can be worked successfully in any other country, there is no reason why they should not be worked in Nova Scotia, conditions being equal.

Coal mining being the chief industry of Nova Scotia, the province's greatest asset is her mines and minerals. These should therefore be protected, as they are the heritage of the people. Along the eastern seaboard of the County of Cape Breton there are valuable coal-fields. Some of these fields contain five or six workable seams overlying each other with a variable thickness of strata

intervening. The question arises, which of these seams should be first attacked? In my opinion, if the market affords it and other conditions permit, the descending order of working is the most practical. Working the top seam first is beneficial to the seams below, forming a cushion over them, especially over the thick seams. By thus relieving the pressure above, the proportion of slack in the underlying seams is reduced. The liability of a crush is averted, and the risk of men's lives is lessened by the lessening of the vertical pressure of the strata. Fatal accidents have often resulted in times of "creeps" or "crushes" in coal mines when sudden pressure has been exerted, and large lumps of coal suddenly forced out upon the miner without any warning whatever.

By working the lower seams first, all the strata right up to the surface is disturbed and broken; and while this settling process is taking place, the upper seams are damaged and sometimes wholly destroyed.

The possibility therefore of danger to other seams must be carefully considered in opening up a coal-field containing seams overlying each other, and the method least calculated to seriously affect the commercial value of the coal-field should be adopted. The tendency of past years seems to have been to work the most profitable seams first, but it has had very baneful effects, and has not always been the most profitable system of mining. Of course I am well aware that competition plays a large part in determining what seams must be opened up first. But if keen competition forces the opening up of the thicker seams at the beginning, might it not be well to consider the workings of thin seams at the same time? This would be a decided improvement on the methods of mining coal, and wherever tried in the province has met with good results.

The method of mining is generally determined after a careful study of the thickness of the seams, the nature of the strata above and below, the angle of the seam and the texture of the coal.

The method of mining coal in Nova Scotia is generally either bord-and-pillar, or long-wall.

The conditions favourable to long-wall working are thin seams which freely part from the roof, and tender strata over head. A band of "dirt" which is easily separated from the coal, makes material for stowage with which to fill up the goaf when the coal has been extracted, so that the roadways, which sometimes must be naturally very long, can be supported. Particular pains, are, however, taken to support the roadways and packs, or packwalls are built on each side of the roadway from the floor to the roof. These are usually of stone blasted from the roof or the pavement. In the long-wall method, ventilation is simple, as the full current sweeps along the working-face without the aid of brattice, and free from obstructions met with in the bord-and-pillar system. In very deep workings the vertical pressure is such that long-wall is the only system that can be adopted.

When conditions are not favourable to long-wall the most practical system is the panel system . When passages are being driven to win the coal, these should be continued back to the boundaries. At the same time headways or balances should also be driven from the main levels to the rise, a distance of four or five hundred feet, and rooms turned off to suit the cleavage of the coal. As soon as the rooms have been driven through to the adjoining balances, pillars should be drawn at once and all the coal extracted. This would save the expense of ribbing, would relieve the pressure and prevent a "crush" or "creep" in that district, and, as usual, where work is concentrated, the cost would be reduced to a minimum and larger profits obtained.

The size of pillars varies in different collieries and is determined by the nature of the coal, the thickness of the seam and of the cover over it. Small pillars have often induced "crush" and "creep" and brought great loss to the owners; but this lesson has been so well learned in Nova Scotia that the present tendency is now all the other way. Especially must large pillars be left where the roof and floor are very strong and the nature of the coal is soft and tender. Where these conditions are the opposite, a smaller pillar may be left; but at no time should any risk be taken, and the margin of strength in the pillar be less than that stated by leading mining authorities.

As passage-ways are driven to win the coal, and districts opened up, all coal should be extracted, except where it is necessary to leave pillars for the support of surface plants, residences, main roads and railways. Under-sea working (and we have at the present very much of it in the Island of Cape Breton) requires special attention and has to be dealt with according to the nature and thickness of the cover. The fact that much of the coal that is now being extracted is taken from collieries opened up fifty years ago, is proof that present methods are superior to those of our predecessors, and it is only natural that they should be.

Discussion.

President Brown.—I would like to have the great pleasure of proposing a vote of thinks to Mr. Nicholson for his paper. This paper touches on a subject that is of the utmost importance, successful coal mining in the Province of Nova Scotia. He has put on the records of the society the first paper treating on this subject.

R. H. Brown seconded the motion.

J. A. Johnson.—In Mr. Nicholson's paper there is one striking point to me, namely that about 400 men have produced 500,000 tons of coal in Cape Breton, while in Cumberland with 1,000 men they did not produce so much.

President Brown.—The conditions under which coal is mined in Cumberland and in Pictou counties are so much more unfavourable, that the production of the counties is not to be criticized.

T. Cantley.—The idea might be got from the remarks of Mr. Johnson that because in the case of Cape Breton five hundred thousand tons are produced by four hundred men, that a thousand men in Cumberland should produce more. I wish it were so, but unfortunately it is not. In order to install mining machinery to do such work as is done in Cape Breton you must invest a very large amount of money in machines, piping, etc., and all the expenditure for wear and tear, which is a matter which runs into very large figures; so that the difference in cost of production in the two districts is not so great as would at first appear. The large amount of capital which is employed in a machine-wrought colliery against the lesser capital employed in a hand-picked mine, must be considered. Dominion No. 1 colliery, Cape Breton, employed 463 men, and the output for the year is 544,500. The hand-picked collieries of Cumberland employed 806 men and the output was 582,202 tons in the year.

A vote of thanks was presented to Mr. Nicholson.

At the Mammoth smelter, Shasta County, California, 1,000 woollen bags are used to filter the smelter fumes. The bag house is divided into five sections, each of which can be shut down to empty the bags. The bags are emptied and shaken mechanically. The dust is removed in cars, dumped into a receiver, mixed with water, briquetted, and charged back to the furnace.

OUR EUROPEAN LETTER.

The Rand no Longer a Land of Sensation—The Speculator's Loss and Investor's Gain—The View of the Present Situation—Pessimistic Views of Maikop—Japanese Mining Exhibits in London—Unhealthy Tin Movements—The Romance of Northern Nigeria—Cinderella of Mining Region Coming into Her Own.

(Exclusive correspondence of "Canadian Mining Journal.")

London, Sept. 21st, 1910.

No special activity is as yet being shown in mining share dealings in London or Paris and no startling news has come from South Africa to liven things up. This makes "Kaffirs" less interesting to the speculator but interests investors more. If Rand mining companies had depleted their gold reserves in August as was done in December, 1908, their return for last month would quite easily have established a new high record. The actual gold production has now reached an average of $440,820 per day, as compared with $437,590 in July, and judging by the preparations for starting new heavy stamps at a number of properties the day cannot be far distant when the average output will attain $500,000. There were again a few properties whose result in August fell short of the reasonable anticipations of their owners. This was in a measure due to the replacement of about 20,000 time-expired native miners by about 18,000 raw workers, whose inexperience had naturally an immediate effect on the output.

With every year that passes, the Transvaal gold mining industry becomes more stable.

One of the contributory reasons for the settling down of the Rand gold-mining companies into a regular and comparatively humdrum, prosaic existence is the ease with which the labour requirements of the industry have been met during the past two years. Recently there have been fluctuations calling for some comment, but the old-time alarm which used to periodically upset the equanimity of proprietors and help the operations of the speculator when a shortage of "boys" took place has been practically non-existent.

On the question of mechanical improvements the Rand is very much alert. Much has been accomplished in the way of reforms, both before and since the departure of the Chinese in organizations, in the economy of labour, and in the adoption of new mechanical appliances, but more remains to be done. That well-worn subject of controversy—the tube-mill—is still under occasional discussion, and the results obtained from it have helped to concentrate more attention than ever on the problem of crushing. It is considered that the Mines Trials Committee have done good work in bringing the efficiency of the tube-mill up to "25 per cent. of that of stamps," but it is thought by some of the most practical mining engineers on the Rand that the qualities of the tube-mill are not fully understood, and that when it is fed with ore of the size best suited for such treatment a still higher efficiency will be obtained. The ore-crushing problem is still receiving keen attention, and it is tolerably evident that either the present form of stamps is quite likely to be very much improved or this plan of treating the ore abandoned in favour of something altogether more efficient.

In mining fields where the surface of the country is either mountainous or very much broken some system of telpherage or overhead transport, is usually found the most economical for mining purposes. But on the Rand this system has never found much favour, and, although efforts are still being made to introduce new methods of telpherage the nature of the surface hardly justifies the initial outlay and cost of upkeep.

If it be true, as appears to be the case, that the majority of the Liquor Commission is in favour of resuming the supply of alcohol for the natives on the Rand, then the decision is a matter of very serious import to the whole mining industry. The majority of the report and the recommendations of the Commission indicate that an attempt will be made to at least introduce native wine. In this connection it has to be observed that the Cape wine farmers control sixteen seats, and this circumstance places the report of the Commission in a very sinister light. The Commission appears to ignore the well-known fact that when a Kaffir gets drunk he becomes a homicidal maniac of a most pronounced type, and that the habitual drunkenness of the "boys" in the pre-war days was one of the most serious handicaps to the mining industry.

The "Great Maikop Oil-field" has retired somewhat under a cloud. The experts, who day after day were ladling out views and opinions, have retired from the arena, and bad reports are drifting in from Russia. The only ground properly existing for the optimistic reports turns out to be the outbreak of the great gusher in September last year. This it will be remembered was plugged and it is impossible in the present state of affairs to estimate its future—even its near future. Other alleged gushers, it is stated in responsible Russian journals, do not exist in any form. The leading Russian paper says that, apart from the great gusher named, not one of the other wells sunk or being sunk is worthy of mention. The only reason that may be said to exist for a hopeful view otherwise apart from the said gusher, is that certain geologists maintain that the geological formation favours an accumulation of petroleum.

The Japanese British Exhibition, which is a popular feature of the London season this year, shows many exhibits, specimens and large diagrams relating to the mineral resources and industries of the Island Kingdom. It appears that the oldest established mining company in Japan on a large scale is the Mitsu Bishu Company, with a capital of $7,500,000. This combines mining with banking, shipping and manufacturing. Its six coal mines and ten metal mines (gold, silver and copper, produce annually 1,300,000 tons of coal, 6,500 tons of copper, sixteen tons of silver, and 1,680 pounds of gold.

The Mitsui Company comes next in importance. This is also a banking company, its total capital being $20,000,000. It owns one metal and four coal mines. Its annual coal output is now two and a half million tons. In its biggest colliery, which has large quantities of water to contend against, it uses over 1,600,000 horsepower in 76 pumps which pump about 18,000,000 tons of water per year. The pumps are Davey Company, differential, Sulzer turbine, and Schleifmuhle. It employs 6,000 hands, looks after its working people very well, even to the establishing of creches, as many women work at loading.

The Fugita Company has a capital of $3,000,000, and includes gold mining, forestry and agriculture. At Kosaka this company has complex sulphide copper ore to deal with. By persistent scientific researches upon commercially economic methods of dealing with the by-products, it has made it a profitable venture. This

company employs 9,300 workers. The bulk of its operations is in open or surface work. The ores are first smelted in blast furnaces, then crushed, and afterwards calcined and further reduced in Herreschoff calciners and reverberatory furnaces.

The oldest and richest gold mine in Japan is on the Sado Island, producing 13,800 ounces of gold and 113,000 ounces of silver per annum. The oldest copper mine is that of Beshi, worked over 200 years by the Sumitomo family. It has lately been developed on modern lines and turns out copper annually worth nearly $2,000,000. There are other great colliery enterprises, initially encouraged by the Mikado's Government. The Hokkaida Company produces annually coal worth $3,500,000. One unusual feature of Japanese mines resulting from the volcanic character of the country is that many of them are on small islands. The mine occupies the whole area of the island and in some cases stretches under the sea. The oil production of Japan is of considerable importance, one company alone having an annual output valued at one and a quarter million dollars.

In view of the recent revival here of speculation in tin shares, which was obviously chiefly accelerated by the startling rise in the price of the metal, it may be well, perhaps, to remember that present market conditions are altogether abnormal and are in no way due to any improvement in the statistical position. The returns issued for August, indeed, disclosed an increase of about 1,100 tons in the London stocks, while the visible supply was swelled to about 18,300 tons, which is only some 1,500 tons less than a year ago, when the price was $120 per ton lower. Hardly ever in the history of the industry has there been a lift of prices of $80 per ton such as recorded in the last few weeks in the face of similar adverse statistical developments, and manipulation on a scale heretofore unknown has been mainly responsible. The London stock, amounting to some 5,700 tons was but 800 tons under that of last year, but the fact remained that very little of that large stock was actually available for market needs.

Since the richness of the alluvial tin fields of Northern Nigeria, West Africa, has become an established fact, whenever two or three old West Africans meet together you hear nothing except about lost opportunities in Northern Nigeria, and it is really a fact that in an unscientific manner reports about the richness of these fields have been circulating on the coast for years. But the traders and the civil service men had too comfortable berths to risk their skins in prospecting and pegging out work. More kudos then, to the plucky Mr. Laws, the mining adviser to the Niger Company, for hanging on through no report and bad report to his prospecting work Bauchi way, notwithstanding the cold water which his own officials at home threw upon his initial efforts. It is notorious that the directors of the Niger Company did not want to be bothered with mining.

Still, the mineral resources of Northern Nigeria were not appreciated in London adequately to their prospects. It generally requires a forlorn hope to do justice to a new mineral country. Is it not a fact that "Beam-enders" have been generally the class of men who have done justice to nearly all the great mineral fields of the world? Beam-enders discovered the Great Boulder, and I could give any amount of instances of desperate mineral enterprises which have led on to fortune.

Lord Scarbrough, year after year, told the British public, through his annual speech to the shareholders of the Niger Company, that there was treasure in Northern Nigeria in the shape of alluvial tin. He had to wait until a company—the Champion Gold Reefs of West Africa, Limited—having abandoned its gold property on the Gold Coast, and really desperate how to utilize its remaining capital—about $60,000, I believe,—came along, and sent some prospectors, followed out by engineers, to Northern Nigeria, who secured the pick of the country. On the 4th of February this year, the Champion Gold Reefs of West Africa, Limited, acquired from the Niger Company, the Naraguta for a large sum of money, and Lord Scarbrough was no longer a mining John the Baptist crying in the wilderness, nor need the shareholders of the Champion Gold Reefs of West Africa feed any longer on locusts and wild honey, for on the strength of the profits of their Northern Nigeria enterprise, they declared in March last, an interim dividend at the rate of 100 per cent. and since its acquisition of the Naraguta property during the last six months an estimated net profit of $50,000 has been made upon the sale of tin from that one property.

Since the Champion Gold Reefs of West Africa turned disciple and listened to the teaching of Lord Scarbrough, the Northern Nigeria Mining School of Adventurers have added to their number representatives of Messrs. Wernher Beit, the Consolidated Gold Fields of South Africa, groups of bankers and others.

In all seriousness, to use the words from an address before the Royal Colonial Institute on Recent Developments in West Africa: "If the professional reports upon these tinfields in Northern Nigeria are anything like approximately correct, and the supply is regulated, a fabulous amount of wealth is waiting to be extracted."

A NEW MINES BRANCH EXPERIMENTAL PLANT.

The Mines Branch of the Department of Mines is installing an experimental testing plant in Ottawa for the concentration of magnetic ores.

When completed, the plant will consist of a standard Gröndal concentrating unit, comprising an ore crusher, ball mill, and two Gröndal magnetic separators operating in tandem; the capacity of the plant being from two to four tons of crude ore per hour.

The plant is being installed for the purpose of testing low grade magnetic iron ores and sands, with the view of proving their amenability to concentration by the Gröndal wet system.

Tests will be carried through for the determination of the following points:—

(1) Extent of crushing required to raise the iron content of the crude to 65-70 per cent. in the concentrate.

(2) Extent of crushing required to depress sulphur, phosphorus, or titanium content to percentages acceptable to furnace men.

(3) Number of tons of crude that are required to produce one ton of concentrate.

(4) Power consumed per ton of crude ore concentrated.

(5) Cubic feet of water used per ton of crude ore concentrated.

It is expected that the plant will be ready for operation about the first week in November, 1910. Tests will be made free of charge on Canadian ores, but it is required that shipments shall be delivered carriage paid at the testing plant at Ottawa.

Shipments of ore for testing purposes should not be less than five, nor more than twenty tons; and it is particularly requested that shipments be made in bags containing not more than 100 pounds of ore, to facilitate handling.

THE CONSOLIDATED MINING AND SMELTING COMPANY OF CANADA, LIMITED

Directors' Report

To the shareholders of the Consolidated Mining and Smelting Company of Canada, Limited:

Gentlemen,—Your directors beg to submit the fifth annual report of the company's operations, together with the managing-director's report, the financial statement and auditors' report for the year ending June 30th, 1910.

The tonnage of ore handled at the smelter was 487,125 tons, against 347,417 tons in 1909.

The profit for the year was $309,945.08 and added to the balance at the credit of profit and loss account as shown last year makes a total of $671,011.09 at credit of that account.

During the year two properties have been purchased. The La Plata, or Molly Gibson group, near Nelson, B.C., for payment of which 2,000 shares of the capital stock was issued, also the No. 7 group in the Boundary district. The operating of these mines, your directors believe, will prove profitable to the company.

The property and plant accounts, after paying for the above properties and additions referred to in the managing-directors' report, and after writing off for depreciation $175,502.60 from the profits of the year, show an increase of $244,202.19.

W. D. Matthews,
President.

Toronto, 27th September, 1910.

Financial Statement

The Consolidated Mining and Smelting Company of Canada, Limited, for year ending June 30th, 1910

Liabilities

Capital:		
Authorized	$7,500,000.00	
Issued 55,552 shares of $100 each		$5,555,200.00
Sundry banks:		
Bank of Montreal:		
Loan and overdraft	763,528.55	
Accrued interest	680.95	
	$764,209.50	
Pay roll bank accounts overdrawn	1,803.10	
		766,012.60
Contingent liability at June 30th, 1910, on drafts against matte shipments	131,845.95	
Accounts payable and unpaid dividends		51,673.44
Reserve: Including provision for claims awaiting adjustment		42,723.79
Profit and loss account:		
Balance June 30th, 1909	$361,066.01	
Profit for year ended June 30th, 1910	309,945.08	
		671,011.09
		$7,086,620.92

Assets

Mines, mineral claims, and shares in other companies	$4,142,181.12	
Expenditure on No. 7 group	22,207.31	
Expenditure on Phoenix Amalgamated group	55,840.82	
		$4,220,229.25
Mining, smelting, concentrating and refining plants:		
Balance June 30th, 1909	$1,498,639.04	
Construction for year to June 30th, 1910	215,143.14	
	$1,713,782.18	
Less sales of plant	$ 1,511.99	
Less depreciation	175,502.60	
	177,014.59	
		1,536,767.59
Smelter product on hand and in transit to refineries:		
Pig lead, bullion, matte, blue-stone and antimony	$170,437.30	
Ores and metals on hand and in transit to smelter at June 30th, 1910:		
Value of metal contents corrected to market quotations:		
Ores on hand	$349,472.02	
Refinery, metals on hand	281,686.10	
Ore in transit to smelter	11,337.77	
	642,495.89	
		812,933.19
Mine and smelter stores and material		353,600.99
Accounts receivable		138,780.27
Insurance and taxes paid in advance		14,081.07
Cash in banks and on hand:		
Head office, Toronto	$2,042.81	
Sundry pay roll bank accounts	8,185.75	
		10,228.56
		$7,086,620.92

Auditors' Report

We have audited the accounts of the Consolidated Mining & Smelting Company of Canada, Limited, for the year ended June 30th, 1910, including the mine and smelter accounts maintained at the offices at Moyie, Phoenix, Rossland and Trail, B.C. The inventories of ore and smelter products at June 30th, 1910, are as certified by the company's officials; the values of metal contents have been corrected to market quotations of that date, and the estimated cost of refining products in course of treatment has been deducted. Stores and materials on hand at the mines and smelter have been verified by the storekeepers.

Subject to the foregoing, we certify that the above balance sheet is, in our opinion, properly drawn up so

as to exhibit a correct view of the financial position of the company as at date of closing the accounts to June 30th, 1910.

Clarkson, Cross & Helliwell,
Chartered Accountants.

Vancouver, B.C., August 26th, 1910.

Profit and Loss Account

For year ended June 30th, 1910

To smelter product on hand June 30th, 1909, and in transit from smelter to refineries		$ 349,741.22
To ore in transit to smelter June 30th, 1909, and in process of treatment		754,644.20
To customs ore, lead and bullion purchased		1,666,504.23
To freight on ore from company's mines		200,950.28
To mining, smelting and general expense:		
"St. Eugene" mines	$ 441,234.61	
"Centre Star" mines	538,010.55	
"Snowshoe" mines	162,336.14	
"Richmond-Eureka" mines	21,232.93	
"Queen Victoria" mines	5,495.90	
"Sullivan" mines	18,774.73	
Trail smelter and refinery	1,521,381.46	
		2,708,466.32
To development expenses:		
"St. Eugene" mines	$163,276.69	
"Centre Star" mines	298,553.70	
"Snowshoe" mines	5,837.78	
"Richmond-Eureka" mines	21,045.07	
"Sullivan" mines	7,057.51	
		495,770.75
To royalty on ore		37,154.89
To depreciation general plant and equipment		175,502.60
To directors' fees		8,800.00
To sundry items written off (including bad debts)		13,988.64
To balance, profit		309,945.08
		$6,721,468.21
By sales of smelter products, ore, etc.		$5,904,004.90
By smelter product on hand June 30th, 1910, and in transit from smelter to refineries:		
Pig lead, matte, bullion, bluestone and antimony		170,437.30
By ores and metals on hand and in transit to smelter June 30th, 1910; value of metal contents corrected to market quotations:		
Ores on hand	$349,472.02	
Refinery metals on hand	281,686.10	
Ore in transit to smelter	11,337.77	
		642,495.89
By rents and sundry revenue		4,530.12
		$6,721,468.21

Managing Director's Report

Trail, B.C., August 15th, 1910.

To the Directors of the Consolidated Mining & Smelting Company of Canada, Limited:

Gentlemen,—I beg to submit the results of the Consolidated Company's operations for the year ending June 30th, 1910, including balance sheet, profit and loss account, production, and general report.

Financial Statement

After writing off $175,502.60 depreciation upon plant and equipment (as compared with $153,218.31 depreciation written off in the previous year), $13,988.64 sundry items including bad debts, and charging to profit and loss account $495,770.75 expended upon development, the operations for the year show a profit of $309,945.08, which added to last year's balance of $361,066.01, leaves a net credit of $671,011.09.

During the year additions to the various plants and the additional equipment of new properties have amounted to $140,977.05. The increase in the investment in lands near the smelter has been $6,704.10. The cost of new properties and their development has been $222,622.76 and the estimated value of plant included with the purchase of the Molly Gibson and Number Seven $65,950; a total of $288,572.76, paid for in stock $200,000 and in cash $88,572.76.

The total cash expended, therefore, upon the above items of property and plant was $236,253.91.

The Snowshoe overdraft guaranteed by this company, the balance of which at June 30th, 1909, was $16,549.12, has been paid in full by the Snowshoe Gold & Copper Mines from royalties on ore shipments, and the liability of this company thereby terminated.

The company's obligations for borrowed capital show a reduction in the year of $462,090.50, or from $1,228,103.10 to $766,012.60.

The quotations for London lead, New York silver, and electrolytic copper have been exceedingly low during the year, having averaged: London lead, £12.921, as compared to £13.249 during the previous year; New York silver, 51.948c., as compared to 51.410c., and electrolytic copper 12.981c., as compared to 13.254c.

Since the formation of the Consolidated Company, the cost of new properties acquired has been $1,142,181.12; additions to plant, including the acquisition of existing plants connected with new properties, have cost $1,235,942.20, making a total of $2,378,123.32. Treasury stock, issued in payment for new properties and plants connected therewith, accounts for $856,400 of this total, and the remainder, $1,521,723.32, was covered by cash expenditure.

Production

Following are the productions of the different properties controlled, leased and operated by the Consolidated Company for the year ending June 30th, 1910, and the total production to date as far as can be ascertained. It will be noted that the gross value of metals produced at the company's smelting works was $5,911,767, as compared to $5,505,526 during the previous year. There was an increase in the gold and copper production, a reduction in silver, and a slight falling off in lead; the total, in spite of low prices for metals, exceeds any previous year. The tons smelted increased from 347,417 to 487,125, the largest in the history of the company.

Year Ending June 30th, 1910

	Tons Ore	Gold in Ounces
Centre Star Group	194,013	78,812
St. Eugene—Ore	114,136	.....
—Conc.	17,987	.....
Richmond-Eureka	3,399	.....
Snowshoe (leased)	182,383	12,413
Sullivan (leased)	6,704	.....
Queen Victoria	777	10
	Smelted	
Trail Smelter	487,125	137,614

Silver in ounces	Lead in pounds	Copper in pounds	Value
51,888	.....	2,263,711	$1,935,886
.....	.....	.....	.....
468,693	22,182,611	.....	1,028,740
185,270	1,190,785	.....	138,398
42,561	.....	4,029,902	803,300
46,196	2,451,758	.....	110,790
293	.....	24,555	3,430
2,162,406	42,368,816	5,974,959	5,911,767

Production Beginning 1894 to Date

	Tons Mined	Gold in Ounces
Centre Star-War Eagle group	1,477,324	721,636
St. Eugene—Ore	954,115	.....
—Conc.	180,125	.....
Richmond-Eureka	7,958	.....
Phoenix Amalgamated	249	7
Snowshoe	520,092	35,993
Sullivan	92,110	.....
Number Seven	1,086	224
Queen Victoria	4,204	36
	Smelted	
Trail Smelter	2,458,684	952,056

Silver in ounces	Lead in pounds	Copper in pounds	Gross Value
850,750	.....	28,239,017	$19,508,633
.....	.....	.....	.....
5,055,433	216,064,521	.....	9,965,476
443,983	2,848,743	.....	334,648
44	.....	2,214	451
137,978	.....	12,750,718	2,913,361
781,993	38,653,397	.....	1,931,226
11,511	.....	.....	11,048
3,203	.....	204,199	41,794
16,999,873	220,872,555	43,453,814	42,646,025

The Centre Star Group is mining and shipping about 14,000 tons per month; the St. Eugene mining and concentrating 5,000 tons (from which 800 tons of lead concentrates are being produced); the Snowshoe, 10,000 tons; the Richmond-Eureka 300 tons; and the Sullivan 2,500 tons, making a total being mined per month of 32,600 tons.

Development

There are over 24.6 miles of underground development or narrow work in the Centre Star Group, Rossland; 18 miles in the St. Eugene, Moyie; 6,041 feet in the Richmond-Eureka, Sandon; 2,581 feet in the Phoenix Amalgamated, Phoenix; 5,277 in the Molly Gibson mine; 4,575 feet in the Sullivan mine, Kimberley; and 3,357 feet in the Number Seven mine, Central Group.

In the company's mines 28,144 feet or over 5 miles of narrow work, has been driven during the year, and 40,824 feet of diamond drilling as follows:

	Drifting and Crosscutting
Centre Star Group	13,165
St. Eugene	7,711
Sullivan	367
Richmond-Eureka	2,505
Number Seven	864
Total	24,612

Raising	Sinking	Total	Diamond Drilling
1,346	211	14,722	28,834
1,483	160	9,354	11,456
8	...	375	534
324	...	2,829	.....
.....	...	864	.....
3,161	371	28,144	40,824

In the Centre Star-War Eagle group, Rossland, new ore has been found upon the Centre Star, 3rd, 6th and 10th levels. No pay ore has been found below the 12th level. From the 16th level, 7,867.6 feet of diamond drilling has been done, without finding ore. One or two more holes will complete the exploration in the deep levels of the Centre Star.

There has been an improvement in the Idaho, during the year, both as to ore reserves and prospective value, due to the finding of a new ore shoot (470) above the 4th level and to the expansion of 539 stope, under 461 stope (above the 4th level).

Developments in the War Eagle continue to be encouraging, increased tonnages having been developed on the 8th, 9th, 10th and 11th levels. The ore body on the 9th level War Eagle, referred to in the previous report, has been located on the 8th level. Parallel to this ore body an entirely new ore shoot has been found on the 9th level. Stopes 1086 and 1155 have yielded a large tonnage. The country in which these ore bodies are located is not fully prospected. The future outlook for this part of the mine is most promising. On the 12th or bottom level War Eagle there are small streaks of ore, but nothing of importance has as yet been discovered.

The Iron Mask developments have also been encouraging, one ore body having been opened by a crosscut from the 4th level Centre Star, and a smaller ore body has been opened on the Josie vein from the 4th War Eagle level, considerably east of the old main workings. The stopes in the Iron Mask above the 4th level War Eagle look well.

The ore reserves of the Centre Star group are estimated at 245,640 tons.

No new large ore bodies have been found at the St. Eugene during the year, although a considerable amount of work has been performed upon the 2,100, 2,200 and 2,400 foot levels. The total number of feet of diamond drill holes driven from these three levels has been 8,683.6.

The ore reserves in the St. Eugene group are estimated at 20,000 tons.

While drifting upon the Richmond-Eureka has not opened up much new ore, yet indications are that a fair tonnage, not yet included in estimated reserves, will come from the Summit and No. 6 tunnel, from which no stoping has been done. The ore reserves in the Richmond-Eureka are estimated at 3,475 tons.

No new development work has been done upon the Phoenix Amalgamated and only a few hundred feet upon the Number Seven, mostly in broken country.

On the Snowshoe, upon which the company holds a lease, no new developments have taken place. The ore reserves in the Snowshoe are estimated at 84,000 tons of shipping ore and 93,000 tons containing copper, about 0.80 per cent., which is too low to be shipped at present copper quotations.

In order to determine the grade of the Queen Victoria ore and the cost of mining, trial shipments have been made. These operations have indicated that after sorting, ore containing copper 1.5 per cent. to 1.7 per

cent. can be shipped, but that it is unprofitable to work the mine until the price of copper is much higher.

CONSTRUCTION

The principal new installations or construction work at Trail during the year were a centrifugal pump with driving motor direct connected, located on the Columbia River; a plant for making bullion anodes from the lead blast furnace without re-melting; improvements in copper mills; additions to the lead refinery.

At the company's lime quarry at Fife, a new railway siding has been built.

In connection with the mines, the principal expenditures upon capital account have been for the following:

Ore testing plant for determining methods of economically treating ores and for devising improvements upon present methods in concentrating ores from the company's mines, a railway spur and tramway at the Phoenix Amalgamated property in the Boundary; the equipment of the Number Seven mine in the Boundary, including an aerial tramway with terminals, a short railway spur, a power line, and motors for driving the compressor.

The value of machinery and buildings at the Molly Gibson and Number Seven, which were included with the mining property in the agreements for sale, has been estimated at $65,950, and this amount has been charged to plant account.

NEW PROPERTIES

In order to maintain the company's earnings, it seemed advisable to secure such new properties as promised to yield a fair return upon the cost of the property, plus the amount necessary to equip them for economical operation, and providing always that there was a reasonable chance that such properties would produce a sufficient tonnage of ore to repay the capital expenditures incurred through their purchase and equipment. After examining a great number of mines and prospects, it was decided that the No. 7 mine in the Boundary and the Molly Gibson mine near Nelson were the most promising.

The Number Seven mine and some adjoining claims were therefore purchased. This property has a hoist, compressor, mine buildings, a shaft 325 feet deep, and a total of 3,357 feet of narrow work. It is estimated that there are developed 20,000 tons of ore containing about $10 gross assay value. An aerial tramway, electrical equipment and a railway spur are about completed.

After long negotiations, the Molly Gibson mine was secured by the payment of 2,000 shares of the company's treasury stock. The Molly Gibson Company owned an 8,000 foot aerial tramway, a concentrator, compressor and mine buildings. Former managements have driven 5,277 feet of narrow work. The ore reserves are estimated at 6,000 tons of ore containing a gross assay value of $30 per ton.

A lease has been taken upon the Sullivan mine near Kimberley. A royalty is paid upon all ore shipments, and the Consolidated Company has undertaken to perform $10,000 worth of development work. The mine is producing about 2,500 tons monthly of ore containing approximately, lead 18 per cent., silver 6.0 ounces per ton.

MANAGEMENT

The operations and business of the company have been ably directed by the following gentlemen:

R. H. Stewart, manager of the company's mines; T. W. Bingay, comptroller; A. J. McNab, superintendent of the smelter; John F. Miller, superintendent of the refinery; M. E. Purcell, superintendent of the Rossland mines; S. G. Blaylock, superintendent of St. Eugene mines at Moyie and the Sullivan mine near Kimberley; Charles Biesel, superintendent Phoenix mines and the Number Seven mine south of Phoenix; John Bakke, superintendent Richmond-Eureka mines; F. W. Guernsey, superintendent Molly Gibson and Queen Victoria mines; James Buchanan, metallurgist; A. W. Davis, assistant to the mine manager; and John M. Turnbull, mining engineer.

Mr. Jules Labarthe, who for many years has efficiently managed the works at Trail, resigned, to accept the general management of the Mason Valley Mines Company of Nevada.

Respectfully submitted,
W. H. ALDRIDGE,
Managing Director.

A UNIQUE SECTIONALIZED POWER PLANT.

The El Tajo Mining Company, of San Sebastian, State of Jalisco, Mexico, has recently ordered a unique sectionalized power plant to supply power for its new mill. The head of water available is 500 feet, and there is being supplied a special Pelton water-wheel of the two-unit type capable of developing 125 h.p. at this head when running at 1,200 r.p.m. With this water-wheel will be supplied two pairs of jaw clutch couplings, thus rendering it possible to disconnect either of the two generators which are driven by this wheel. The water-wheel will be sectionalized for mule back transportation and no piece will weigh over 300 pounds. A mechanical governor will be furnished to control the water-wheel.

The two generators to be driven by this wheel, as with all the electrical apparatus, come from the works of the Westinghouse Electric & Manufacturing Company, and will be of 50 k.w. capacity each. These also will be 3-phase, 60-cycle, 600 volts and run at a speed of 1,200 r.p.m. corresponding to the water-wheel. They will have extended shafts for belt driving the exciters. The generating station also provides for the usual switchboard, lightning arresters and protection apparatus.

The power generated is to be consumed at the mill by various alternating current motors, one of which, belt drives the stamp mill line shaft at a speed of 150 r.p.m., resulting in 100 drops per minute. The tube mill line shaft runs at 200 r.p.m., the mill itself making 37 revolutions per minute. Other motors are scattered about the mill for the usual drives in a mill of this kind.

Since the generating plant is located close to the mill, the generator gives 600 volts and the motors employed are for 550 volts. The lighting is taken care of by separate transformers.

The Uruguayan Republic last year provided for the coinage of $500,000 worth of metal money. The pieces are, respectively, 5-cent, 2-cent, and 1-cent. Twenty million pieces in all were provided for.

A new winder is being installed at the Micklefield Colliery, England. It is to be electrically operated, and will be capable of raising 150 tons of coal per hour from a depth of 300 yards. At every wind three tubs, each containing 12 cwt. of coal, will be raised. The winding period is set at 35 seconds, and the banking interval at about eight seconds. A balance rope will be used, and the parallel drum, 11 feet in diameter, will be driven directly by means of two continuous current winding motors.

Waterborne Packing of Stopes in the Transvaal

For some time past the question of packing the stopes solid has been attracting attention on the Rand and the adoption of the waterborne system is being seriously considered, several of the principal mines, both outcrop and deep level, being busily engaged making experiments in connection therewith. The system is not by any means new, but up to the present it seems to have been principally used in connection with the working of the thick coal seams in Silesia.

The Rand gold mines have hard, cohesive, unyielding quartzite hanging walls and near the outcrop small pillars will suffice, but now that the working costs have been so reduced it has been found profitable to extract the whole of the pillars hitherto considered unpayable, but the difficulty very often has arisen of finding suitable stowing material. Owing to this several nasty falls of the hanging have taken place and down to a depth of six hundred feet these falls have generally worked their way to the surface, and it is probable that at even greater depths it is only a question of time before the surface over these open stopes will also become affected.

Several of the deep mines on the Rand have now attained a depth of between four and five thousand feet and there are indications that at this depth the pressure of the superincumbent strata is a coming difficulty to contend against, and, if successful, the waterborne system of sand filling the stopes promises to afford the Rand mines an easy and cheap way out of the difficulty. As an illustration of the difficulties of deep mining the Cinderella Deep accident may be quoted, where sixteen natives lost their lives through the collapse of a large pillar at a depth of 4,000 feet from the surface. This is one of the few mines allowed by the government to work with a single shaft or outlet, and this permission can only be obtained on extraordinary steps being undertaken with the view of the prevention of accidents, so that at this mine the discipline must be of an exemplary character. However, the other evening at nine o'clock, whilst a white overseer and over twenty natives were working as usual in the 4,000-foot level, a loud report was heard, and a large pillar collapsed, killing sixteen natives and injuring several others, without the slightest warning. A government enquiry was held into the accident and the cause attributed to the excessive pressure of the superincumbent strata at this depth. Several managers on the East Rand, however, still hold the view that with such a cohesive hanging wall, a pressure of the nature required could not have resulted from depth alone, forgetting the fact that under the circumstances a cohesive unyielding hanging wall is the most likely to break in large masses and, thus, bring about such an accident. Now, from actual experiments made with the Rand quartzites it would seem that they fracture at pressures varying from 1,945 to 6,804 pounds to the square inch and with an average pressure of 4,566 pounds to the square inch, and, as at a depth of 4,000 feet from the surface, the actual weight of the overlying strata, would be 4,888 pounds, a pressure nearly equal to the weight of the whole thickness of the overlying strata, must have been thrown on to the pillar. It is difficult to see how in a comparatively new mine like the Cinderella Deep, such a condition of affairs could have been brought about, but the fact must not be overlooked that stoping operations throw extra weight upon the pillars, and the extraction of one-half the reef by means of stopes doubles the work cast on to a pillar, so that at this great depth unusually heavy pressures are possible. An overlap fault also exists in the locality and it is possible that this may have had something to do with the accident. However, it is becoming evident that nearer the outcrop, where it is found profitable to extract the pillars, and in depth, where the superincumbent pressure is beginning to show itself, solid filling of the stopes is absolutely necessary and it is due to these reasons that the sand filling process is being extensively tried.

One great advantage on the Rand is the existence of thousands of tons of old tailing sands sufficient to last for many years in close proximity of water and sand to produce a ready flowing mixture, whilst a fall of 1 in 10 is considered the minimum. With such a fall the sand and water readily flows to the shaft, but where the sands lie below the level of the shaft some mechanical means of transport must be used. In such a case bins or hoppers are built near the shaft and the sand mixed with water and then conveyed by six-inch pipes lined with hardwood down the shaft and to the spot in the stope at which it is intended to deliver the sand. Wherever possible the use of launders is preferred as being simpler and less liable to choke, but they must have a minimum gradient of 1 in 10. For vertical and horizontal lines pipes are essential, but the horizontal lines need a head of at least 3 to 1 to keep the waterborne material moving, whilst rising lines of pipes are to be avoided. Of course, some preparation is necessary in the stope before the deposition of the sand. All openings must be closed at the lowest point, either by building water-tight tracks or barricades, the water escaping from outlets formed at the side as the stope becomes gradually filled with sand. Too much pressure must not be thrown against the artificial barricades or packs and, for this reason, the receiving stope should have length in preference to height, but by building packs the depositing of the sand can be regulated at will. To ensure that the overflow water, before reaching the pumps is clear of sand, it may be necessary to construct catch pits or weirs, whilst to protect the pumps and pipes against the action of any cyanide a small proportion of lime is added.

This question of the tailings still containing cyanide has been fully gone into, and to avoid such an occurrence as much as possible, only old tailings are being used, of which there is an ample supply at most of the mines to last for many years. Experiments are also being made with the object of destroying any cyanide the tailings may contain and considerable success has attended those experiments, for although entire destruction of the cyanide in fresh tailings has not been achieved, Dr. Irwin, the chemist to the Transvaal Government Mines Department, has succeeded in reducing the cyanide to three or four parts per million, which ought to be sufficient for all industrial purposes. So far when once a stope is properly filled the shrinkage by continued drainage does not seem to be sufficient to materially interfere with the success of the system whilst with regard to the quantity deposited in the stopes no difficulty is being experienced at the Village Deep in sending into the mine 200 tons of sand per hour. It is not anticipated that the cost will exceed two pence to four pence per ton, as this is the cost at one of the mines where the sand filling process was carried on under favourable conditions for some time on a small scale. It is not unlikely that if proved successful the sand filling process may in a sense revolutionize mining methods at present employed on the Rand.

ROWLAND GASCOYNE.

Personal and General

Mr. C. McK. Campbell, head mining engineer for the Granby Consolidated M. S. & P. Company, has returned to his post at Phoenix, B.C., after having spent a month's vacation visiting Winnipeg, Montreal, and other places.

Messrs. James McEvoy, of Toronto, and R. G. Drinnan, of Vancouver, B.C., both well known coal mining engineers, have been engaged during the summer just past in locating, for a Toronto syndicate, coal lands in the country west of Edmonton and north of the Brazeau district, Alberta. Mr McEvoy returned to Toronto last month, and Mr. Drinnan to British Columbia.

Mons. A. Fournier, of Kaslo, B.C., manager for the Selkirk Mines, Ltd., a French company owning the Cork mine and concentrating mill on the south fork of Kaslo Creek, has, after some delay, received from France, the Medal of Merit, for valour and discipline. Mons. Fournier served 16 years in the French army, and now holds the rank of captain in the reserve.

Mr. Robert R. Hedley is investigating a gold-copper mine in the vicinity of Alberni Canal, Vancouver Island, B.C., which is under bond and option of purchase to a Vancouver syndicate, for whom he is acting.

Mr. Wm. Fleet Robertson, Provincial Mineralogist for British Columbia, who recently returned to Victoria from a trip through the Lillooet country, has gone to Portland Canal to make investigations there in his official capacity.

Mr. W. W. Leach, who has spent the field-work season of this year in the Skeena district, British Columbia, is expected to return to Ottawa during October.

Mr. R. P. Williams, western representative of the Canadian Rand Company, Limited, last month returned to his headquarters at Vancouver, B.C., from a trip to Whitehorse and Dawson, Yukon Territory, and thence to Nome, Alaska.

Mr. Charles Graham, formerly one of the underground managers for the Western Fuel Company, with large coal mines near Nanaimo, Vancouver Island, B.C., has been appointed superintendent of the Nicola Valley Coal & Coke Company's Middlesboro colliery, in the Nicola Valley, B.C., in succession to Mr. James Gray, resigned.

Mr. Newman Erb, of New York, president of the British Columbia Copper Company, Limited, has been visiting the company's mines and smelting works in the Boundary district, British Columbia.

Mr. G. G. S. Lindsey, of Toronto, lately paid a visit to some mining property in the Portland Canal district, British Columbia, in which he is interested.

Mr. A. B. Stewart, formerly manager of the Chester Basin gold mine, Nova Scotia, is at present in Porcupine.

Mr. H. C. Meek, superintendent of the Dome mine, Porcupine, is at present in the West.

Mr. J. B. Tyrrell has been appointed consulting engineer in Canada for an important English mining company that has heretofore confined its operations to South Africa.

Mr. J. McEvoy has returned to Toronto from the West and has taken an office in the Stair Building.

SPECIAL CORRESPONDENCE

ONTARIO.

Cobalt.—Mr. Lorne McGibbon, president of the La Rose Consolidated, recently stated that the proposed amalgamation of the more important Cobalt properties, was further away now than it had been a few months ago. This is due to the stronger position of the La Rose, which has made important gains on the No. 3 vein of the original mine, and also on the Lawson and Princess claims. One of the best discoveries of the year was made a short time ago on the Princess and subsequent development serves to increase its importance. At the recent annual meeting the directors declared the regular quarterly dividend of two per cent. payable on October 20. It was anticipated in certain quarters that the dividend rate would be raised, but the management has decided not to take such action until the properties have been more thoroughly developed. Although no official notification has been issued, it is known that the annual report, which will shortly be in the hands of the shareholders, will be very favourable.

The shaft on the Dreadnought property formerly known as the Rothschild, is now down 150 feet, and from this point crosscuts will be run under the lake. A couple of calcite veins have been located, and a considerable quantity of float nuggets have also been found.

The raise from the 288 to the 190 foot level of the Cobalt Lake Company, has been finished and it was in ore all the way. The vein is about two inches in width of high grade ore, and the values extend for some distance into the wall rock.

Surface work has been started on the Bartlett property in Gowganda, with the result that one of the best veins in the country has been found. A small shaft has been started and at a depth of eight feet the vein showed seven inches of high grade ore. This company has some of the best claims in Gowganda, and if conservatively managed there is every reason to believe that it may make good.

For some time the Ontario Department of Lands, Forests and Mines has been collecting data regarding the water power available in the northern parts of the province. The water powers of Northern Ontario figured largely in these estimates, which totalled an aggregate of 2,000,000 horse power. The powers in question are located over a distance of approximately 600 miles, occurring principally along the main tributaries of the Moose, Albany, Winnipeg and Rainy Rivers, which drain northward into the Hudson Bay. Some of these powers range from fifty to one hundred thousand horse power, and form a tremendous reserve that can be turned into electric energy. It it believed in some quarters that it may eventually be used for the electrification of the Grand Trunk Pacific.

The Northern Customs Concentrator has installed two more Nissen stamps, so that they now have in operation fifty regular stamps and four Nissens. This gives the mill a capacity of 160 tons a day, so that it is with the Coniagas treating the largest tonnage of any mill in the district. At the present time it is handling ore exclusively from the La Rose and City of Cobalt mines, and these contracts alone are sufficient to keep the mill in operation several years. The La Rose ore is all coming from underground operations, none of it being from the big dumps.

All Cobalt mines operating concentrators have received notification from the president of the Lord's Day Alliance that they must close down at 12 o'clock Saturday nights for the 24 hours' Sabbath rest. The general practice has been to close the mines down but to run the concentrators till about seven in the morning, and then to start up again at seven o'clock Monday morning. If the Alliance forces this action on the mill oper-

ators it will be extremely inconvenient and cause considerable loss. The Mine Managers' Association has taken the matter up, and written the Alliance, showing that the men obtain 24 hours' rest, and that to force the mills to shut down at twelve o'clock Saturday night would be a hardship both to the employees and the companies.

With regard to the Cobalt Central, the Referee in Toronto has decided that the question of selling the properties of the company will be definitely postponed till December 28th. He has also ruled that in the meantime all those connected with the former management shall be subpoenaed to Toronto, in order that their actions suggesting the liquidation of the company some months ago may be gone into.

Further exploration in the vicinity of the No. 1 shaft of the Trethewey has opened up two stringers of high grade ore that will give a stoping width of approximately fourteen feet. The greater part of the ore for the mill is coming from Nos. 2 and 4 shafts. The northern end of the property has been showing up exceedingly well and there are now five high grade veins showing in the No. 4 workings. The concentrator is treating over 100 tons a day, practically none of which is coming from the dumps.

A new shaft is being put down by the Coniagas, from which a crosscut will be run to explore the southern half of their property. The sinking is being done on a lot belonging to the Cobalt Central close to the boundary and is about 600 feet distant from the nearest working of the Coniagas. This section is in the conglomerate but no surface finds of any importance have been made.

At the Wyandoh mine, silver has been encountered at a depth of 135 feet. From the 80 foot level a winze was sunk on the vein, which at that point was barren. At a depth of 45 feet, however, the calcite changed to smaltite, which carries some silver values.

The Little Nipissing has obtained a lease of the ground on which the Peterson Lake Company started their shaft, and they will work this lease from their own shaft. Some of their veins carrying high grade ore have been found to lead into it. The lease is for seven years and the Little Nipissing has to pay a bonus of $10,000.

The Trethewey Company has declared a dividend of 10 per cent., payable October 15th.

Good results are now being obtained on the Provincial, and some fine ore is being taken from the 175 foot of the No. 2 shaft. At this point there are two veins showing high grade ore and a crosscut is being run to the south to intercept a promising surface vein. An ore house will shortly be erected, that will contain a small concentrating plant, to reduce the ore. The management expects to ship a car each, of high and low grade in about a month. This will be the first shipment from the property for a couple of years.

At the annual meeting of the T. & H. B. Company, held Sept. 26th, two reports were submitted, one from the original company and the other from the Hudson Bay Mines, the operating company. The former showed that $148,169.05 had been received from the sale of ore, while the latter showed receipts amounting to $383,451.60. The directors have tried unsuccessfully to float the stock of the Hudson Bay Mines, which is capitalized at $3,500,000, so that it is extremely improbable that the stock will be distributed among the shareholders of the parent company, as was originally intended. The construction of the new concentrator is being held up on account of the failure to deliver the machinery.

Recent heavy rains all over the district have greatly retarded surface development and assessment work. Practically every day for the past three weeks rain has fallen to such an extent that the Montreal River has risen over two feet.

Porcupine.—The township of Shaw has lately been coming into prominence on account of several reported discoveries of free gold. A good many prospectors have been into that section, and there have been several sales of undeveloped claims.

The main shaft of the Scottish Ontario Company is now down 100 feet, and from this point crosscuts will be run to open up the four veins discovered on the surface. It is probable that during the winter a couple of stamps will be installed for sampling purposes.

The Homer veteran claim in Tisdale has been sold to New York capitalists.

The owners of the Vipond property have decided to install a small steam plant and a single stamp for sampling purposes. There are two veins showing on the surface and samples from these show good values in gold. Two shafts are being sunk, but work has been greatly hampered on account of the shortage of supplies. There are at the present time five tons of ore on hand, which assays about $1,000 to the ton.

Four claims known as the McIntyre properties have been sold to New York men. Machinery and supplies will be taken in during the winter.

An important discovery has lately been made on the Armstrong-McGibbon properties while the assessment work was being done. The find was made about 150 feet from the boundary line of the Crown Chartered and the showing of free gold is as spectacular as any seen in the district. Several small test pits have been sunk on the vein and they show free gold in the bottom.

Active mining operations are shortly to be started on the Bilsky properties which are owned by New York and Montreal men who are closely identified with the Jacobs Exploration Company. It is stated that some promising veins have been found.

The freight from Kelso to Porcupine is arriving in greater quantities than formerly and it is also being looked after better. It is anticipated that there will be several hundred teams on the road this winter.

BRITISH COLUMBIA

The total tonnage of ore received at the Kootenay and Boundary district smelteries during nine months to September 30, is in excess of 1,500,000 tons. The aggregate tonnage mined during that period is larger, though, by probably 150,000 tons, this quantity representing ore either concentrated or milled. Then there is a small tonnage from Coast district mines to add, ore having also been smelted at the Tyee Copper Company's works on Vancouver Island, and other British Columbia ore sent to Tacoma, Washington, for treatment.

The annual general meetings of several British Columbia mining and smelting companies will have been held before this shall be printed. The more important of these are that of the Consolidated Mining and Smelting Company of Canada, Limited, called for September 27th, and that of the Granby Consolidated M. S. & P. Company, for October 4th.

Cassiar.—A press despatch dated Atlin, September 27, is as follows: "John P. Lamb, employed for a number of years by the North Columbia Gold Mining Company in cleaning bedrock, was arrested by Chief Constable Owen on Friday, 23rd inst., and charged with stealing gold. He afterward appeared before Magistrate J. A. Fraser and was committed for trial. Some time ago two native children playing behind Lamb's cabin found a small tobacco tin containing more than 13 ounces of gold in nuggets. Later, the police found 3 ounces more in his cabin. When they arrested Lamb, they recovered 47 ounces of amalgam valued at more than $700, which had been cached under a stump near Taku, and the hiding place of which had been disclosed by Lamb." The North Columbia Gold Mining Company is a Cincinnati organizaztion, of which Mr. J. M. Ruffner is manager. It operates on a larger scale than any other company in Atlin camp, hydraulicking extensively on Pine Creek in gold-bearing gravel in places 45 feet in depth and much of it yielding gold to the value of 40 cents a yard. Its water supply

ditch is five miles in length and of a stated capacity of 15,000 miner's inches. Much of the gold recovered is coarse, and it is reported that included in this season's yield was a nugget of 27 ounces in weight.

East Kootenay.—The gold mining season is drawing to a close on Wild Horse, Perry, and other streams in East Kootenay on which placering is carried on so long as weather conditions permit and sufficient water is obtainable. Lode mining at the St. Eugene and Sullivan lead mines, respectively, continues to constitute the chief feature of this branch of the industry, operations at other mines being small in comparison, and not yet productive of much ore for shipment. The output of the St. Eugene for nine months, to September 30, has been between 11,000 and 12,000 tons of lead-silver concentrate from 80,000 to 90,000 tons of ore, and from the Sullivan about 14,000 tons of crude ore. Both mines are worked by the Consolidated M. & S. Company, and both ship their product to that company's smeltery at Trail.

In coal production, the Crow's Nest Pass Coal Company has been maintaining a large output, the tonnage for the month of August having been 109,000, as compared with 73,000 tons in the corresponding month of 1909, this showing an increase in output of nearly 50 per cent. Both the Hosmer and Corbin collieries are also producing coal in considerable quantity, though on not nearly so large a scale as the Crow's Nest Pass Coal Company. Prospecting the coal measures in the upper Elk River country, north of Michel, is being proceeded with, and too, in the Flathead country, in the southeast corner of the province. Both these new districts are likely to have railway transportation next year.

West Kootenay.—In Ainsworth division, the mines on which work is being done are the several that have had mention in recent numbers of the Journal. Two or three others are expected to shortly resume after having been idle for a time. The list includes the Highlander, Highland, Blue Bell, several mines up the south fork of Kaslo Creek, and one at Poplar Creek. Wagon road communication has been established with McGuigan, Bear Lake, and Whitewater, so that building materials have been received at the Whitewater, Lucky Jim, and Rambler-Cariboo mines, and mining has been resumed in the last mentioned. It is intended to haul ore from both the Rambler-Cariboo and Lucky Jim to the C.P.R. at Three Forks, for shipment thence to smelteries. The Slocan Star, near Sandon, has lately been shipping some ore after a long period of practical non-productiveness, last year's output having been only 64 tons. The fact that ore is being again shipped has given rise to the statement that work was only lately resumed after a long period of idleness, which is an error. It is true that during several years no work had been done in the old workings affected by the Star vs. White litigation, happily finally settled last November ,but work has been in progress on the other side of the Star gulch with little intermission for two years or more. In 1909 about 1,550 feet of underground development was done, beside surface trenching and other prospecting work. This mine was visited last June by the writer of these notes, and shortly afterwards the following information relative to it was published: "The Slocan Star and Richmond-Eureka are both interested in the further extension of the latter's No. 6 tunnel. This was started on the Eureka claim; at about 500 feet in it entered the Hidden Treasure of the Slocan Star group and has been driven about 500 feet in that claim. At 200 feet farther ahead, or 1,200 feet from its portal, it will be in the Summit claim of the Richmond-Eureka group. An incline raise is being made in the vein from No. 6 to Eureka No. 5, a distance of 170 feet. This raise is up nearly 90 feet and it is expected it will be through to No. 5, which passes through one corner of the Hidden Treasure, early in July. A tunnel has also been driven on the vein about 200 feet lower down than No. 6, on the Slocan King claim of the Slocan Star group; this has passed through into the Hidden Treasure, and its breast is about 1,600 feet from its portal. Three shoots of ore have been passed through, and it is expected that another shoot, opened in Nos. 5 and 6 above, will be reached at about 1,800 feet in from the portal of this King tunnel. The chief purpose now is to get the two drifts well into the mountain (to cut several ore shoots known to occur in No. 5), and to connect them by raises to ensure good ventilation. When this shall have been done the miners will go back and cross-cut wherever deemed advisable, and stopes will be opened in the ore shoots." The account also described some aerial tramway improvements being made, and concluded thus: "The give-and-take arrangement between the two companies concerned makes it practicable to work their adjoining claims at less cost than if operated independently one of the other. As practically all of the ore from the workings above-mentioned can be shipped crude to the smeltery, it now appears unlikely the Slocan Star concentrating mill will again be operated until work shall be resumed in the old workings of the Slocan Star mine, which may not be done this season." This information will serve to show that instead of being "tied up" as mistakenly chronicled in Nelson, much development work has been in progress on the Slocan Star property during the last two years, with results that may be expected to allow of shipment of a lot of ore of good grade whenever the management shall deem it advisable to make shipments regularly to the smeltery.

In the Slocan Lake section of the district, developments at the Standard and Hewitt mines are regarded as satisfactory, with large shoots of ore opened ready for stoping. The Van Roi, in the same neighbourhood, is also being put in condition for maintaining an output of ore continuously; meanwhile the erection of a concentrating mill is being proceeded with. About Nelson, the Molly Gibson silver-lead mine, for several years known as the La Plata, is being worked by the Consolidated M. & S. Company, with Mr. A. W. Davis in charge as superintendent. The Athabasca gold mine is reported to be developing encouragingly. An announcement has been made of the intention of a syndicate to acquire and work the Silver King, Dandy, and other properties situated on Toad Mountain, near Nelson. In Ymir camp, the Yankee Girl, Wilcox, and Dundee mines are being worked, but only the first-named is producing ore in considerable quantity; it has this year sent to the Trail smeltery more than 4,000 tons. In Sheep Creek camp, The Queen and Nugget are keeping their respective stamp mills going, while the Mother Lode is being developed to a greater extent than other claims in the camp, though not taking out ore except that broken down in the course of development.

In Rossland camp, beside the larger mines—Centre Star group, Le Roi, and Le Roi No. 2—there are the Cliff, lately bonded to the Granby Company; the Mayflower, and the Blue Bird, and from these three results are expected that it is hoped will admit of their becoming regular shippers of ore to Trail. Resumption of work on the Beatrice silver-lead mine, Lardeau district, has been announced, while the Silver Cup, also in northern Lardeau, is sending ore out and now has a total production for the current year of about 900 tons of high-grade ore.

Boundary.—Shipment of ore from the Rawhide mine to the B. C. Copper Company's smeltery at Greenwood was commenced during the week ended September 17. This mine is one of the Dominion Copper Company's properties; some time ago its production was comparatively large and the ore was sent to the Boundary Falls smelting works. Publication of the reports prepared for presentation at the annual meeting of the Granby Consolidated M. S. & P. Company in New York on October 4, is being awaited with much interest. It is stated the company's net earnings during the fiscal year ended June 30 last, have been equal to $4 per share. As there are 150,000 shares in the company, this would mean a net profit for the year of $600,000. The British Columbia Copper Company is reported to have cash in hand and due for copper delivered, to the amount of about $250,000. Beside this, there is the value of copper in transit—

about $50,000. The Phoenix Pioneer is authority for the statement that "when the company shall have $500,000 in actual cash, the management propose to place the stock on a dividend basis." The aggregate tonnage of ore produced by Boundary mines during nine months to September 30 is given at about 1,260,000 tons.

Texada Island.—The general average value of the ore produced at the Cornell mine, near Van Anda, Texada Island, by the Northern Texada Mines, Limited, during seven months of this year, to August 31, is higher than that of last year's production, as shown by the following figures: In 1909 the production tonnage was 10,178 tons of ore, having an average metal content of: Gold, 0.297 ounces and silver 1.38 ounces per ton, and copper 3.78 per cent. During the seven months of 1910 the production was 4,301 tons, having an average metal content of: Gold, 0.407 ounces, and silver, 1.73 ounces per ton, and copper 4.47 per cent.

Portland Canal.—The mining properties on which the chief work is being done are those of the Portland Canal, Stewart, and Red Cliff companies. The Portland Canal Company's concentrator will be at work in October, and profitable results are looked for with confidence, there being much ore of good trade available for concentration. The Red Cliff Company is driving a long deep-level tunnel to cut at a considerable depth a shoot of copper ore opened by an adit at a higher level. This tunnel will soon be in about 100 feet from its portal.

Skeena.—Reports are published of the occurrence of silver-lead ores in several parts of the district about Hazelton, and of others in the Babine range, farther east. Samples of ore shown are of good grade, and the development of several silver-lead mines is expected.

Queen Charlotte Islands.—The work of prospecting the coal measures on Graham Island of the Queen Charlotte group is being proceeded with. Several companies have been organized to develop the coal resources of this island, and it is claimed the outlook for successful results is promising.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax, Oct. 9.—The troubled mining centre of Springhill had unlooked-for excitement during the past week. Following the injunction granted by Judge Drysdale, which virtually stopped picketing , a period of lethargy set in. Men came to Springhill and found employment with the company without interference by the strikers. Last week the scene changed. James D. McLennan, provincial organizer of the U. M. W. from Glace Bay, arrived in Springhill early in the week. A mass meeting of strikers was held behind closed doors, and the morning following picket duty was resumed in greater force than ever before. Those of the strike breakers who did not live behind the palisade had to run the gauntlet of from three to six hundred men. The company acted quickly, and had warrants issued for eight of the principal U. M. W. leaders. The men arrested were J. D. McLennan, provincial organizer; J. B. Moss, of the Nova Scotia U. M. W. Executive; A. C. Bonnyman, president of the local lodge; Emile Michelson, Lionel Dobar, Richard Richardson, W. A. Mattix, and David Colwell. The last mentioned is an elder of the Presbyterian Church, and one of the most highly respected citizens in Springhill. The trial was called for Saturday afternoon before Stipendiary Ross, but before any evidence was taken an adjournment was made until next Saturday at 10 o'clock. Mr. Moss expressed the view that the men would ultimately win out, that the mines could not be successfully operated by the class of labour employed, that the longer the company operated under existing conditions the more money it would lose.

Over against the statement of Mr. Moss must be set some hard facts viz., the company is steadily increasing its coal output, it has about as many men employed as it desires, and, while a portion of them are far from desirable citizens, many are from Glace Bay and other Cape Breton collieries, and are experienced miners. There is no sign of yielding on either side.

NEW BRUNSWICK.

St. John, N.B.—Messrs. Charles Russell and H. E. Tiebur, representing large oil refining interests in the United States, after a careful inspection of the oil shales in Albert City, have made an offer to Senator Domville, representing the General Oil Shales Company of Canada, which holds large areas in Albert county, to purchase the entire product of the property for 25 years or more at a fixed price, for the purpose of refining the oil.

The proposition of Messrs. Russell and Tiebur is to build a refinery either at Hillsboro or St. John, preferably at St. John, connecting it with the mines by a pipe line 80 miles long.

Senator Domville will lay the proposition before the General Oil Shales Company, which is composed of English capitalists.

ALBERTA.

Coleman, Sept. 29.—An accident occurred on Tuesday at the International Coal & Coke Company's mine when M. Pieblado, an Italian, was unfortunately caught between two coal waggons and had his side crushed. He was taken to the miners' hospital and is progressing favourably.

BRITISH COLUMBIA.

Vancouver.—Since the first discovery of coal on Graham Island by Mr. Robertson, of Victoria, a syndicate has been formed with a capital of $1,000,000, which has acquired 43,500 acres of coal lands on the north end of the island and round the Masset Harbour district. The company has taken out mining licenses from the Provincial Government and will develop its holdings on a large scale.

Vancouver, Oct. 1.—A ten million dollar merger covering all powder companies in the Dominion has just been formed, the only concern outside the deal being the works of the Giant Powder Company of San Francisco, located at Telegraph Bay on the island. The new company is known as the British Columbia Explosives Limited. The merger is controlled by the Nobel Company, operating powder plants in every European country, and the Dupont Company controlling the industry in the United States. The plant of the Hamilton Powder works near Nanaimo, and of the Western Explosives Company on Bowen Island, figure in the deal and representative interests are now here inspecting the properties. It is understood that the amalgamation was arranged to put an end to keen competition and in future each company will operate within definite limits.

YUKON.

Dawson.—Dawsonites now making the journey five miles from Dawson over the Hunker Boulevard to a point a mile this side of Bear Creek can see in the making the largest gold recovering machine ever designed. Not in the history of man has there been such a mammoth machine built to recover gold.

The Canadian-Klondike Mining Company, Limited, is building the giant dredge.

President and General Manager Joseph W. Boyle has more than 100 men engaged on the construction, rushing the work

day and night. During the hours of darkness the numerous electric arc lamps make it almost as light as day, and the work progresses without a hitch.

At the rate the undertaking is being pushed along, the dredge should be finished and receive the juice before the end of the season. The outlook now is that the big machine will have ample time for a thorough test before the closing of the dredging season.

The dredge is to be known as the "Canadian." The name is taken from the first part of the company's name. Large metallic name plates are prepared to be placed on the side of the house.

The cost of the dredge will run between $300,000 and $400,000. The freight on the machinery alone, to say nothing of the penalties to be added because of the enormous size of many parts, will reach something like $100,000.

The dredge will be driven with power from the new plant now being installed on the north fork of the Klondike by A. N. C. Treadgold. The giant motors for the new dredge are on the ground. No transformers are to be used on the dredge, and every wire going aboard the boat will be absolutely insulated, and the craft thus fully protected from fire risk.

The digging line will have a 300 horse power motor, and will be guaranteed to stand an overload of 50 per cent. A 200 horse power motor will operate the ladder hoist. The total capacity of the motors is 1,000 horse power. The motors were designed especially for this work by the General Electric Company.

The digging ladder and the stacking ladder have steam heating apparatus especially designed to keep the ice from interfering with the work. Other machines have much trouble from ice on these parts, especially late in the fall.

With this new device for warding off of ice, Mr. Boyle calculates on being able to dredge 200 to 215 days.

The Canadian will have a capacity of 10,000 cubic yards a day. The company's dredge No. 1,now at work on the Klondike, has a capacity of 4,000 yards. The big dredge will handle 15 cubic feet of material with every bucket.

The second largest gold dredge in the world is the Natoma No. 1, in California. Its buckets are a little more than 13½ feet each.

MINING NEWS OF THE WORLD.

NEWFOUNDLAND.

St. John's.—The company which has been prospecting near Parsons Pond, Nfld., has struck oil and will proceed with development operations immediately.

The Steamer Harlaw, which sails on Tuesday from Halifax, will have almost a cargo of equipment for the Parsons Cove concern this trip, and is loading the goods at G. S. Campbell & Company's wharf now. They came from New York by the Florizel and Bornu and include two three-ton boilers and attachments, heavy steel drills, an immense lot of iron piping, derricks, timbers, etc., for the development work; also a large quantity of flour and food supplies.

UNITED STATES.

Los Angeles, Cal., Sept. 30.—The American Mining Congress placed itself on record yesterday as opposed to the Roosevelt and Pinchot conservation policies, and by a vote that was practically unanimous declared in favour of state control of water power and all other natural resources as against federal control.

As indicative of the attitude and sentiments of the delegates in the matter of national conservation of natural resources, the congress accepted a report of the committee on Alaska mining laws in which L. R. Glavis, the land office special agent dismissed by Secretary Ballinger, was attacked, and applauded a delegate who denounced Colonel Roosevelt's attitude on conservation.

Los Angeles, Cal., Oct. 3.—It is officially stated that the report of an agreement between the Associated Oil Company and the Independent Producers' agency for the sale of 10,000,000 barrels of oil to the Associated is premature. No such deal has been perfected, although it is admitted that negotiations are under way. The difficulty in closing the deal appears to be in the price, the agency demanding at least 35 cents per barrel, and the Associated refusing to pay more than 30 cents.

Cripple Creek, Colo.—It is learned that 48 new applications for leases have been filed since the announcement of the United States Reduction & Refining Company's big cut in ore treatment charges, and the holdings of these nine corporations represent less than 11 per cent. of the ground in that section of the district known as the mineral belt. To place the present number of applications at 200 in covering the entire camp would be conservative, as mining men declare they are besieged by men after leases, and at this time it is predicted that the reduced treatment rates will result in an ore tonnage increase of at least 10 per cent. before the expiration of 30 days.

Cripple Creek, Colo.—The output of the Cripple Creek district for September, compiled from figures given out by mill managers, was 68,570 tons, with a gross bullion value of $1,314,838.50, being a slight increase in money value over August, with a decrease of 230 tons handled. The figures follow:

Mill.	Tonnage.	Av. value.	Total.
New Portland	8,650	$ 3.55	$ 30,718.50
Wild Horse	1,000	3.00	3,000.00
Stratton's Independence ..	7,800	3.60	31,040.00
Smelters	4,120	65.00	267,800.00
Portland	9,000	20.00	180,000.00
Golden Cycle	25,600	30.15	515,840.00
U. S. P. & R. Co.	12,400	23.10	286,440.00
Totals	68,570		$1,314,838.50

Danville, Ill., Oct. 6.—One hundred and fifty men were entombed in the Hartshorn coal mine, which took fire near this city to-day. All of the miners were taken out safely. The fire is confined to the lower levels and the managers say there is no danger.

New York, Oct. 1.—Returns of copper exports to Europe in September show that sales of the metal abroad the present month were the largest in more than a year. Not including the shipments made yesterday, exports of the month have totalled 31,630 tons, which compares with 27,976 tons in August and 22,875 tons in July. Not since the summer of 1909 have any one month's exports been equal to those of September.

The present month's large total was the result of the buying movement which gathered considerable headway in August, when it was announced that production of the metal was to be curtailed. Since that movement came to a stop, the copper market has been very quiet.

SOUTH AMERICA.

Colombia.—The American Vice-Consul at Barranquilla reports that the discovery of petroleum by a Canadian company near the town of Tubara, Colombia, has led the company to take steps to prospect extensively for the fluid. A large quantity

of American equipment has been ordered and operations are to be commenced almost immediately.

AUSTRALIA.

The discovery of gold in payable quantities in Australia dates back to 1851. From that year to the end of 1908 gold was raised to the value of £501,474,770. Silver was discovered in Australia as early as 1839, but was not worked until 1864. The mineral mined to the end of 1908 was, in conjunction with lead, valued at £57,993,423. The total mineral production of the Commonwealth to the end of 1908 was valued at £714,903,750. The total is made up as follows: Gold, £501,474,770, silver and lead, £57,993,423; copper, £51,863,038; tin, £26,749,012; coal, £63,454,277; other minerals, £13,369,230. Queensland's contributions to those figures were: Gold, £68,277,156; silver and lead, £1,753,314; copper, £6,313,083; tin, £6,959,156; coal, £4,121,425; other minerals, £1,276,262.

GREAT BRITAIN.

The Cambrian Colliery Combine men, who number 12,000, decided to go out on strike on Sept. 19th.

This decision is directly opposed to Saturday's conference at Cardiff, at which it was decided to take a ballot of all South Wales miners as to whether there should be a general stoppage in sympathy with the Cambrian men or whether the latter should be supported by a levy. Those who represented the Cambrian men at the conference undertook that they should continue at work pending the taking of the ballot. In deciding to cease work the men have flouted those who represented them and gone contrary to the advice of their leaders.

It is feared that the owners may retaliate by locking out the whole of the men in the South Wales coalfield. The owners see indications of a general stoppage in the not distant future, and are believed to prefer to enter upon the fight at once—if there is to be a fight—rather than await the convenience of the miners' leaders. Hence it is feared they may seize the opportunity that the action of the Cambrian men seems to offer of calling a general lock-out.

WEST AFRICA.

The West African Chamber of Mines states that the gold yield of the colony for August was 13,921 ounces, valued at £57,713, a decrease of 1,643 ounces, or £838, compared with the preceding month.

SOUTH AFRICA.

A cablegram from Johannesburg states that during August the mines of the Witwatersrand (that is, excluding outside mines) crushed 1,834,105 tons. The average yield per ton was 28s. 3d., the working costs per ton were 17s. 8d., while the profit per ton was 10s. 6d., and the aggregate profit £961,304. Compared with July, 19,419 tons more were crushed, the daily average tonnage being 59,164 in August, as compared with 58,538 in the previous month.

The Simmer and Jack report for the year ended 30th June shows a profit of £584,700. The shortage of labour during the year necessitated the use of extra drills, and that has been the chief factor in the reduction of the grade of ore, together with the inclusion of ore from poorer stopes hitherto neglected. The total ore reserve estimates are now given as 2,690,000 tons, assaying 6.3 dwts. The filling of old stopes with waste sands is now being carried out, permitting of the recovery of pillars of ore previously left in the mine as supports. This system increases the amount of pay reef extractable and will improve the total profit per claim area.

Developments upon the Modderfontein mine show an aggregate of 2,582,000 tons, averaging 7 dwts., being an increase during the year of 1,000,000 tons and an improvement of 1 dwt. per ton in the value. These figures and facts are unique in the history of mining on the Rand. Further capital expenditure on plant and development will enable the handling of 52,500 tons monthly by January next. The new central vertical shaft is to be built on the circular plan to a depth of 2,000 feet. The consulting engineers estimate that by means of the new shaft 8,250,000 tons of ore can be developed by June, 1913, at a very low cost. The new battery, in course of erection, will increase the crushing capacity by an additional 39,000 tons per month. It is estimated that from June next a dividend of a sovereign per share will be distributed.

SPAIN.

Private telegraphic advices have been received in Glasgow to the effect that the mining strike at Bilbao has been settled through the intervention of the Spanish Government. The men are to resume work. The news created considerable comment both in the iron trade and in shipping circles. The reserve ore stocks of hematite makers are nearing exhaustion, and it is anticipated that there will be considerable pressure to get forward cargoes. It will probably be some months before production on a normal scale can be resumed.

HOLLAND.

The contest between the Standard Oil and the Royal Dutch Petroleum Companies is, according to an Amsterdam dispatch to "L'Information," of Paris, becoming more and more acute. Recently the Royal Dutch Company put down the price of benzine from 16 to 12 cents a litre, but now the Societe des Automates, subsidiary of the Standard Oil Company, of New Jersey, is offering best quality motor essence for 10 cents the litre and is inviting dealers, before concluding contracts, to inquire of them as to details and conditions. The Royal Dutch Petroleum Company is now selling "sumatrine" at 10 cents and "autoline" at 12 cents.

AUSTRIA.

A Vienna dispatch to the "Kolnische Zeitung" announces that the Vacuum Oil Company, which is the Austrian subsidiary of the Standard Oil Company, has in many cases informed its customers that, in consequence of the measures adopted against the company by the authorities, it is unable to carry out the deliveries of benzine in accordance with the existing contracts. The customers, therefore, placed the matter before the Chambers of Commerce, which, in turn, forwarded the complaints to the Government. An order has now been issued by the Government recommending the customers to take legal proceedings, as the Vacuum Oil Company has not suspended working, but has sought, it is declared, under the pretext of "force majeure," to withdraw from its obligations of delivery under unfavourable contracts. It is added, for the rest, that the union of refineries is prepared to accept such contracts.

COMPANY NOTES.

VAN ROI MINING COMPANY, LIMITED

The following statement has been issued by the shareholders of the above company from the London office:

The recent satisfactory developments on the vein parallel to and south of the main lode, now known as the Beryl vein, have decided the board to at once proceed with the erection of the new mill on the Mountain Boomer site. This vein has now been opened up on No. 4 level for a length of 360 feet with the following results:

Average width, 4 feet 2 inches; average assay, silver 16.68 ounces, lead 6.5 per cent, zinc 11.8 per cent.

A drift is also being run on No. 3 level, but has not yet reached the point where it is expected to encounter the ore shoot.

The lease of the Wakefield mill having terminated on the 15th of August, possession was accordingly given up on that date and the work of moving the aerial tram to the Mountain Bloomer end of the mine was commenced. Foundations for the new mill are already completed and the flume work finished. Construction of the mill house will be commenced early this month, as soon as the bunk house to accommodate the men is ready. From the 15th of August all stoping ceased the only work taking place in the mine was the necessary development for preparing the Beryl vein for future stoping. The amount of work necessary is approximately:

240 feet crosscutting on Level No. 5.

80 feet raising from Level No. 5 to Level No. 4.

225 feet raising from Level No. 4 to Level No. 3.

80 feet of drifting on Level No. 3.

Contracts have been let for this work at satisfactory prices.

It is expected that the new mill will be in operation about the beginning of January.

The following cable has been received from the company's managers at Rossland:

Mill report to August 15th: Total amount crushed, 1,226 tons, assaying 12.6 ounces silver, 3.4 per cent. lead, 6.1 per cent. zinc—yielding 65 tons lead concentrates, assaying 141.9 ounces silver, 64.3 per cent. lead, and 9.9 per cent. zinc; and 70 tons zinc concentrates, assaying 41.5 ounces silver, 1.7 per cent. lead and 43.8 per cent. zinc. Total approximate value, $6,925 (£1,428). Mill ran 264 hours.

Estimated expenditure for the month of August: On development, $6,121; on ore production, $1,093; on milling, $1,688; total, $8,902 (£1,835).

Beryl Vein: No. 4 Level—Advanced westwards 35 feet. Raised No. 4 Level to No. 3 Level 51 feet, of which last 30 feet assayed 12 ounces silver, 7⅜ per cent. lead, 14 per cent. zinc, over 2⅝ ft.

No. 3 Level: Advanced westwards 102 feet.

CHAMBERS-FERLAND.

A statement of the Chambers-Ferland Company's affairs, as of August 31st, 1910, shows the assets now represent about $131,000 in cash and bills receivable, and upwards of $70,000 in estimated ore reserves, or nearly the present market valuation of the stock, without taking the property into consideration. The statement is as follows:

Cash on hand	$106,456.19
Bills and accounts receivable	8,458.96
Ore in transit and smelters	16,698.95
Ore on hand	5,621.00
Accounts payable	6,264.56

The ore reserves are estimated at 146,700 ounces.

GRANBY.

At the annual meeting of Granby Consolidated on October 4th, J. B. F. Herreshof, G. W. Wooster, Wm. Hamlin, E. R. Nichols and Northrup Fowler were elected directors to succeed Crawford Clark, jr., J. Langeloth, H. L. Higginson and Payne Whitney resigned.

Mr. Langeloth was president of the company and the largest individual stockholder.

It was voted to request the directors to issue a report every six months on general business conditions and affairs of the company.

BRITISH COLUMBIA COPPER COMPANY.

The British Columbia Copper Company is in good condition, according to late returns. There is in the treasury $250,000, which includes amount due for copper delivered.

The British Columbia Copper Company has ores running high in both gold and silver, particularly the former, from which there is a standard income of $20 an ounce. This ore comes largely from the Jack Pot, the company's new shipper in Wellington camp. This has enabled the company to produce its copper and lay it down in New York ready for sale—notwithstanding the railroad haul across the continent—in the neighbourhood of seven cents a pound, a record which many producers of the continent have not yet attained.

Now that one of the furnaces at the company's reduction works has been enlarged the smelter has increased and will be able to treat about 2,000 tons of ore daily.

The company's August operations resulted in a net revenue of $32,500. These profits compare with $11,918 in July and $7,121 in June. After crediting gold and silver values it cost the company 7.7 cents a pound to produce its copper in August, with only two furnaces in operation.

The production during the previous seven months was as follows:

	Copper (lbs.)	Gold (ozs.)	Silver (ozs.)
January	656,473	2,513	7,530
February	683,234	2,500	7,627
March	891,419	2,623	9,191
April	340,061	125	3,611
May	.....	.....	.....
June	417,040	1,550	5,221
July	574,172	1,960	6,623

STATISTICS AND RETURNS

NOVA SCOTIA STEEL AND COAL.

The statement of the Nova Scotia Steel & Coal Company for September, just issued, shows an output of 55,100 tons of ore, 7,387 tons of coal, 7,220 tons of pig iron, 6,830 tons of steel, while the company shipped 90,000 tons of coal.

COBALT ORE SHIPMENTS.

The ore shipments from Cobalt camp for the week ended October 1st were comparatively large, aggregating 1,387,258 pounds, or 668 tons. Kerr Lake, which made no shipments the previous week or two, heads the list with 420,000 pounds. The total shipments aggregate 47,197,530 pounds, or 23,859 tons.

Shipments for the week and year, in pounds of ore, are:

	Week ended Oct. 1. Ore in lbs.	Year. Ore in lbs.
Beaver	45,600	226,617
Buffalo	60,990	1,783,738
City of Cobalt	66,000	548,875
Chambers-Ferland	.....	1,341,100
Cobalt Central	64,049	562,237
Cobalt Lake	.....	260,000
Cobalt Townsite	.....	366,840
Colonial	.....	193,480
Coniagas	.....	1,363,968
Crown Reserve	65,000	5,059,160
Drummond	.....	664,200
Hargraves	.....	401,170
Hudson Bay	.....	417,925
Kerr Lake	420,999	7,546,714
King Edward	.....	263,460
La Rose	172,620	8,662,001
McKinley-Darragh	150,000	2,944,969
Nipissing	187,270	9,342,907
O'Brien	.....	928,416

Peterson Lake		432,320
Provincial		65,000
Right of Way	82,330	1,311,567
Rochester		60,750
Silver Cliff		268,720
Temiskaming	122,400	1,771,480
Trethewey		808,520
Waldman		63,992
Wyandoh		48,300

Following are the shipments from the Cobalt camp for the week ending October 8th, and those from January 1st, 1910, to date:

	Oct. 8. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver		226,217
Buffalo	56,100	1,839,738
City of Cobalt		548,875
Chambers-Ferland	58,800	1,399,900
Cobalt Central		293,286
Cobalt Lake		260,900
Cobalt Townsite	88,000	454,840
Colonial		193,480
Coniagas	138,300	1,502,266
Crown Reserve	58,740	5,117,900
Drummond		664,200
Hargraves		401,170
Hudson Bay		417,925
Kerr Lake	303,280	7,849,994
King Edward		263,406
La Rose	238,530	8,900,531
McKinley-Darargh	108,820	3,053,789
Nipissing	440,780	9,783,687
O'Brien	58,800	987,216
Peterson Lake		432,420
Provincial		65,000
Right of Way		1,331,567
Rochester		60,750
Silver Cliff		268,720
Standard Cobalt		258,951
Temiskaming		1,771,480
Trethewey		808,580
Waldman		63,992
Wyandoh		48,300

Ore shipments for the week ending October 8th were 1,550,150 pounds, or 775 tons.

Total shipments from January 1st to October 8th were 49,269,080 pounds, or 24,634 tons.

PIG IRON PRODUCTION.

According to "The Iron Age," pig iron production in September amounted to 2,054,175 tons, or 68,470 tons a day, an increase of about 50 tons a day over the August rate. Production of all kinds of pig iron is now at the rate of about 24,900,000 tons a year. The United States Steel Corporation has 45 blast furnaces idle and its capacity active is 67.82 per cent., there being practically no change in three weeks. The September bookings in wire products were greater than for any previous September, save one. Specifications and new contracts exceeded those for August. The foundry iron market is uninteresting. Large buying for 1911 is still deferred and the shadow of lower prices for ore in 1911 has now been thrown across the situation.

BRITISH COLUMBIA ORE SHIPMENTS

The Bluebird mine of Rossland and the Hewitt mine of Silverton have both entered this year's shipping list the past week, the former with a shipment of 25 tons, and the latter with a shipment of 22 tons. Both mines have been doing active development work. The Bluebird was a prominent shipper last year, its ore being gold-copper-silver. The Hewitt is in the dry ore belt. The Fern mine makes its second shipment of the year.

The following are the returns of the ore production and movement for the past week, ended October 1st:

Boundary Shipments.

Granby	14,305	871,135
Mother Lode	6,300	258,587
Snowshoe	2,363	114,696
Jack Pot	383	9,457
Other mines		11,923
Total	23,351	1,265,798

Rossland Shipments.

Centre Star	3,072	144,025
LeRoi No. 2	270	23,971
LeRoi No. 2, milled	300	11,700
Bluebird	25	25
Other mines		12,681
Total	3,667	192,402

Slocan-Kootenay Shipments.

Greenwood, B.C.

St. Eugene, milled	2,775	108,225
Van Roi, milled	800	31,200
Queen	420	16,380
Granite-Poorman	250	9,750
Nugget, milled	110	4,290
Highland, milled	450	6,700
Wilcox, milled	75	450
Richmond-Eureka	97	3,257
Standard	68	1,222
Fern	12	39
Emerald	26	1,535
Yankee Girl	32	4,040
Eastmont	35	587
Sullivan	1,065	14,277
Ruth	36	458
Idaho	30	71
Slocan Star	33	88
Hewitt	22	22
Other mines		32,624
Total	6,336	235,215

The total shipments for the week, including the estimated amount milled, were 33,354 tons, and for the year to date, 1,693,415 tons.

B. C. Copper Company's Receipts.

Greenwood, B.C.

Mother Lode	6,300	258,587
Jack Pot	383	9,457
Other mines		11,739
Total	6,683	279,783

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	14,305	871,135
Other mines		120
Total	14,305	871,255

Consolidated Company's Receipts.

Trail, B.C.

St. Eugene, concentrates	178	11,551
Van Roi, concentrates	31	944
LeRoi No. 2, pt. concentrates	270	23,971
Queen, concentrates	38	585
Centre Star	3,072	144,025
Snowshoe	2,363	114,696
Richmond-Eureka	97	3,257
Standard	68	1,222
Fern	12	39
Emerald	26	1,535
Yankee Girl	32	4,040
Eastmont	35	587

Bluebird	25	25
Sullivan	1,065	14,277
Ruth	36	458
Idaho	30	71
Slocan Star	33	88
Hewitt	22	22
Other mines	.....	30,075
Total	7,433	351,413

The total receipts at the smelters, including concentrates, were, for the week, 28,481 tons, and for the year to date, 1,502,451 tons.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—October 10th, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	15
Dominion Coal Company	63	..
Dominion Steel Company	63	..
Nova Scotia Steel	..	83
Granby	30½	31
Consolidated Smelting	60	65
Crow's Nest Pass	..	80¼
Dominion Steel & Coal Corporation	..	61¾
Black Lake Asbestos	18½	..

New York Curb.—October 10th, 1910.

Boston Copper	17	19
British Columbia Copper	7	7⅛
Butte Coalition	12	12¾
Canadian Mines	6¼	6½
Chino Copper	19⅜	19½
Davis-Daly Copper	2	2⅛
Ely Consolidated	.28	.32
Giroux Mining	7¼	7⅜
Goldfield Consol.	7⅞	8⅛
Greene-Canadian	7⅜	7½
Harcuvar Copper	10	15
Inspiration Copper	9⅜	9½
Miami Copper	19½	19¾
New Baltic Copper	4	8
Nevada Con. Copper	20¼	20⅜
Ohio Copper	1¾	1 13/16
Rawhide Coalition	.05½	.06
Ray Central	1 15/16	2
Ray Consolidated	19	19⅛
Union Mines	15/16	1 1/16
Yukon Gold	3 15/16	4 1/16

Cobalt Stocks.—October 10th, 1910.

Amalgamated	.02	.03
Bailey	.07½	.07⅝
Beaver Consolidated	.33	.33¼
Big Six	.01	.06
Buffalo	2.00	2.05
Chambers-Ferland	.16⅝	.16⅞
City of Cobalt	.25⅜	.26
Cobalt Central	.07	.08
Cobalt Lake	.15¾	.16½
Coniagas	4.20	4.50
Crown Reserve	2.65	2.68
Foster	.08	.11
Gifford	.07	.09
Great Northern	.08¾	.08⅞
Green Meehan	.02⅝	.02⅞
Hargraves	.32½	.33
Hudson Bay	90.00	105.00
John Black	.04	.06½
Kerr Lake	6.55	6.65
La Rose	3.85	3.95
Little Nipissing	.27⅛	.27¼
McKinley	1.01	1.02
Nancy Helen	.03	.04¾
Nipissing	10.50	10.65
Nova Scotia	.25¼	.26
Ophir	.28	.32
Otisse	.02	.02⅝
Peterson Lake	.24¾	.25
Right of Way	.32⅝	.33
Rochester	.15	.16
Silver Leaf	.05	.06½
Silver Bar	.02	.06
Silver Queen	.03	.08
Temiskaming	.85	.86
Trethewey	1.24½	1.26
Watts	.02	.10
Wettlaufer	.65	.66

SILVER PRICES.

		New York cents.	London pence.
September	24	53¾	24 13/16
"	26	53¾	24 13/16
"	27	53⅞	24⅞
"	28	53¾	24¾
"	29	53⅞	24 13/16
"	30	54	24⅞
October	1	54⅛	24 15-16
"	3	53⅞	24⅞
"	4	53¾	24 13/16
"	5	53⅞	24⅞
"	6	54⅛	24 15-16

TORONTO MARKETS.

October 11.—(Quotations from Canada Metal Co., Toronto.)

Spelter, 6 cents per pound.
Lead, 3.65 cents per pound.
Antimony, 8 to 8½ cents per pound
Tin, 38 cents per pound.
Copper, casting, 13.25 cents per pound.
Electrolytic, 13.25 cents per pound.
Ingot brass, 8½ to 12½ cents per pound.

Oct. 10.—Pig Iron (Quotations from Drummond-McCall Co., Toronto)..

Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.50 (f.o.b. Toronto).
Hamilton No. 1, $20.00 (f.o.b. Hamilton).
Hamilton No. 2, $19.50 (f.o.b. Hamilton).
Clarence, $20.00 (f.o.b. Toronto).
Cleveland, $20.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1 1-4-inch lump.

COKE.

Oct. 6.—Connellsville Coke (f.o.b. ovens).

Furnace coke, prompt, $1.60 to $1.65 per ton.
Foundry coke, prompt, $2.10 to $2.25 per ton.

Oct. 6.—Tin (Straits), 36 to 36.75 cents.

Copper, Prime Lake, 12.75 to 12.87 1-2 cents.
Electrolytic copper, 12.65 to 12.75 cents.
Copper wire, 14 cents.
Lead, 4.47½ cents.
Spelter, 5.62 1-2 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.15 cents.
Aluminium, 22 to 22.50 cents.
Nickel, 40 to 47 cents.
Platinum, ordinary, $35.50 per ounce.
Platinum, hard, $37.50 per ounce.
Bismuth, $1.95 per pound.
Quicksilver, $46 per 75-lb. flask.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto



ON TIME

One of the most important business transactions which sensible minded men should perform on time is that of making proper provision for those who are dependent on them for the necessities of life.

The only way to do this is by means of life insurance. The only way to do it on time is to act now while in health. The most satisfactory way is to insure at once in the

North American Life

ASSURANCE COMPANY

"Solid as the Continent"

HEAD OFFICE, - - TORONTO

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent
Board of Trade Bldg.
Montreal

J. S. CARTER, Gen. Agent,
450 Main St.
Winnipeg, Man.

I. E. SUCKLING, Gen. Agent,
S. E. Corner King & Yonge Sts.,
Toronto, Ont.

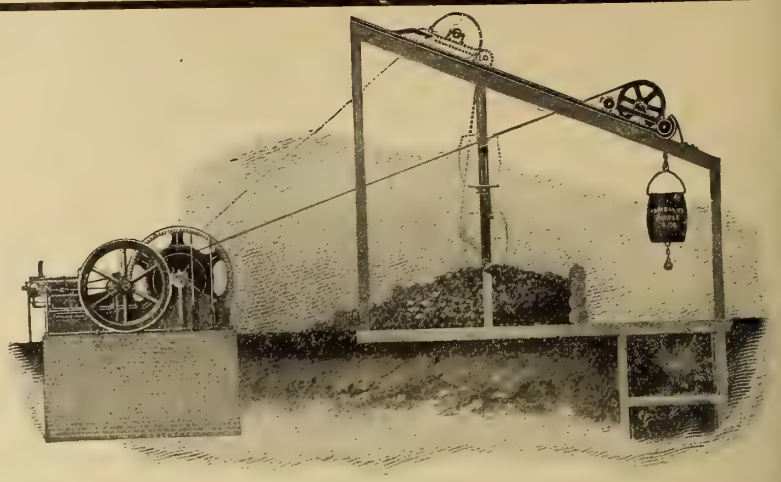
Fairbanks-Morse Automatic Ore Dumps

—FOR—

Rapid and Economical Handling of Ore

Your elevating and conveying charges can be reduced — your tonnage output increased—your profits enlarged—by the use of one of our Automatic Ore Dumps.

The Fairbanks-Morse Dump as Illustrated will handle any ore or other similar material Rapidly and Economically It is inexpensive to operate as the one operator at the hoist raises, dumps and lowers the bucket automatically.



They are Operated By Fairbanks-Morse Gasoline Hoisting Engines

All you have to furnish is timber for the frames, all iron work, bolts, nuts etc. are furnished complete. Working drawings furnished.

What We Can Supply For The Mine

Nissen Stamp Mills, complete Crushing and screening Plants, Gates Gyratory Rock and Ore Breakers, Jaw Rock Crushers, Prospector's Outfits, (Portable), Dimmick Classifiers, Rock Drills and Mining Tools, Sinclair Drill Sharpeners, Steam Pumps, Valves, Fittings, etc. Steel Ore Cars.

The Canadian Fairbanks Co., Limited

Fairbanks Scales—Fairbanks-Morse Gas Engines—Safes and Vaults.

Montreal, Toronto, St. John, N.B. Winnipeg, Saskatoon, Calgary, Vancouver

CONSTANT-HERZIG COMPANY

SUCCESSOR TO

C. L. CONSTANT COMPANY

MINING ENGINEERS AND MINE MANAGERS

ASSAYERS AND ANALYSTS

42 NEW STREET, - NEW YORK

Ore Shipments

We take personal charge of your shipments to the Atlantic Seaboard, attend to the weighing, sampling, assaying and all other details

We have been successful because we furnish our clients with returns quicker than our competitors.

Consign your shipments to us and rest assured you will get the maximum returns.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

Want Advt.

Mining Engineer, technical graduate wants position with Coal Co. in Western Canada. Experienced Surveyor, Assayer and Draftsman. Unmarried, age 26. Low initial salary, no objection if chances are good.

Address, Box 653,
Oshawa, Ont.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HITCHCOCK, C. H.
MINING ENGINEER
for LONGYEAR & HODGE
Box K, Sudbury

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

LORING, FRANK C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

LECKIE, J. EDWARDS
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

LONGYEAR & HODGE
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

RALPH A. MEYERS, E.M., B. SC.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

MAGEE, BOYD
Consulting Mining Engineer
HAILEYBURY AND TORONTO

MILES, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc., and any work connected with the mining profession.

PERKINS, FRANK CLINTON
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

ALEXANDER H. SMITH
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

SCOTT, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

SMITH, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

SPENCER, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

SUTCLIFFE & NEELANDS,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

WALTER E. SEGSWORTH
Mining Engineer
108 BAY ST. TORONTO
PHONE MAIN 2311

TYRRELL, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

WILLMOTT, A. B., M. A., B. SC.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

WEBB R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

WOOLSEY, W. J.
Mining Engineer
THETFORD MINES, QUE.

SURVEY OF MINING CLAIMS TOWNSITES, TOWN LOTS, ETC.
MINE SURVEYING MUNICIPAL ENGINEERING
CODE & CODE
Ontario Land Surveyors and Civil Engineers
OFFICES: COBALT AND GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

JOHN, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

CAREY, ELMER ELLSWORTH,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

BROWN, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - COBALT, ONT.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office; McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

S. F. KAVANAGH
Assayer
Minning Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors. Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
404 Lumsden Bldg, TORONTO.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

FLAHERTY, R. H.
Examines and reports on Iron Lands.
Object: Purchase or Lease.
General assaying and ore testing laboratory in charge of W. W. Benner.
Port Arthur, Ontario

G. W. DIXON,
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

T. H. CRABTREE
Member of Canadian Mining Institute
DEALER IN ASBESTOS
Inspector of Shipments for Foreign or Home buyers.
Twenty years actual work amongst the asbestos mines of Quebec, ten years as manager.
Will examine and report on asbestos properties. Plans and specifications made for asbestos fibreizing mills.
BLACK LAKE
Cable address "Crabtree" Black Lake
A. B. C. code 4th edition

FOR SALE

Two Locomotive Type Boilers of about 125 horse-power; weighing 31,000 lbs. each; for prompt delivery; will be sold at a bargain.

ADDRESS—
THE CANADIAN LOCOMOTIVE CO., LTD.
KINGSTON, ONT.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific. profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward applicat'on of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology* as *applied to practical mining*. It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary. School of Mining, Kingston, ∴ ∴ ∴ Ontario

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL
The Canadian Copper Company

Nickel for Nickel Steel
The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

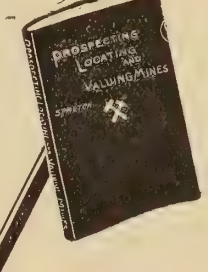


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,
TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co.....vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D.,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, C. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd., Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,
John McDougall Caledonian Iron Works Co., Ltd.

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,
John McDougall Caledonian Iron Works Co., Ltd.

Condensers—
John McDougall Caledonian Iron Works Co., Ltd.
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
John McDougall Caledonian Iron Works Co., Ltd.
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
John McDougall Caledonian Iron Works Co., Ltd.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
John McDougall Caledonian Iron Works Co., Ltd.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

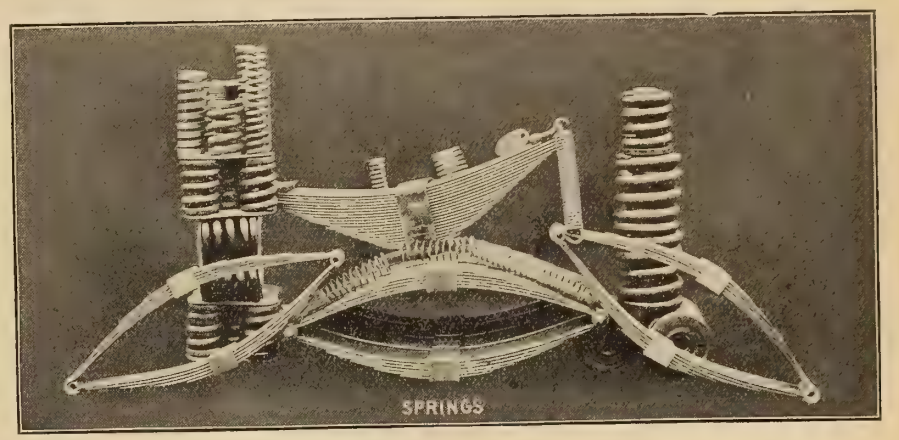
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

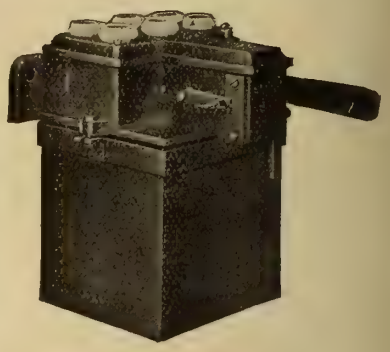
MONCTON, N.B.

Westinghouse

Type "H" Oil Circuit Breakers

Made in Two, Three and Four Pole Styles.

Although specially designed for industrial, mining and general motor applications being placed in any position convenient to the motor, they are also adapted to switchboard mountine. Type "H" Breakers can be used on both alternating and direct current circuits, and have a maximum capacity of 100 amperes at 500 volts. Their calibration range is from 80 to 160 per cent. of rated carrying capacity. While automatic in action it can be tripped by hand by means of a small lever on the side of the case.



Write for Circular 1096

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.

Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. It **does not freeze**, or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appear ance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

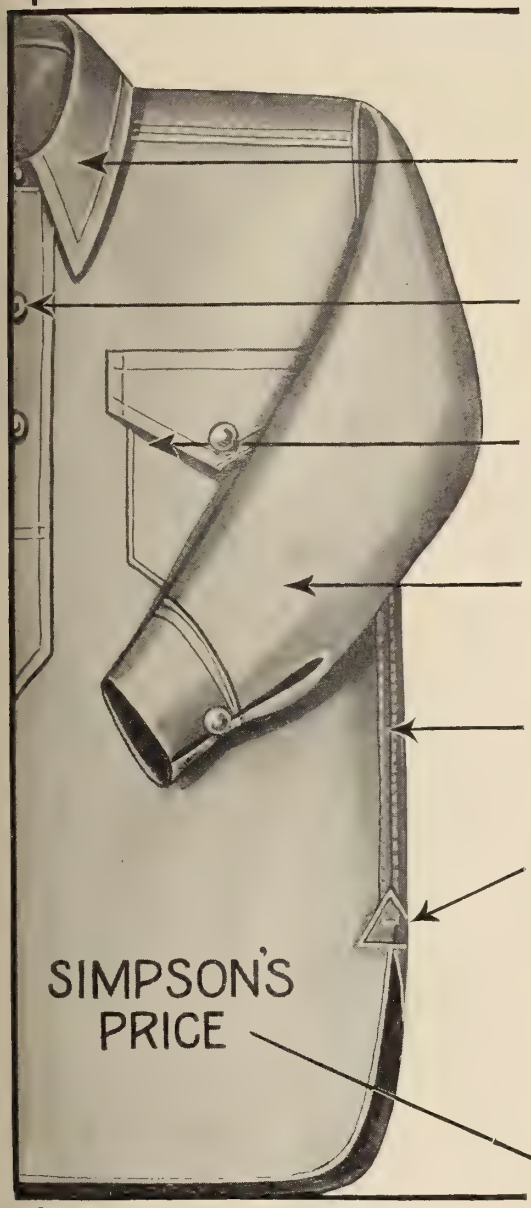
PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

KHAKI DUCK SHIRT

For Miners, Lumbermen, Prospectors, Surveyors



MADE THE SIMPSON WAY

NOTE THE DIFFERENCE FROM THE ORDINARY WAY:—

COLLAR will fit neatly, all ways, all the time. Is well interlined to retain its shape. Steels inserted to prevent curling points.

DOME FASTENERS of brass used throughout. No buttons to come off. No occasion to swear. A feature that will be appreciated by every man.

POCKET Two pockets, one on each side, with dome fastened flap. A splendid idea. Plenty of *pocket space* is a Simpson improvement.

SLEEVES are made large. Plenty of elbow room. Inter-lined wrist-band, dome-fastened. One of the strong points not to be overlooked, viz.—roomy sleeves.

DOUBLE STITCHED seams throughout, with extra strong thread insuring strong wear. This Simpson shirt is made stronger to wear where the most wear comes.

GUSSETS are made strong and double stitched, adding extra strength. You can be absolutely sure the seams will not rip at this point.

FABRIC extra heavy khaki duck. Wind-proof and shower-proof. Will stand the hardest kind of wear. Try it. Almost indestructible.

KG522 IS THE ORDER NUMBER
Sizes 14½ to 18

$1.00

THE POSTAGE IS 20c EACH
Order at Once

A SHIRT OF EQUAL VALUE WOULD SELL IN MOST STORES AT FROM $1.50 to $2.00

THE ROBERT SIMPSON COMPANY LIMITED

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

VOL. 31 TORONTO No. 21

WHITE JACKET FUSE

Made By Bickford Smith & Co.



Is known as the most reliable fuse the world over.

Don't use inferior brands when you can buy the very best made and not pay more.

White Jacket Fuse stands all tests better than any other fuse:-

24 hours immersion in water.
Rapid changes of climate and temperature.
Burning speed very regular.
Very tough and stands rough handling.

If you have not already used it let us send you samples for a trial.

We carry White Jacket Fuse at all our warehouses and can fill your wants promptly.

MUSSENS LIMITED

MONTREAL, 318 St. James St. | **TORONTO,** 73 Victoria St. | **COBALT,** opp. Right of Way Mine | **WINNIPEG,** 259-261 Stanley St. | **CALGARY,** Crown Bldg. | **VANCOUVER** Mercantile Bldg.

LIDGERWOOD CABLEWAYS

FOR

MINES AND QUARRIES



Cableway in Quarries, Amherst, N.S.
The Rock Plaster Mnfg. Co. of New York
Span 550 Feet; Load 3 Tons

This cableway which is electrically operated and has travelling towers takes the rock from the quarry and delivers it either to the storage pile or into a hopper over the cars, or from the storage pile to the cars. The skip is self-dumping and all operations are controlled by the cable-way operator.

For further particulars apply to

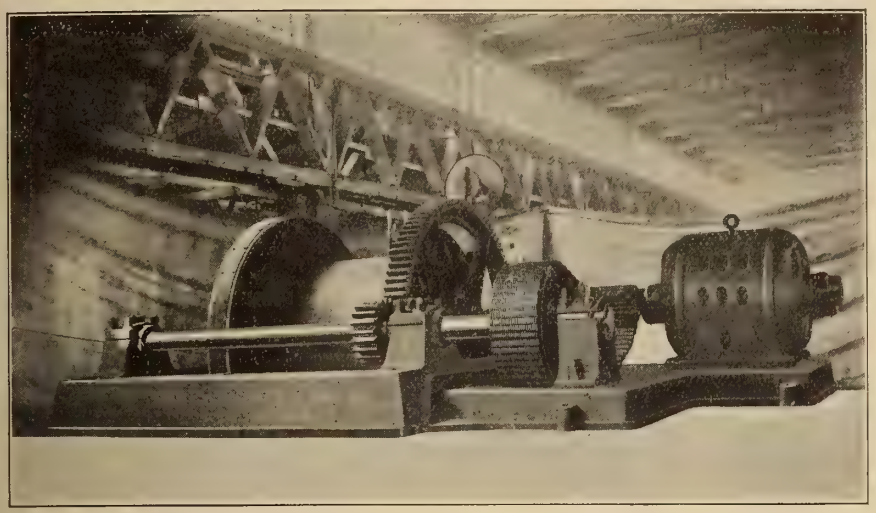
EXCLUSIVE AGENTS IN CANADA

ALLIS-CHALMERS-BULLOCK
LIMITED

WORKS - - - MONTREAL

OFFICES: MONTREAL TORONTO COBALT WINNIPEG CALGARY VANCOUVER

Renold Patent Silent Chains



A Renold Silent Chain driving a mine hoist from a 150 h.p. motor. Centres 6'.

No Vibration

No Breakdowns

No Bother

Write for particulars

JONES & GLASSCO

Sole Canadian Agents **MONTREAL**

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

SPEED

A single motion is quicker to make than two.

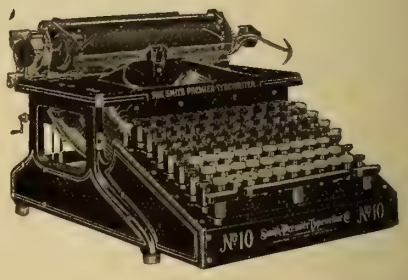
Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of the

easy action
light running **Model 10**

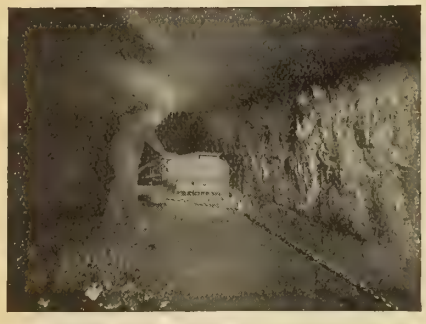
Smith Premier

The Smiih Premier Typewriter Company, Inc.
Syracuse, N. Y.

Canadian Representatives:
National Typewriter Co.,
87 Victoria St., Toronto
Wm. H. Hall & Co. 221 Notre Dame St. W., Montreal
E. R. McNeill,
166 Sparks St., Ottawa
A. Milne Fraser,
1157 Holis St., Halifax, N.S.



There's a Sullivan Coal Cutter,



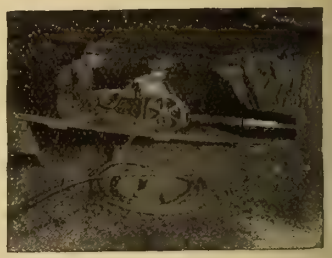
Continuous Coal Cutters. Bulletin 663-C.



Longwall Air Machine.

Exactly suited to mine YOUR coal with the greatest speed and at the lowest cost.

The Sullivan Machinery Company is the "sole manufacturer" which can recommend to you, without bias, the type of coal cutter which your mines need for safest and most profitable operation.



Pick Machines. Catalogue 657.

There are Sullivan Pick Machines, Sullivan Room-and-Pillar Machines, "continuous" cutter pattern, Sullivan Longwall Chain Machines, air or electric, and Sullivan Shearing Machines—and you may rely on your selection as the most rapid and efficient of its particular class.

Free Catalogues Upon Request.

AIR COMPRESSORS FANS HAMMER DRILLS ROCK DRILLS
DIAMOND CORE DRILLS

SULLIVAN MACHINERY CO.

Claremont, N.H. Chicago, Ill., U.S.A. Cobalt, Ont. Nelson, B.C.

BIRMINGHAM DENVER KNOXVILLE PITTSBURG SAN FRANCISCO PARIS, FRANCE SALT LAKE BUTTE JOPLIN
NEW YORK ST. LOUIS SPOKANE SEATTLE SYDNEY, AUS. EL PASO

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg



BEST FOR MINE BUILDINGS

Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

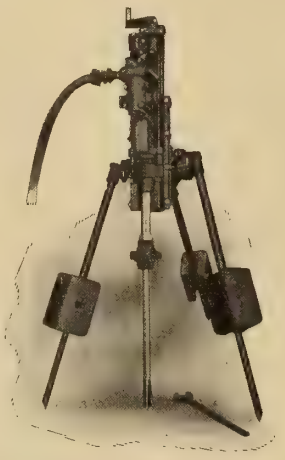
THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.

ROCK DRILL EFFICIENCY

Rock Drill Efficiency is measured by the length of time the drill stays on the job doing good work, standing up to its original capacity without breakage delays.

MATERIALS—The most carefully selected materials are used in the manufacture of **"Rand Drills."** Vital cast parts are made of high-grade open-hearth steel castings and steel parts are made of the finest steel, each selected to perform its particular function in the operation of the machine. Special treatment of steel parts insure the utmost service from each part.



WORKMANSHIP—Rand Drills are built by mechanics who are experts in their line, with years of experience and every facility and incentive for the best work, in a shop equipped with every modern convenience.

—

Can you afford to buy anything but the best—**RAND DRILLS.**

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



Price $350.00

We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

The Deister Concentrator Co., Ft. Wayne, Indiana, U.S.A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
REST, - - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

Every Branch of this Bank is able to issue, on application, Drafts on the principal points in the following countries:

Africa	France	Peru
Arabia	French Cochin-China	Philippine Islands
Argentine Republic	Germany	Portugal
Australia	Great Britain	Roumania
Austria-Hungary	Greece	Russia
Belgium	Holland	Servia
Brazil	Iceland	Siam
Bulgaria	India	Siberia
Ceylon	Ireland	Soudan
Chili	Italy	South Africa
China	Japan	Spain
Crete	Java	Straits Settlements
Cuba	Malta	Sweden
Denmark	Manchuria	Switzerland
Egypt	Mexico	Turkey
Faroe Islands	Norway	United States
Finland	Panama	Uruguay
Formosa	Persia	West Indies

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

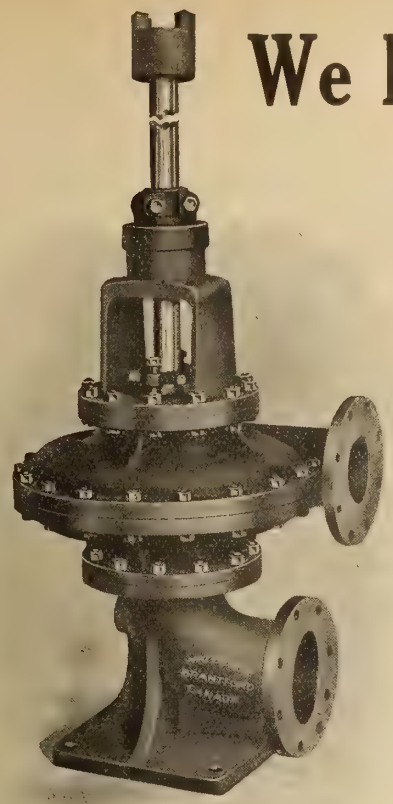
Successfully used at the following EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE



We Recommend Our Pumps For Mine Work

¶ They are simple, compact, durable and built with few parts.

¶ Anyone can operate them, they require little room, can stand the heaviest work, will not clog up and are readily over-hauled for cleaning or repairs.

¶ They are built in sizes up to 14″ discharge opening. In Vertical or Horizontal Types, for dry or wet Pit work, and can be operated with any kind of drive—Belt, Motor or Engine.

We will be glad to forward descriptive Bulletin.

The Waterous Engine Works Co.
LIMITED
BRANTFORD, CANADA

Specify Distinctly "STAG" BRAND Allen's Stag Brand



SOLID OR HOLLOW
Mining Drill Steels
All Sizes and Sections from Stock

SOLE MAKERS AND SELLERS: **EDGAR ALLEN & CO., Limited**
330 ST. JAMES ST., MONTREAL
THOS. HAMPTON, Manager for Canada

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

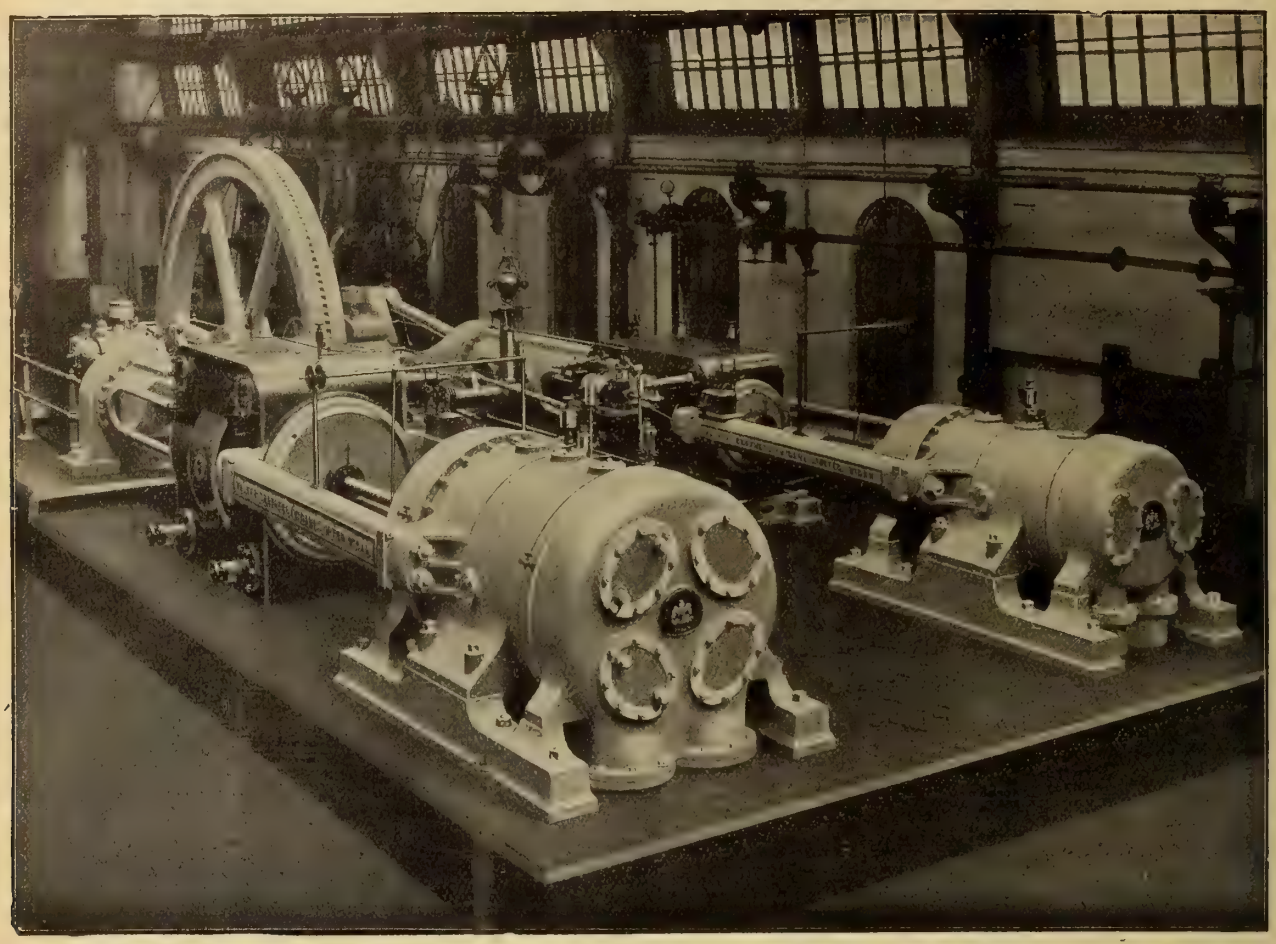
Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves Walker's Latest Patents.

AIR COMPRESSORS

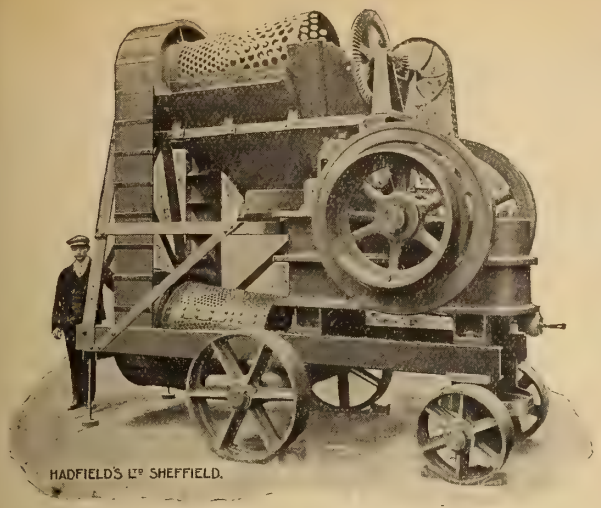
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



HADFIELD'S PORTABLE COMBINED CRUSHING, SCREENING, ELEVATING and LOADING APPARATUS

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of

COMPLETE CRUSHING PLANTS

of every description,

Embodying Hadfield's Latest Improvements

Hadfield's Patent Era Manganese Steel

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines,

ETC., Including

WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS, ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield.

PEACOCK BROS.

68 Beaver Hall Hill, - - Montreal, P.Q.

FOR

DYNAMITE, ROCK-CHIEF

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

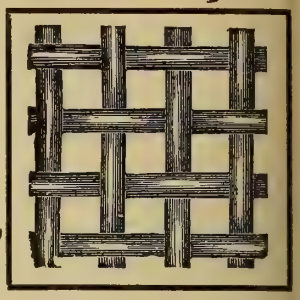
CORRESPONDENCE SOLICITED

THE BROWN MACHINE COMPANY, LIMITED

NEW GLASGOW — ENGINEERS — NOVA SCOTIA

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalogue 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

Steel Works & Head Office: **NEW GLASGOW, NOVA SCOTIA**

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK

Cobalt Electric Equipment Co. Limited.

Electrical, Mechanical
and
Constructional Engineers

Contractors for all classes Electrical Installations

Head Office, Supply Depot and Repair Department, Cobalt, Ont.

Mine Hoisting Engine

Cylinders 22 inches diameter, stroke 42 inches, about 900 horse power; double drums 8 feet diameter, 5 feet wide.

Corliss valves, steam actuated clutches and brakes. The reversing gear, throttle, brake and other levers are grouped at a central platform.

This engine was completed within the past few months and is thorougly modern. Write for drawings, specifications and photographs.

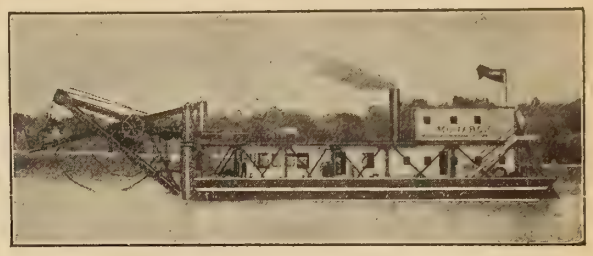
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF

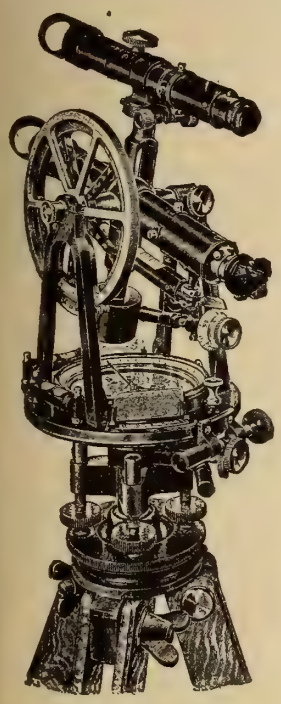


Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S
Field Instruments
FOR
Civil, Mining Engineers & Surveyors



Maufacturers Instruments of Precision

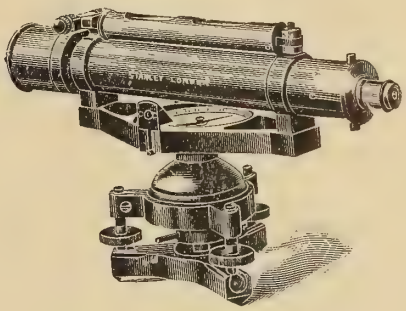
also

Engineers and Draftsmens Supplies

Eugene Dietzgen Co., Limited
TORONTO

STANLEY, LONDON

The largest manufacturers of
Surveying and Drawing Instruments
in the World.



"Stanley Quick-Setting-Up Level"

Please send for our J 65 Catalogue (post and duty free) and compare our prices with those of other first-class makers.

Trade STANLEY Mark

Stanley Underground Theodolite for Tunnelling has a hollow Axis so as to read nadir at 10 degrees through the Stand.

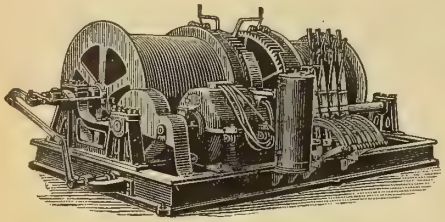
W. F. Stanley & Co., Limited
Great Turnstile, London, England

Flory Hoisting Engines

STEAM AND ELECTRIC

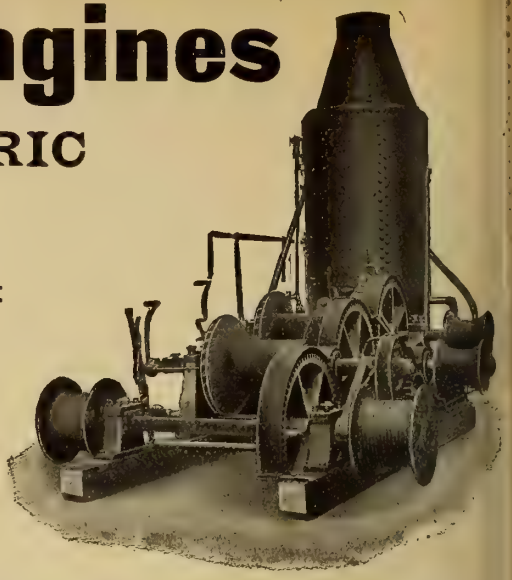
Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

ARE YOU GOING HUNTING?



There are more hunting grounds reached by the Canadian Pacific Railway than by any other line in America

SINGLE FARE FOR HUNTERS

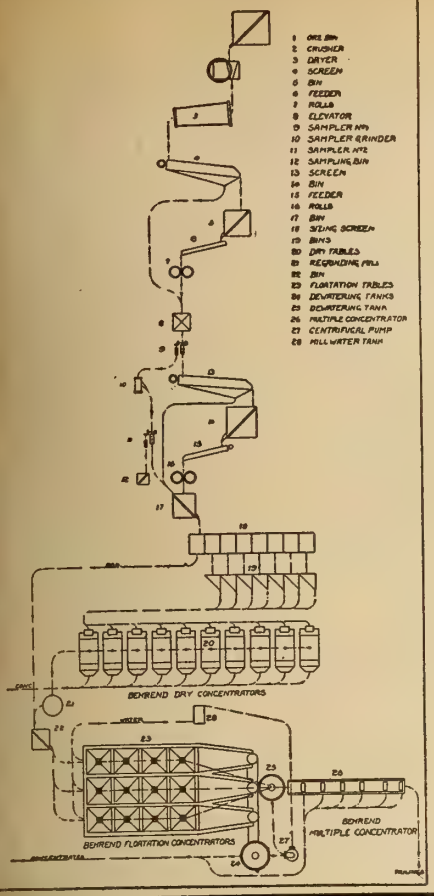
In effect October 20th to November 12th with a return limit of December 15th.

"Fishing and Shooting"
"Open Seasons—1910"
"Hints to Hunters"
"Sportsman's Map"

Handsomely illustrated publications of interest to Hunters. Ask any Agent of

Canadian Pacific Railway

R. L. THOMPSON, D.P.A. 67 Yonge St., Toronto



FLOW SHEET

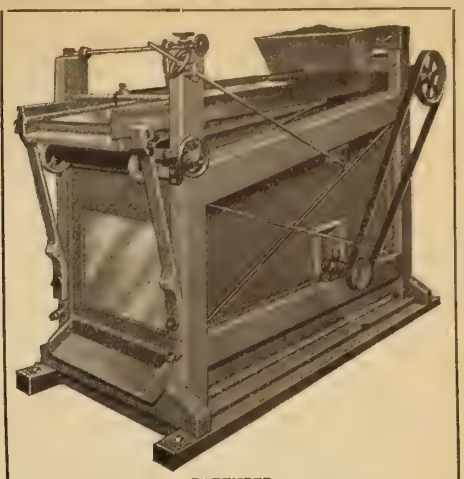
OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM

OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED

32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

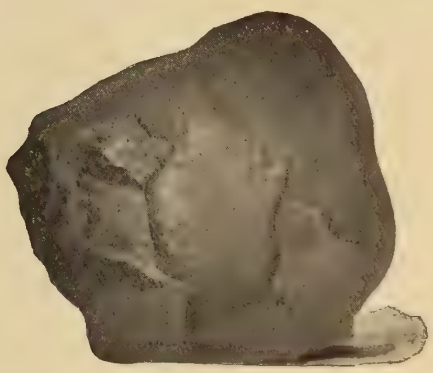
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa.	- -	314 Peoples Nat. Bank Bldg.
Duluth, Minn.	- -	710 Torrey Bldg.
Denver, Col.	- -	225 E. Maple St.

When wanting goods write nearest office.

COAL TIPPLES

COAL TIPPLE
of the
Franklin County Construction Co., Benton, Illinois.



Write for Book No. 95 — "CONVEYING MACHINERY FOR COAL MINES."

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK 299 Broadway
PITTSBURGH 1501-2 Park Building
ST. LOUIS Central Natl. Bank Bldg.
SEATTLE 439-440 N.Y. Block
DENVER Lindrooth, Shubart & Co.
NEW ORLEANS Wilmot Machinery Co.
SAN FRANCISCO Eby Machinery Co.

The Davis Handbook of the Cobalt Silver District

Illustrated with Photographs

PRICE

Paper Cover = = *$1.50*
Stiff " = = = *$2.00*

by H. P. Davis

¶ The first section of this volume is an outline on the Goelogy, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general infromation necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = **Canadian Mining Journal** = *Toronto*

A PROPER SAFETY LAMP
SHOULD BE SAFE, STRONG, SIMPLE AND EASY TO MANIPULATE IN THE LAMP CABIN —OURS FILLS THIS BILL.



"Hailwood's Improved Safety Lamp."

By means of Expensive Special Accurate Machinery we produce nothing but the very best possible lamp.

Don't continue risking your Mines with worn out unsafe old style lamps but possess an installation of our goods and follow the example of the majority of the best Colliery Concerns in existence by obtaining from us a complete installation of Oil Lamps, Electrically Ignited and Magnetically Unlocked together with Cabin Lamp Lighting and Unlocking Machines, Oil-filling Machines, Underground Fool Proof Lamp Re-lighting Machines.

ACKROYD & BEST, LTD.
MORLEY, NR. LEEDS, ENGLAND
For Prices and Particulars address:—
ACKROYD & BEST, LIMITED
No. 2 Arrott Power Buildings, Barker Place
PITTSBURGH, PA., U.S.A.

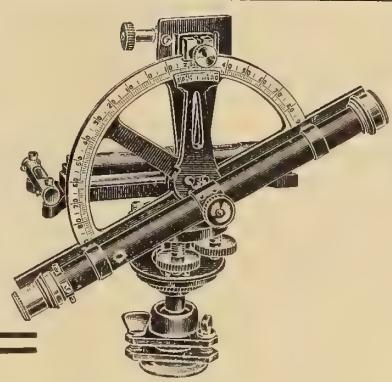
JENA
GLASSWARE
THE BEST IN THE WORLD
Sole Agents for Canada
LYMANS, Limited
(ESTABLISHED 1800)
Laboratory Apparatus and Chemicals
MONTREAL

DIAMOND DRILLS
We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.
138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY
Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Jayes' Mining Level

Specially designed for accurate levelling and for taking angles of inclination in mines. Equipped with a ball and socket motion for rapid levelling—can be levelled anywhere in 15 seconds. A great time-saver and invariably accurate. With telescope attachment or sights.

A well-built and minutely accurate instrument with advantages too numerous to explain herein

Catalogue F sent free.

Joseph Casartelli & Son
Scientific Instrument Makers
43 MARKET STREET
MANCHESER, EG.

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys, Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co., Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Beath's Steel Kegs

Beat any Shipping Package in the World. Unequalled for Shipping Concentrates, Oxides and in fact everthing requiring protection in transit.

They're **Light, Cheap and Strong.**

Write for Samples and Prices

W. D. BEATH & SON, Ltd. Toronto

The South African School of Mines and Technology, Johannesburg.

Owing to the present Principal and Professor of Mining of The South African School of Mines and Technology having been appointed Consulting Engineer to one of the Witwatersrand Minning Houses, the Council invites applications for the joint position, or alternatively for the chair of Mining alone. The salary attached to the chair of Mining is £1500 per annum. This would be increased by £250 per annum if the Professor were also appointed Principal of the School.

Particulars with regard to the School and the vacant posts may be obtained on application to:—

The Registrar, McGill College and University,

Montreal, Canada.

Applications must be sent so as to arrive in Johannesburg not later than the 30th November, 1910. They should be addressed to:—

THE SECRETARY,
P. O. Box 1176,
Johannesburg.

Handling Coal and Ore about Mines

The Simplest and Most Practical Systems Cost Less to Operate



View, interior of tipple, two Jeffrey Pan Conveyers used as picking tables and adjustable loading booms delivering egg and lump coal to railway cars

We design amd build the most economical and dependable coal handling equipments. Write for Illustrated Book X 42.

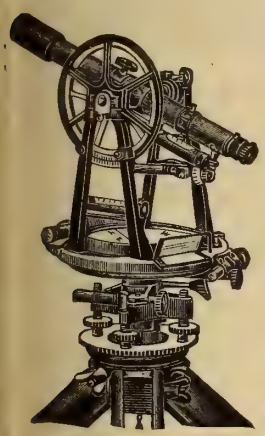
THE JEFFREY MFG. CO.

CANADIAN WORKS, MONTREAL

Cote and Lagauchetiere Streets

Jeffrey Branch Offices in the leading Commercial Centers all over the World

Toronto Office - 174 King Street West



C. L. Berger & Sons

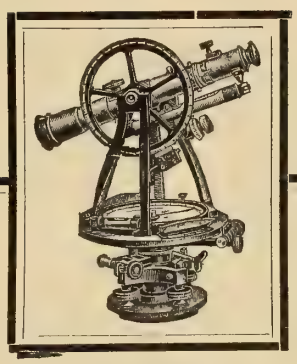
37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES :

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.



K & E

Surveying Instruments

The superior design, high quality of material, workmanship and finish which characterize our Surveying Instruments, account for their use on nearly every important engineering enterprise.

When in the market for a new surveying outfit, we will be pleased to quote on your requirements, as we furnish every requisite of the engineer for field or office.

Our complete Catalogue sent free on request.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

General Office and Factories,

HOBOKEN, N.J.

New York, Chicago, St. Louis, San Francisco

Mathematical and Surveying Instruments

Drawing Materials Measuring Tapes

Springhill Coal

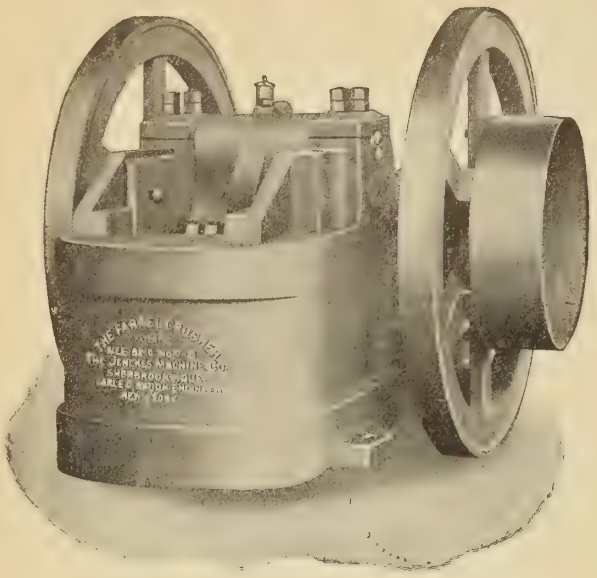
The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

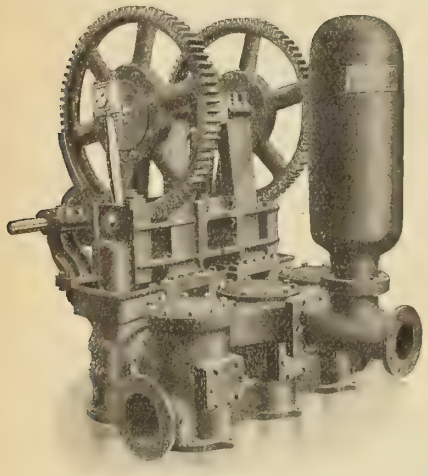
The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices:

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver



WE MANUFACTURE

Power and Steam Pumps, Condensers, Travelling Cranes, etc.

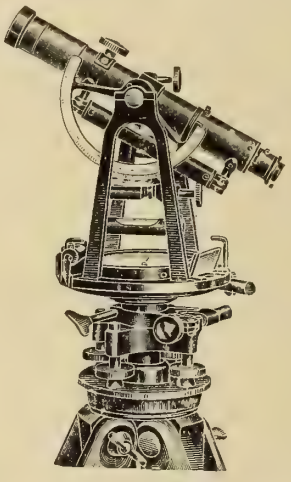
Write for Catalogue

THE

Smart-Turner Machine Co.

LIMITED

Hamilton - Canada



DAVIS DERBY.

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 Beaver Hall Hill, MONTREAL.

Write for pamphlet No. 42 M.

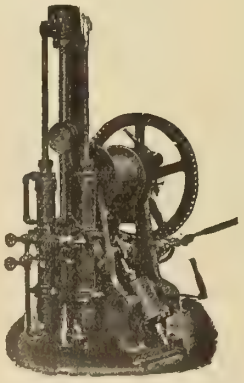
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins,
ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, Nov. 1, 1910 No. 21

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto.
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 645
(a) Porcupine 645
(b) Third Annual Report of La Rose Consolidated.... 646
(c) Mining Opportunities in Canada 647
(d) Standard English 648
(e) Editorial Notes 648
Porcupine Gold Deposits, by R. E. Hore..... 649
Annual Report of Department of Public Works of the Province of Alberta, Coal Mine Branch..... 656
Portland Canal Mining Company, Limited..... 663
Le Roi Mining Company in Liquidation..... 664
White Pass and Yukon Railway Rates..... 665
Personal and General 666
Correspondence 666
Special Correspondence, etc. 667

PORCUPINE.

History is being made rapidly in the Porcupine district. Despite bad trails and the utter absence of decent mail service, telephone or telegraph communication, the camp is abundantly vigorous. Owners and prospectors are too busy and too enthusiastic to give more than casual expression to the many grievances that in less strenuous circumstances would be magnified into first-class sores. This is well.

In a previous issue we printed an article on the Porcupine trail, written by Mr. Reginald E. Hore. Already that article is in need of revision, for the Government road, in part bad, in part worse, and in part passable, has been pushed through from Hill's Landing to Golden City. This, along with the establishment of a recorder's office and the careful geological mapping of the region, embraces practically all the attention paid to Porcupine by the Ontario Government. We shall revert later to the question of the Government's duty to the new mining district. Meanwhile let us glance hurriedly at the present condition of the camp.

Porcupine has had a singularly auspicious early history. Large corporations have shown an unequivocal desire to get a strong footing, and several have succeeded. On one property in particular, intelligent and systematic work has been done to determine the character and extent of one section of the ore bodies. Although this work has extended over several months, and although much is now known as to the satisfactory nature of the ore, yet every day adds a little to that knowledge. In other words, every step taken is planned to bear definitely upon the past and the future. At another mine, one that has received a great deal of publicity, work is being conducted vigorously but most unsystematically. Whilst it is now known that the ore bodies here are large, the operators are still very much in the dark as to the distribution of the precious metal. Consequently the tendency to accept insufficient evidence of richness still persists.

On the hundred and one newer properties the chief work done consists in stripping and trenching. On numerous claims only assessment work has been completed. After looking over a few of the typical claims, the observer is amazed at the extraordinarily wide dissemination of gold. Sometimes that gold is visible to the naked eye. Sometimes close inspection will not reveal the tiny yellow specks until the more experienced Porcupiner has pointed them out. The total impression remaining is one of confused conviction that the chances are well worth taking.

There is no lack, of course, of absolutely worthless ground. There never is. But in Porcupine there is abundance and to spare of territory that can be de-

scribed as ranging all the way from moderately attractive to irresistably seductive. And when we find mining engineers from all parts of Europe and America spying out the land, it can be taken as indicating that there the game is worth the candle.

As of all new camps, it is true of Porcupine, that there are no fixed standards whereby to evaluate prospects and properties.

Prices are in the main exorbitantly high, and prices will remain high as long as the demand lasts. This is human nature and from one point of view may be good business. But the custom of refusing to consider workable terms is decidedly detrimental to the whole camp. Reasonable terms of payment are essential—more essential indeed than the magnitude of the total purchase price. Except in odd cases we have heard no fair terms discussed or offered by owners.

In an article elsewhere in this issue Mr. R. E. Hore discusses the form and character of the lodes, veins, and vein systems of Porcupine. His article is a clear exposition of our present knowledge of the subject. Much yet remains to be learned. Probably it will become more and more clear that Porcupine gold veins differ only incidentally from other Canadian deposits. We hope that in the one essential they will stand in a class by themselves.

It is a truism to state that Porcupine is not yet a proven camp. Naturally it cannot be and will not be for many moons yet. On the other hand, nothing has yet been adduced to discourage the investor. And that is saying a good deal.

Of Porcupine's needs volumes could be written. Nature will provide for one of the most pressing. The advent of winter will solve transportation problems for a time, and will render possible the moving in of machinery and other heavy freight. Temporary as this relief will be, it is hard to overestimate the meaning of this. One must have seen for himself the quagmires, the ruts, the liquid mud, the paralyzing corduroy of Porcupine trails, before he can realize what the mine operators have to contend with. Incidentally, it is surprising to notice the lack of co-operation between mines in the matter of good roads.

The lack of telephone and telegraph lines is a costly gap in the organization of Porcupine. Precious hours and days are lost. Loss also is daily incurred through an unspeakably bad mail service.

Now we shall not discuss the point as to what may or may not be the moral obligations of the Ontario Government towards Porcupine. It will serve our object better to review matters from the commercial side, a side that is not without its appeal to most of us. For the first time on record there is developing in Ontario a gold mining camp that is the cynosure of mining men of both hemispheres. It is situated in a part of the Province that must soon be opened up in any case. It is in no need of booming, but it very decidedly does need a fair proportion of assistance. In all probability Porcupine will soon have netted the Provincial Treasury about $75,000 in revenue from miners' licenses, transfer and recording fees, etc. This is a direct gain. But indirectly Porcupine has brought and will bring many hundreds of thousands of dollars into the Province. At least two or three thousand persons will find employment there this winter. The Government railroad will be taxed to its utmost capacity to carry the quantities of freight that will be shipped in. In these and in other ways Porcupine will be profitable to Ontario. And this will be the case whether the life of the camp is three or thirty years. As with Cobalt, so with Porcupine, as regards agriculture. The farmer will follow the miner just as soon as economic conditions become normal.

It seems, therefore, that for reasons of business expediency alone, it is shortsighted for Ontario to withhold her instant support. A railway charter for a branch line from a point on the T. and N. O. has been granted; but we believe that no serious effort is being made to enforce the chief condition of that charter, which implies speedy construction. We would suggest that every day lost deprives the Province of a large and sure income. Because of some complications with the Canadian Pacific Telegraph Company, the erection of a telegraph line has not been proceeded with. This entails loss and hardship upon Porcupine itself, and upon interested outsiders. These instances in themselves indicate a departure from the policy that built up the country north of Cobalt.

The attitude of the mining public towards Porcupine warrants the Ontario Government in giving prompt consideration to requests for assistance. In giving that assistance the financial risks assumed will be relatively nothing. The returns to the Government throughout the period of construction and installation will be enormously in excess of any appropriations that it is likely to make.

The men who are putting their money into Porcupine are in earnest. They are taking all the chances, and they are glad to take them. They ask for fair treatment, especially in respect to public utilities. Rather than delay their plans they are willing to construct a railway and erect telegraph lines themselves. We believe that the Government can do both without laying itself open to the charge of rashness. Neither the operators nor the Government can see far into the future. But both can justify present expenditure by present prospects.

THIRD ANNUAL REPORT OF LA ROSE CONSOLIDATED.

We are inclined to agree with the statement made by Mr. D. Lorne McGibbon in his prefatory remarks, to the effect that the position of La Rose Consolidated has been strengthened during the past fiscal year. The net profits have increased from $1,320,147.82 to $1,472,005.03. This is especially gratifying in view of the fact

that the cost per ounce of producing silver during 1909 was only 61.31 cents per ounce, whereas the cost per ounce recorded in 1910 is 23.27 cents per ounce. A contributory factor in the larger net profits was the higher average selling price of silver. During 1909 the average for the fiscal year was 51 cents, while the average price for the period covered by the report under consideration was 52.261, a difference of 1.261 cents per ounce, aggregating a gross advance of $39,974.05. This figure, however, is incidental. A truer basis of comparison is afforded by the total expenditure on production. In 1909 this expenditure amounted to $475,562.53. During 1910, the sum of $737,842.37 was expended. Of this latter amount, $152,403.38 was spent in trenching and general development. Whilst the tonnage shipped during the year ended May 31st, 1910, was slightly greater than that shipped during the preceding period, the average silver content was also higher. The averages stand respectively 480.8 ounces per ton for 1909, and 491.05 ounces per ton for 1910. These averages are affected principally by the larger tonnage of ore concentrated—649.79 tons as compared with 31.62 tons—during 1910. The average silver contents of high grade, low grade, and concentrated ores are, respectively, 1181.98 ounces, 133.84 ounces, and 649.79 ounces.

As the third annual report is more completely itemized than is the previous report, it is possible to follow the distribution of expenditure. The largest item in mine operation is "development and exploration," which amounts to $144,223.21. "Stoping" comes next with $71,906.11. The charge for mine operation per ounce of silver mined was only 0.089 cent in 1909, whilst in 1910 it ran up to 0.1414 cent, an increase due almost wholly to development. In other charges there are only relatively slight changes.

During 1909 the total footage of drifting, raising, crosscutting, and sinking was 6,303 feet. The corresponding figures for 1910 are 10,059 feet. But in stoping and trenching the difference is most marked. The figures for 1910 are 18,789 cubic yards, as against 7,477 cubic yards for the previous year, and 5.16 miles of trenching as compared with 12,145 feet.

The Lawson mine enters as a producer for the first time, being credited with 173,730 ounces.

The Princess produced 113,146 ounces, whilst the output of the University is negligible, and the Fisher-Eplett does not appear at all.

Concentration as carried on by contract at the plant of the Northern Customs Concentrator, Limited, appears to be eminently satisfactory. An extraction of 79.12 per cent. is reported on ore carrying 28.58 ounces.

Ore reserves have been maintained. Their total silver content is 5,544,000 ounces, as compared with 4,968,418 ounces estimated one year before. However, the great bulk of this year's reserve is mill rock. Of the total reported reserves, 65,849.7 tons, only 2,876.7 tons is high grade. Close comparison with the previous year is not practicable, for the reason that only one classification of ore in the mine is now adopted, namely "Developed and Partly Developed." In the former report, reserves were thrown into two categories, "Partly Developed Ore," and "Indicated Ore." We take it that General Manager R. B. Watson's present classification is less speculative than was that formerly used.

Whilst the general manager is to be congratulated upon the really excellent showing that he has made, it is a matter of regret that the annual report of so important a concern as La Rose Consolidated should not be more ample. Plans of the workings should be shown. Assay maps would throw much light upon points that are now necessarily obscure. We would suggest, therefore, that in future the annual report of this corporation be fittingly illustrated and greatly amplified.

MINING OPPORTUNITIES IN CANADA.

The new fields of Northern Ontario and Northern British Columbia are so much in the public eye that other districts are overlooked. In fact, the foreign investor is prone to imagine that Cobalt, Porcupine, and Portland Canal offer the only sound chances for venture. This, of course, is far from the truth.

In an editorial that appeared in The Canadian Mining Journal, January 15, 1910, we alluded to a few of the sound ventures and investments that are open in unadvertised regions of the Dominion. The time is ripe to draw attention once again to these overlooked districts.

The full benefit of keen foreign interest in new fields cannot be felt if that interest is permitted to centre exclusively in one camp. Any one camp, no matter how meritorious it may be, is bound to bring disappointment and failure to many. The irrevocable law of averages holds in prospecting and in mining as in everything else. Hence it is unwise to place all of one's eggs in one basket. Furthermore, there has never been a better time for impressing upon the representatives of capital the desirability of investigating the merits of mineral deposits and mines in other parts of Canada. Any newly discovered bonanza should be merely a point from which increasing waves of activity radiate.

Advices are constantly reaching us of the revival of mining in places that have long lain dormant. For instance, the placer gold of Eastern Quebec, the gold-antimony ore of Nova Scotia, the iron deposits of Eastern Ontario, the gold mines of Lake of the Woods, and many almost forgotten metalliferous mines in southern British Columbia, are all receiving active attention. This is particularly true of Nova Scotian gold mines and of various non-metallic mineral deposits throughout Eastern Canada.

It is appropriate to point out here that in some respects British Columbia and Nova Scotia are still preeminently our mining provinces. In both mining has long been a leading industry. The development of transportation facilities has been influenced, therefore, very largely by the requirements and growth of mining.

The movement of large quantities of such commodities as iron ore, coal, and gypsum demands traffic organization that is adequate and expansible. It is unfortunate that in Quebec, Ontario, and Alberta the railways are yet far behind the pressing needs of the industry. Hence the two previously mentioned Provinces afford in many instances better industrial surroundings than do the others. Time, of course, will bring improvements all over the Dominion.

But, harking back to our original theme, there are specific localities where foreign capital can seek investment with strong chances of success, chances heightened by an improving market for Canadian mineral products. The molybdenite and graphite deposits of western and northern Quebec require investigation. Much of the unexploited coal area of Nova Scotia is entirely worth while. The building and decorative stones that are found so frequently in the older geological horizons have as yet been practically neglected. Such minerals as gypsum, barite, infusorial earth, paint ores, and so on, await commercial development. In all these there is money to be made, provided always that the investor employs men who know their business and are thoroughly familiar with working conditions.

Another legitimate channel of investment lies in the careful selection and equally careful consolidation of mines now abandoned. This, naturally, is treading upon very delicate ground. But the life history of the average mining camp, more especially of camps that have been opened with a boom, points to the conclusion that the steadiest profits may be expected long after the period of bonanzas is past. Cases could be cited here that would astonish readers who are not conversant with the mining history of Canada. But it is not well to be too specific. Suffice it to say that consistent study of Provincial and Federal reports is one of the best possible guides. Above all it is desirable that the foreign investor be advised by a mining engineer practising in Canada. Not only are initial mistakes avoided, but energy, time, and money are saved by employing a professional man who knows the customs, laws, and red tape of the Dominion. And in dealing with lands controlled by the Federal authorities it is absolutely necessary to possess a first-hand knowledge of red tape—not infrequently adhesive.

To the foreign mining investor who is in earnest, who knows what he wants, and who is capable of taking ordinary pains to be sure that he gets it, Canada is a land rich in possibilities.

STANDARD ENGLISH.

"Mines and Minerals" for September contains an editorial on "Standard English," which is mainly a plea for the use of plain English in mining literature, and the avoidance of localisms. Most persons will thoroughly agree with such a plea, but the writer goes a little further. He states that so far the people in the United States have "spoken better English with fewer dialects than the inhabitants of the British Isles," and there is not any reason why Americans should adopt old English localisms "that originated in fun or ignorance." The writer then goes on to explain the origin of "inbye" and "outbye," as follows:—

"The former had its inception from some old miner who remarked 'are you going in, bye?' instead of 'are you going in the mine, boy?' and 'outbye' followed naturally."

This explanation must have originated either "in fun or ignorance," for it is utterly fantastic. The words "inbye" and "outbye" have been used in Scotland and the north of England for generations beyond memory, and it may be suggested, with due deference to the boasted freedom of the American nation from dialect, that the pronunciation of "boy" as "bye" smacks more of Pennsylvania than of either Durham or Fifeshire. There are many English localisms that should not be introduced into American mining literature, but the writer in "Mines and Minerals" is unfortunate in picking out for attack such convenient and useful expressions as "inbye" and "outbye." It is a fair challenge to ask what he would substitute for them. The phrases "up track" and "down track" have their significance on railways, the words "indoor" and "outdoor" are good English not liable to be misunderstood, and "inbye" and "outbye" are legitimate words sanctioned by long usage. The idea they convey cannot be otherwise conveyed but by the use of a phrase containing at least half a dozen words, and even then there is a risk of ambiguity. The writer of the "Mines and Minerals" editorial has evidently had little experience in English coal mines or with English miners, else he would not have used the word "boy" in his very ingenious explanation; the English miner says—"lad." It is more charitable, however, to assume that the account of the origin of "inbye" and "outbye" is intended as a solemn joke.

EDITORIAL NOTES.

Analyses of iron ore from Arisaig, Antigonish County, Nova Scotia, as reported by the Mines Branch, Ottawa, range from very low iron contents up to 53 per cent. Sulphur is uniformly low. Phosphorus ranges from 0.5 per cent. to 1.20 per cent., whilst lime is usually in the neighbourhood of 2 per cent.

A special committee of the British Home Office is considering amendments to rules governing the installation and use of electricity in coal mines. The rules under revision were formulated in 1903 and are adapted rather to the alternating-current system of power transmission than to the continuous-current system.

The silica content of finely divided sulphide concentrate can very seldom be reduced to less than 20 per cent. without disproportionate loss.

During the calendar year 1908, the quantity of silver issued for use in the industrial arts throughout the United States amounted to 23,775,422 ounces.

PORCUPINE GOLD DEPOSITS

(Written for the Canadian Mining Journal by Reginald E. Hore, Houghton, Mich.)

The gold at Porcupine occurs chiefly in pyritic quartz. In lesser amounts it is found in the country rocks.

The quartz in most cases is white in colour, with reddish-brown patches of iron oxides. Less commonly, but including some spectacular veins, the colour is greyish-blue.

The gold is, in part, coarse and readily visible to the naked eye. In most of the quartz, however, it is very fine. The greater part, 50 to 65 per cent. is readily won on crushing. A smaller percentage is more intimately allied with sulphides and will probably be treated by cyanidation.

The country rock is usually either pyritic grey schist or rusty-weathering mixed carbonates. Less often it is a conglomerate.



Quartz Ferrodolomite Lode—Foster Claims. Quartz Veinlets In Ferrodolomite.

The schistose country rocks are for the most part altered volcanics, and are of various types. Many are sericitic and all are impregnated with carbonates. Small cubes of pyrite are usually abundant. Copper pyrite occurs; but in very subordinate quantity.

The carbonate rocks are grey to yellowish-grey, crystalline and massive. They are iron—calcium—magnesium carbonates, such as are common in the iron formations of Ontario and the Lake Superior states. Such rocks range in composition from siderite through ankerite to dolomite, and on the iron ranges are called ferrodolomite. The percentage of iron in the Porcupine rocks, as in most Keewatin carbonates, is less than in normal ankerite.

The conglomerate is composed of light-coloured pebbles of various types set in a fine grey coloured matrix. An arrangement of the pebbles with their longer dimensions parallel, gives a decided schistose appearance.

Form of the Deposits.

The deposits vary greatly in shape. Some appear at the surface to be well defined single fissure fillings or veins. In some cases there is a series of fissure fillings running nearly parallel and enclosing large and small masses of rock. These are conveniently referred to as vein systems. In another type numerous quartz veins run through ferrodolomite beds. We may designate these as ferrodolomite lodes. There are also large quartz masses of irregular and unknown form, which cannot be well designated as veins or lodes. They appear to be lenticular rather than tabular in shape. From the nature of outcropping surfaces, they have been called "domes." Until their true character is known, it seems best to refer to them as quartz masses.

These four types may be illustrated by description of four claims in Tisdale Township. For a single quartz vein we may take one on the Connell property. A system of quartz veins is exposed at the Timmins mine. The most striking example of quartz ferrodolomite lode is the Foster. A remarkably large quartz mass or "dome" is that at the Dome mine. None of these deposits has been thoroughly explored, and observations on their nature must therefore be confined almost entirely to superficial characters. The Dome is being tested by drifts and cross-cuts at the 60-foot level, and by diamond drilling to a few hundred feet. One of the veins at the Timmins is being drifted on at the 100-foot level. The Foster lode and the Connell vein have each

been carefully stripped; but neither has yet been tested for more than a few feet in depth.

Quartz Vein.

The deposit selected as an example of this type is located on the Connell claims, just south of the centre of Tisdale Township. The vein has been exposed almost continuously for over 200 feet. At the western exposure it is 15 inches and at the eastern, where it dips into low ground, 5 feet wide.

The quartz is milky-white and vitreous. Where it has been directly exposed to the weather, it is coated with yellowish-brown iron oxides. Streaks and patches of this secondary material are found filling small cavities and crevices for a few feet downwards. Portions of the vein which were protected by a mantle of soil, show similar alteration, but to a much less degree. Some such portions show scarcely any weathering and appear brilliantly white in the sunlight.



Quartz Ferrodolomite Lode—Foster Claims. White Bands of Quartz Stand Out. In Relief from Rusty Ferrodolomite.

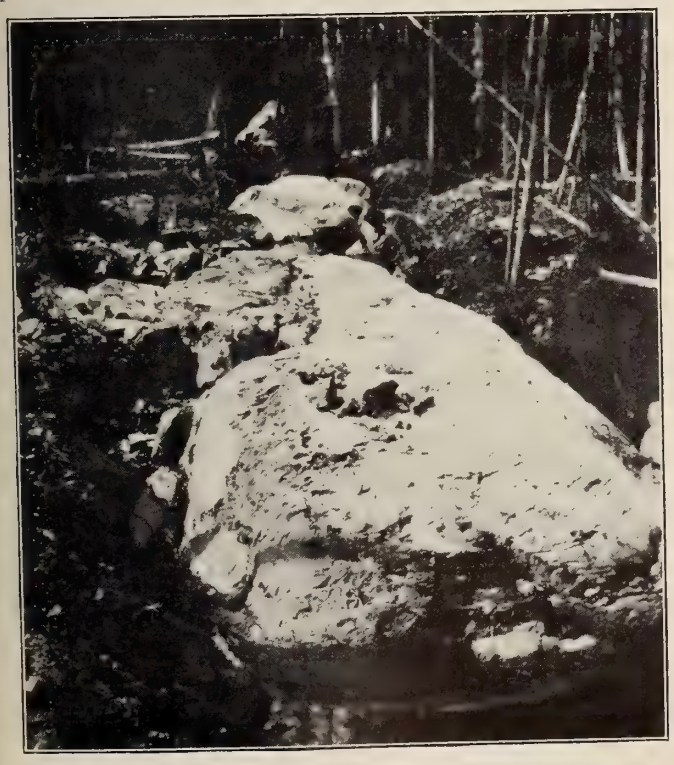
Free gold can be seen for several feet along the vein. It is coarse and readily detected by the naked eye. The most spectacular and richest portion is a streak about 15 inches wide on the north side of the vein. Here countless particles of coarse gold appear on the surface. It occurs especially in rusty cavities and in minute dark streaks, which fill crevices in the quartz. The gold particles are even more numerous, however, on the vein



Quartz Vein, Connell Claim. Showing Well Defined North Wall.

wall. This wall is very clean cut, and has but a thin selvage of dark greenish colour. It is slickensided and shows pronounced grooves running nearly vertical. These grooves, running normal to the undulatory strike, produce a decidedly corrugated surface, as may be seen in the accompanying photograph.

The wall rock is a rusty weathering ferrodolomite. At the immediate contact it is disintegrated for a foot in depth. A foot or more from the contact it is quite massive, except for a few inches at the surface. The fresh rock is of light grey colour, finely crystalline and soft. It effervesces slowly with dilute acid. Scattered through it are striated cubes of pyrite. Veinlets of white quartz penetrate in all directions.

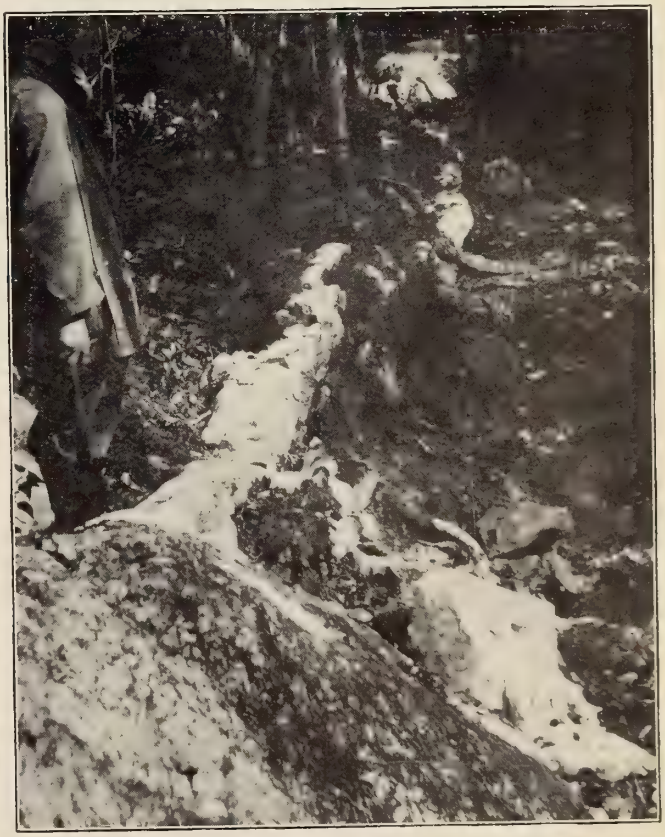


Quartz Vein, Connell Claim.

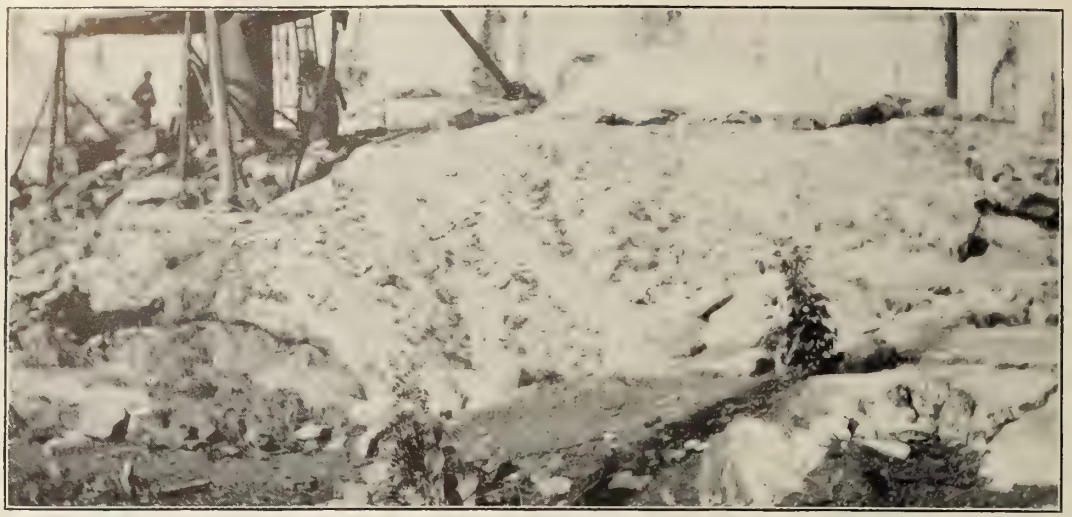
The carbonate on the north wall is only a few feet wide, and is succeeded by dark-coloured, fine-grained porphyritic igneous rocks. South of the vein the rocks are not exposed.

Quartz Vein System.

At the Timmins mine there are a number of large quartz veins striking in a northeasterly direction. Some of them are but a short distance apart and appear to converge and enclose large masses of rock. Others running parallel, and supposedly of the same vein system,



Quartz Vein, Connell Claim. Looking East along Strike showing Vein for 200 feet.



Quartz Mass, Dome Mine. All Quartz except at lower left corner.



Quartz Vein, Connell Claim. Undulating and grooved Slickensided wall Coarse gold particles are abundant on this wall. Left half of photo shows Disintegrated Ferrodolomite wall rock.



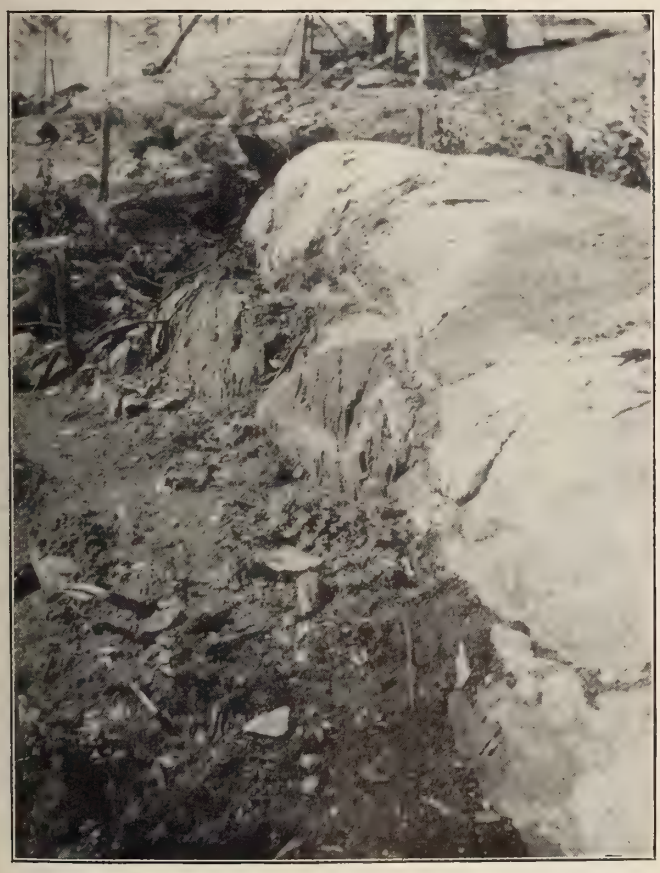
Quartz Veins, in Grey Schists, Timmins Mine. This illustrates, in miniature a Vein System.



Quartz Mass, Dome Mine. Showing nature of Contact.

are 200 feet and 400 feet apart. The larger members of the system themselves enclose numerous fragments of schist similar to the country rock. This vein system appears to be part of a larger veined zone, which extends northeast to and north of Pearl Lake.

The quartz is in most of the veins white in colour, except where stained brown with iron oxides. An exception is a vein of greyish-blue colour, which cuts across one of white quartz. The veins are commonly 4 feet to 10 feet wide, and one vein, now being developed from two shafts 250 paces apart, is 8 feet to 15 feet wide.



Quartz Mass, Dome Mine

There are a large number of veins which show free gold on the surface, generally in rusty patches or in minute fractures. The ore from a few feet below the surface is remarkably free from iron stains, and the pyrite crystals have scarcely any tarnish. Ore impregnated with par-



Quartz Vein, Connell Claim. Rich Streak containing coarse gold in centre.



Dome Mine. Shows Veins in Schists near Large Quartz Mass.

ticles of coarse gold has been taken from a drift at the 100-foot level, and it is more spectacular than any of the surface showings. The workings are in ore at almost all points, and the ore is high grade.

The wall rock is a grey pyritic sericite schist impregnated with carbonates. The pyrite occurs both as small cubes scattered through the rock, and in less perfect crystals in little veinlets. Mr. C. W. Knight has suggested that the schist is an altered phase of quartz porphyry, which occurs in the vicinity. It is similar to, but not so siliceous as, some of the sericite schists at Temagami, which Dr. Barlow showed to be mashed quartz porphyry.

It is as yet impossible to trace out the individual members of the vein system. Many of the outcrops are small and separated by low ground. The strike of veins on neighbouring outcrops is frequently too divergent to permit the interpolation. Considerable stripping has been done and a few veins traced continuously for several hundred feet.

A remarkable outcrop is the greyish-white quartz "dome" beside which No. 1 shaft has been sunk. For the greater part it shows, as may be seen from one of the accompanying photos, a marked similarity to some marbles. In places it is stained with iron oxides, and in such rusty patches are many particles of coarse gold. The exact relation of this mass to the vein in the shaft is not evident. From the far side of the shaft house, a vein 3 feet wide, runs northeast for a few paces along the edge of the stock pile, and then is lost in low ground.



Timmins Mine, Nodular Quartz Masses in Crumpled Grey Schist.

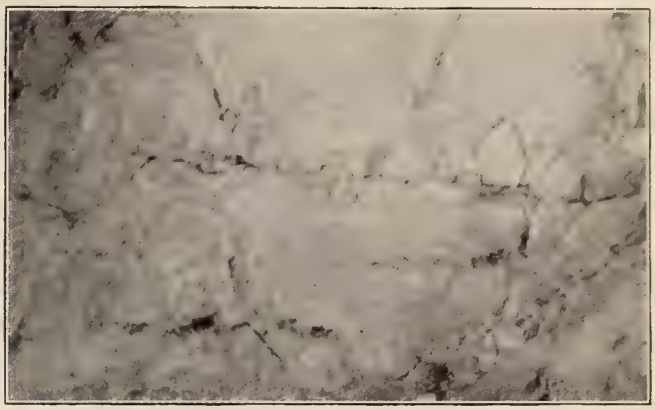


Timmins Mine, White Quartz in Grey Schists.

Several hundred feet along the strike another outcrop shows similar quartz. Southwest from No. 1 shaft there are fairly continuous outcrops of quartz, which are probably parts of one vein, and which have been tested



Timmins Mine, one of the larger Veins, showing decided Tabular Shape.



Timmins Mine. Face of White Quartz Mass at No. 1 Shaft.

by two shafts. From the further shaft a drift is being made at the 100-foot level towards No. 1.

In some outcrops east of No. 1 shaft, a variety of structure is shown by quartz veins in the schists. In some places the veins cut distinctly across the foliation of the country rock. In others there are veins of similar quartz, which conform closely to the schistosity and terminate abruptly in the sharp folds.

Quartz-ferrodolomite Lode.

On the Foster claims gold occurs in quartz veins which run through a band of rusty weathering ferrodolomite. The largest lode has been stripped for about 250 paces. It shows a width of 5 feet to 20 feet, and for a considerable proportion of its length, averages over 10 feet.

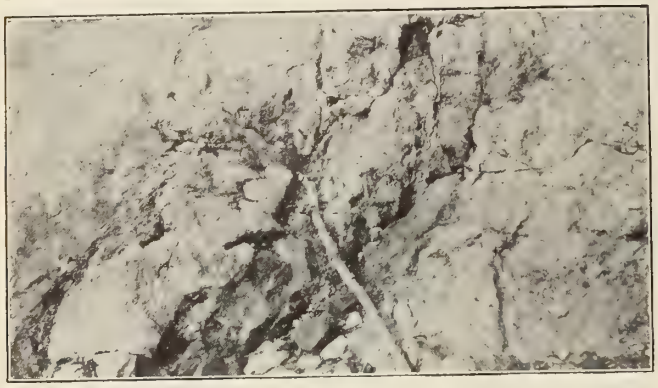
The quartz stands out in relief from the more deeply weathered, red brown, oxidized ferrodolomite. Several quartz bands, 4 inches to 10 inches wide, run normal to the strike of the lode, and the carbonate is impreg-



Timmins Mine, showing Quartz Vein in Grey Schists. Stockpile at Left.

nated with a multitude of very small quartz veins. Many of the latter occur in two sets which divide the carbonate into small rectangular blocks.

The quartz is white in colour, but stained with iron oxides. The red rust comes partly from the oxidation of small pyrite crystals, which are abundant in patches of the quartz, and in part from the weathering of the ferrodolomite. In some of the rusty crevices there are spectacular showings of coarse gold.



Timmins Mine, showing Rusty Spots where Coarse Gold is found in Quartz Mass.

The lode strikes nearly due west. The country rock is a pyritic grey schist impregnated with carbonates.

Quartz Masses.

At the Dome mine a smooth hummocky outcrop glistens white in the sunlight. It is chiefly made up of huge masses of quartz which enclose large and small fragments of grey schist. The country rocks are grey sericite schist, grey slate and a schistose conglomerate.

One mass, which is almost entirely quartz, has a surface area 100 feet by 200 feet, and there are numerous smaller masses of elliptical plan. An oval-shaped area, including much country rock, but of which about one-half is quartz, is 600 feet by 200 feet. In addition to the large masses, there are numerous veins one foot to three feet in width, which penetrate the country rock. Some of these are almost conformable with the schistosity, but many cut distinctly across it.

The dome-shaped masses show rather varied relations to the enclosing rock. In some cases the contact is nearly vertical, while in others it is but gently inclined. The



Timmins Mine, showing Contact of Quartz with Grey Schists.

boundaries are seldom nearly straight lines, but elliptical or circular.

Coarse gold shows at several places on the surface. It, together with pyrite, is especially abundant in the vicinity of enclosed schist or the country rock. A large tonnage of quartz carries workable quantities of fine gold. The pyritic schist itself is known to carry some gold values. Small striated cubes of pyrite are abundant in both the schist and the quartz. Copper pyrites also occurs, but is probably not in such quantity as to interfere seriously with the recovery process.

ANNUAL REPORT OF DEPARTMENT OF PUBLIC WORKS OF THE PROVINCE OF ALBERTA, COAL MINE BRANCH

That the coal mining industry in the province is steadily expanding may be seen from the following comparison of outputs for the last few years. The year 1909 shows a considerable increase in output over 1908, and doubtless this increase would have been still greater had it not been for a dispute between the operators and their workmen during the early part of the year, which had the effect of closing down most of the large mines in the southern part of the province for about three months and shutting off approximately 75 per cent. of the total coal production of the province during the period of inoperation.

Year.	Output in tons for N.W.T. (Alberta and Saskatchewan)	Output in tons Alberta.
1901	346,648	.....
1902	510,674	.....
1903	622,939	.....
1904	782,931	.....
1905	.....	811,228
1906	.....	1,385,000
1907	.....	1,834,745
1908	.....	1,845,000
1909	.....	2,174,329

The above figures show that there has been an increase of 17.85 per cent. over the 1908 output.

Classification of Output of Coal in Alberta During the Year 1909.

	No. of tons.
Lignite coal	763,673
Bituminous coal	1,197,399
Anthracite coal	213,257
Coal used in coke production	148,104
Coke produced	87,812
Briquettes produced	89,785

Summary of Statistics.

Number of mines at present in operation	121
Number of new mines opened in 1909	32
Number of mines abandoned in 1909	8
Number of tons of coal mined	2,174,329
Number of tons of coke produced	87,812
Number of tons of briquettes produced	89,785
Average number of persons employed inside the mines	3,893
Average number of persons employed outside the mines	1,314
Number of fatal accidents inside the mines	7
Number of fatal accidents outside the mines	2

Number of non-fatal accidents inside the mines	47
Number of non-fatal accidents outside the mines	13
Number of mine manager certificates issued	27
Number of pit boss certificates issued	23
Number of fire boss certificates issued	44

Summary of Inspector's Report.

Edmonton, January 15th, 1910.

John Stocks, Esq.,
Deputy Minister of Public Works,
Edmonton, Alta.

Sir,—As Provincial Inspector of Mines, I have the honour to submit herewith my annual report for the year ending December 31st, 1909.

The development work in connection with the coal mining industry throughout the province has been very active during the past year and several important mines have been added to the list.

At Taber a number of the small companies have consolidated and three larger and more substantial companies formed, viz.: The Great Western Coal Company, The Alberta Consolidated Coal Company, Limited, and The Rock Springs Sootless Coal Company, Limited. All three of these companies have installed good sized plants, including complete compressed air plants and coal-mining machines, and two of them have already procured railway facilities.

In the Lethbridge district the Diamond Coal Company, Limited, have completed the installation of their plant, put in a spur line of railway and are now in a position to push the development of their mine ahead, which will put them in a position to produce a much larger output during the coming year. The Royal Collieries, Limited, are pushing the development of their mine ahead rapidly and are getting it into shape for a much larger output. The new plant of the Alberta Railway & Irrigation Company, at their No. 6 mine, has been completed, and the development of the mine is being carried out on a large scale.

In the Crow's Nest Pass the Leitch Collieries, Limited, have opened a new mine, erected a tipple and obtain-



Surface Plant No. 2 Mine, H. W. McNeill Co., Ltd., at Canmore.

ed railway connections. At Burmis there is another mine opened by the Davenport Coal Company, who have procured railway connections. At Blairmore a new mine has been opened by the West Canadian Collieries, Limited, which should develop into a large mine. West of Coleman the McGillivray Creek Coal & Coke Company, Limited, a new company which has been formed, has opened a mine on a 12-foot seam of coal and a new tipple and plant are in course of erection.

In the Pincher Creek district the Western Coal & Coke Company, Limited, have had a gang of about thirty men prospecting the coal seams on their property during the last few months, and are now opening permanent tunnels.

West of Edmonton, along the Grand Trunk Pacific Railway, a number of companies which have recently organized have secured extensive properties and have done considerable work in proving the coal seams. At least two of these companies have ordered machinery and are making preparations to develop their mines, and I understand will have railway connections during 1910, which will place them in a position to produce a



Surface Plant Nos. 5 and 6 Mines. Alberta Railway and Irrigation Company Lethbridge.

fair amount of coal by the end of the year.

Following you will find a summary of the development work in the various districts during the past year:

International Coal & Coke Company, Limited, Coleman.

Additions have been made to the machine and carpenter shops and the following tools installed: Two new lathes, hack saw, steam hammer, band saw, pipe cutter and threader. The boiler house has been extended and two 100 h.p. Leonard return tubular boilers installed, bringing the total boiler capacity up to 1,250 h.p. Two condensers have also been installed. Two additional compressed air locomotives of 19,500 pounds weight have been put into use, making a total of eight compressed air locomotives in use at the mine. The company's snow sheds have been extended. A 10-inch water supply pipe has been laid to the plant and a 500-gallon fire pump installed. The track in the mine has been relaid with 45-pound steel. A considerable amount of rock tunnelling has been done and preparations are being made to work the coal to the dip of the present gangway.

Bankhead Mines, Limited, Bankhead, Alta.

A hoisting engine has been installed at the head of slope in No. 4 seam. A rock tunnel has been driven from the slope workings in No. 4 seam to No. 5 seam and is now being extended to intercept No. 6 seam. The use of explosives for blasting coal has been discontinued, excepting in the No. 6 seam, in which Monobel powder is used. This has greatly added to the safety of the mine and has also increased the percentage of lump coal produced.

Hillcrest Coal & Coke Company, Limited, Hillcrest Mines, Alta.

A wash house with concrete floor and walls has been erected, and snow sheds have been extended. Monobel powder has been introduced into the mine and is now used exclusively for blasting the coal, which adds greatly to the safety of the mine.

The H. W. McNeill Company, Limited, Canmore.

The following machinery has been installed:

No. 1 mine, above ground—One 18-foot x 66-inch 125 h.p. tubular boiler. One exhaust steam Hoppes feed water heater with boiler feed pump. One first motion 22-inch x 36-inch hoisting engine for hauling coal from main slope. The wash house has been enlarged and has now a total of 250 lockers.

No. 1 mine, below ground—One 6-inch x 10-inch 7-ton compressed air locomotive. The main air courses have been improved and enlarged. A rock tunnel has been driven from No. 3 seam to No. 1 seam across a fold, a distance of 200 feet, and has reduced the length of the main haulage road about 1,500 feet.

No. 2 mine, above ground—A tipple and screening plant with a capacity of 100 tons per hour has been completed and is now in operation. The wash house has been extended and is now fitted up with 140 lockers and hot and cold water shower baths.

No. 2 mine, below ground—The main air courses and travelling roads have been enlarged and improved.

The fire bosses at Nos. 1 and 2 mines have been provided with safety lamps of the Wolf pattern. All lamps which were fitted with the screw lock are now fitted with the lead plug lock, which adds considerably to the safety of the mine.

Canadian Coal Consolidated, Limited, Frank. (Successors to Canadian-American Coal & Coke Company, Limited.)

Old Mine:—Preparations are being made to recommence the working of the slope. The main gangway has been improved and enlarged. Safety lamps are used in all places above the level of the main gangway. The use of dynamite has been discontinued and Monobel powder is used for blasting the coal, shots being fired Bickford-Smith igniters. The fire bosses have all been provided with safety lamps of the Wolf pattern, and the Clanny lamps which are now used by the workmen are gradually being replaced by the Wolf lamp.

Shaft Mine:—The following additions have been made to the surface plant: A new bankhead has been erected; two Stirling water tube boilers, 225 h.p. each; one low pressure Ingersoll air compressor for operating rock drills; and a saw mill with a capacity of 25,000 feet per day have been installed. Foundations have been laid for four Babcock & Wilcox boilers of 250 h.p. each. A power house is being built to accommodate a 500 k.w. electric generator, exciter, switchboard and necessary fittings, which are now on order. A ventilating fan has been placed at the mine and the development of the underground working is being pushed ahead.

West Canadian Collieries, Limited, Blairmore.

A steel tipple fitted with the Green dump with a capacity of 1,500 tons per day is being erected by the Bartlett Snow Company, and one high pressure compressed air plant, one eight-ton and two five-ton compressed air locomotives have been installed. The present mine track is being relaid with 40-pound steel. One 78-inch Sirocco fan, capable of giving 100,000 cubic feet of air per minute with a two-inch water gauge and one 150 k.w. electric generator for lighting purposes, driving fan, tipple, etc., have been put in. The power house is being built of masonry. A considerable amount of diamond drilling is being done on the property to ascertain the quality and position of the coal seams at a depth of 400 to 500 feet.

Lille Mine.

Safety lamps of the Wolf pattern have been installed in all districts where gas has been found. A considerable amount of prospect work has been done on this property in order to prove the thickness and quality of the coal.

Blairmore Mine.

This is a new mine which has been opened during the past year. The main and counter gangways have been driven a distance of 2,600 feet on strike of coal seam, which is 6 1-2 feet in thickness and is known as the No. 2 seam. A prospect tunnel is being driven to locate No. 4 seam. A coal dumping and loading station for railway cars has been erected and a spur track laid from the C. P. R. Crow's Nest line to the mine, a distance of about half a mile.

McGillivray Creek Coal & Coke Company, Limited, Coleman.

This is a new mine which has been commenced at Carbondale, near Coleman. No. 2 seam, which is 12 feet thick, is being developed. A steel tipple with a handling capacity of 5,000 tons per day is being erected by the C. O. Bartlett & Snow Company, of Cleveland, Ohio. A power house, built of masonry, has been erected, size 88 feet x 60 feet. A machine shop, 102 feet x 28 feet, also built of masonry, and fitted up with a full compliment of all necessary tools, and new offices have also been erected. The following machinery has been installed: One 150 k.w. Ridgway generator, for supplying power for locomotives, tipple and machine shop and for lighting purposes; one five ton electric locomotive with rack rail for hauling the coal from the mine to the tipple, a distance of nearly two miles; a Sirocco fan, electrically driven, capable of giving 60,000 cubic feet of air per minute with a 3-inch W. G. Steel cars with a capacity of 4 1-2 tons, with automatic couplings, are used. The mine track is being laid with 55-pound steel. Two 150-pound Waterous boilers have been installed. A well has been sunk and a water supply for the plant is pumped up to a tank with a capacity of 10,000 gallons. Railway sidings have been put in and foundations are being prepared for a box car loader.

The Davenport Coal Company, Burmis.

This property was formerly operated by the East Crow's Nest Coal Company, Limited. Considerable development work is being done, also grading for railway sidings. This mine should be a large producer in the future.

Leitch Collieries, Limited, Passburg.

The output for the past year from the old mine, which is south of the Canadian Pacific Railway, Crow's Nest Branch, is more than double that of 1908. Safety lamps of the Wolf pattern are now used throughout this mine.

A new mine has been opened about two miles north of the old mine and a seam of coal 15 feet in thickness is being developed. A spur track has been laid from the C. P. R., a distance of 1 1-4 miles, to where a tipple is erected, equipped with scales, shaking screens, picking tables, etc. A power house has been built and the following machinery installed: Two locomotive boilers, hoisting engine and low pressure air compressor.



Surface Plant of Canada West Coal Company, Ltd., Taber.

Galbraith Coal Company, Limited, Lundbreck.

No. 2 seam has been opened up and is being developed. The tipple has been extended and a revolving screen installed.

Maple Leaf Coal Company, Bellevue.

This company has opened up a new seam of coal during the last year and is now operating two seams. Monobel powder is used for blasting the coal and is giving good results. Safety lamps of the Wolf pattern are used throughout the mine.

Carbon Hill Coal & Coke Company, Burmis.

This company has done considerable prospecting during the past summer and has proved nine workable seams, some of which are over eight feet in thickness and of a good coking quality. It is expected that the railway which has been surveyed will be built in to the property in the early part of next summer.

The Head Syndicate, Limited, Lundbreck.

This company has done a considerable amount of prospect work, on what is known as the Hastings property, and has been successful in proving a seam of coal of excellent quality, with an average thickness of 10 feet and there are indications of other seams of a good quality on this property. Most of the prospect work has been done along the north side of Lynx Creek.

Western Coal & Coke Company, Limited, Pincher Creek.

This property is located in township 6, range 2, west of the 5th meridian, about 12 miles west of Pincher Creek. Considerable prospecting work was done on the property during the past summer, and several coal seams proved, one of which is seven feet thick and of a good coking quality. This seam is opened up by a tunnel, which has been driven a distance of 1,500 feet and will be used as a permanent opening. The following plant has been installed to carry on the work: Two boilers, one hoisting engine, two pumps. A number of temporary buildings have been erected, including offices, wash house, engine house, blacksmith shop, etc.

Alberta Railway & Irrigation Company, Lethbridge.

The steel tipple at the No. 6 mine referred to in the report for 1908 is now completed and is equipped with Ramsey pusher for caging cars, car retainers, cross-dumps, weigh scales, screens, picking tables, and necessary conveyors for handling four sizes of coal and rock. The tipple is designed for four loading and one by-pass track, and is fully equipped for handling 1,800 tons of lump coal in eight hours.

In addition to the tipple, the following equipment has been installed: Two sets of railway scales; Ottawa tilting box car loader; Sirocco ventilating fan, 114-inch diameter with a capacity of 200,000 cubic feet of air with the 6-inch W. G., rope driven with a pair of 16-inch x 36-inch Leonard Corliss engines; two units of Babcock-Wilcox water tube boilers, 500 h.p. each, equipped with Babcock & Wilcox chain gate stokers and induced draft; and two American Blower Company's fans.

The boiler house is built to accommodate two additional units of Babcock & Wilcox boilers, which will be installed when required.

The power house is built to accommodate three Rand air compressors, three electric generators, two boiler feed pumps, feed water heaters and hoisting engine. Of the above, the following are now installed: One duplex Rand air compressor, simple steam, cross-compound air, with a capacity of 3,000 feet of free air per minute; one 200 k.w. generator, A.C., direct connected to a Robb engine; two Wier boiler feed pumps; two feed water heaters; hoisting engine, 30 inches x 48 inches, direct connected to a 12-foot drum and equipped with a steam brake, steam throttle and Nicholson automatic stop. A travelling crane for erecting machinery has also been installed in the power house.

The shaft is equipped with cages 18 feet in length, each carrying two cars placed tandem, and plow steel hoisting ropes, 4 7-8 inches in circumference. The pit bottom is made large and roomy, the roof being supported with 18-inch steel beams. The underground workings are laid out for endless rope haulage.

Royal Collieries, Limited, Lethbridge.

The development of the underground workings in this mine has been pushed ahead rapidly during the past year and now an output of about 200 tons per day is produced and the indications point to a large increase in this output during the coming year. A number of new cottages for the workmen and new office buildings have been erected. Four Ingersoll-Sargent coal cutters have been added to the equipment of the mine.

Diamond Coal Company, Diamond City.

This company has during the past year installed the following equipment: One new electric generator, A.C., 105 k.w., 2,200 volts, 75.5 amp., 3 phase, 60 cycles, 240 r.p.m., direct connected to a Robb steam engine 15 inches x 16 inches, together with exciter, switchboard and necessary fittings, one Morgan-Gardner electric chain coal cutter; one Jeffrey electric chain coal cutter. A new branch line of railway has been laid from Kipp to the mine and equipped with locomotive, passenger coach, etc. This mine is now fully equipped for an output of 1,000 tons per day. The development of the underground workings is being pushed ahead and the indications point to a large increase in the output from this mine, which will add materially to the supply of domestic coal during the coming year.

LETHBRIDGE DISTRICT.

The Lethbridge district is the largest domestic coal producing centre in the province and will no doubt retain that position for some time to come. The building of the C. P. R. viaduct across the Belly River valley at Lethbridge has opened up a large coal area just north and west of the river, on which several prospect shafts have been sunk and a number of bore holes put down during the past year, with favourable results. The development work at the mines and prospect work throughout the district have been actively carried on during the year and from present indications there will be a substantial increase in the output from these collieries for the year 1910.

Canada West Coal Company, Limited, Taber.

The output from this mine is gradually increasing and has now reached 850 tons per day. An air shaft has been put down near the face of the main north entry and has reduced the length of the airways by 50 per cent. When the airways which are now being driven are connected, all ventilating doors can be removed from the main haulage road, which will facilitate to a certain extent the transportation of coal and will insure a more efficient supply of fresh air at the working face.

Great Western Coal Company, Limited, Taber.

This company has during the past year installed the following machinery: One Ingersoll low pressure air compressor, with a capacity of 800 feet of free air per minute; a number of coal cutters (Ingersoll puncher) with pipe lines and necessary fittings; two new Jenckes locomotive boilers and a new hoisting engine. The tipple has been remodelled and fitted with screens for sorting two sizes of coal.

Rock Springs Sootless Coal Company, Taber.

This company has during the year installed three locomotive boilers with a combined capacity of 300 h.p., one straight line single stage Ingersoll air compressor with a capacity of 1,000 feet of free air per minute, and nine coal cutters, viz.: Three Ingersoll-Sargent punchers, four Siskols and two little Hardies. A new tipple has been erected, equipped with scales, screens, etc. A spur line of railway and sidings and railway scales have been put in.

Alberta Consolidated Coal Company, Limited, Taber.

This company has during the year absorbed the Scranton and Central Coal Companies and has put in the following equipment: Three boilers with a combined capacity of 270 h.p., hoisting engine, one straight line single stage Ingersoll air compressor with a capacity of 1,000 feet of free air per minute, eight coal cutters (Ingersoll-Sargent punchers), and necessary pipes and fittings, a water supply system, including pumping station, 7,000 feet of 5-inch water main and stand pipe with a capacity of 40,000 gallons. A tipple has been erected, equipped with screens, etc., for sorting two sizes of coal. Railway sidings and spur lines have also been laid.

Other coal mines operating in the Taber district are as follows: The Bullock mine, operated by the Domestic Coal Company; the Independent mine, operated by Messrs. Fox & Simms; the Monarch mine, operated by the Monarch Collieries, Limited; the Hopeful mine, operated by John Howells; the Star mine, operated by the Southern Alberta Coal Company; the Golden West mine, operated by the Golden West Coal Company; the Superior mine, operated by the Superior Coal Company; and a number of small mines operated by individuals who each employ a few men. The total daily output of these mines is approximately three hundred tons.

The Taber district is now an important mining centre, being the third largest domestic coal producing district in the province, and when all the mines in that district are working full time the output reaches approximately fifteen hundred tons per day. Owing to lack of railway facilities, however, the smaller operators are only able to compete on the market during the busy season of the winter months.

A considerable amount of prospecting work has been done throughout the district during the year and a number of valuable coal properties proven, and indications point to a continued increase in production in this district during the next few years.

Medicine Hat, Grassy Lake, and Milk River Districts.

A few small mines are operating in vicinity of Medicine Hat, Grassy Lake and Milk River, but owing to lack of railway facilities the output so far is regulated to a great extent by local demand.

Little Bow District.

In the Little Bow district, about 50 miles north of Lethbridge, there are seven small mines operating, producing a few tons of coal, the output being regulated by the requirements of the settlers throughout the district.

Big Bow Collieries, Limited.

This property is located in township 17, range 17, west of the 4th meridian, on the Big Bow River, about 16 miles south of the C. P. R. main line. Considerable prospecting work was done on the property during the year and a 5-foot seam of domestic coal of good quality, with a sandstone roof, has been proved.

South Fork of the Old Man River.

A considerable amount of prospecting has been done in this district and a large number of coal seams have been proved. Owing to the lack of transportation facilities there has been practically no development work done yet. A number of different companies have secured extensive properties in this district, and with the coming of the railways a considerable production is to be expected. The coal is of a good quality and should find a ready market. It is expected that early next year a railway will be built from Burmis in to the Carbon Hill Coal & Coke Company's property, and from it branch lines into the other properties in the district.

Three Hills and Knee Hill District.

The mines in this district are being worked on a small scale. Owing to the lack of transportation facilities the amount of coal produced is regulated entirely by the local demand. It is expected, however, that within the next few months a railway will be built through this district so that when the railway does get through they will be in a position to ship a considerable output.

Edmonton Standard Coal Company, Limited, Edmonton.

During the past year this company has installed at their mine a hoisting engine, locomotive boiler and ventilating fan, and the output from the mine has been increased about 40 per cent. over that of the previous year.

Alberta Coal Mining Company, Limited, Cardiff.

The tipple at this mine has been remodelled and screens for three sizes of coal installed.

Ritchie Coal Company, Edmonton.

The following machinery and equipment has been installed at this mine during the past year:

A 50 h.p. Leonard return tubular boiler, hoisting engine, ventilating fan, two pumps, weigh scales and tipple capable of handling about 250 tons of coal per day.

Clover Bar Coal Company, Limited, Edmonton.

A spur line has been laid from the G. T. P. railway, a distance of about a quarter of a mile to where a new shaft has been sunk, and the following machinery installed: Two 100 h.p. Robb return tubular boilers; Hoppes feed water heater; hoisting engine, 14 inches x 30 inches direct connected to a 4 1-2-foot drum, and a 10 k.w. electric generator for lighting purposes and driving tipple machinery. The main entries in the old mine are being driven to connect with the new shaft and when the tipple and plant are completed all the coal from the old mine will be hoisted and dumped direct into railway cars.

Humberstone Coal Company, Edmonton.

This company has sunk a new shaft and installed the following machinery: Hoisting engine; locomotive boiler and two pumps. A temporary tipple has been erected and the main entries are being driven to connect with the workings of the old mine.

The output from the mines in the Edmonton district for the past year shows a considerable increase over that of 1908. This increase is, to a certain extent, due to the gradual widening of the market, more coal being shipped to outside points. The mines in this district are operated on a comparatively small scale, still the aggregate output taken from all the mines is fairly large and Edmonton stands as the second largest domestic coal producing centre in the province.

West of Edmonton the first coal lands that have been prospected are along the north side of Wabamun Lake. Small seams of coal crop out on the railway cuttings and a number of prospects have been sunk in the coal, which reaches a thickness of from 18 to 22 feet, with one band of shale about the centre ranging from six inches to a foot.

Further west we reach the crossing of the Pembina River where the coal can be seen out-cropping on the river bank. At this point coal mining has been carried on in a primitive way for a number of years. Besides these outcroppings on the river, a large amount of money has been expended in drilling on the property of the Pembina Coal Company, Limited, with very favourable results. The coal is of the same geological age as that prospected on Wabamun Lake, and in character very similar. Proceeding westward from the Pembina

River, the country is fairly well wooded, mostly with poplar, until about Mile 109, where there are some large spruce timber limits and a sawmill in operation.

The next sign of coal to be seen is at Wolf Creek, Mile 120, where a few small coal seams have been located, but nothing has yet been proved economically workable. The Grand Trunk Pacific Railway at this point crosses the mouth of Wolf Creek at a great height and also the McLeod River at a very high level.

Following the McLeod River westward, large beds of sandstone of the lower Laramie series are passed to Mile 142. In this vicinity it is intended that a branch railway will strike southward to tap the coal fields, following the high lands between the Embarras River and the McLeod River. At the head waters of the Embarras River a large amount of prospecting was done last summer by the Yellowhead Pass Coal & Coke Company. At least four workable seams have been prospected and several tunnels drifted in for about 100 feet. The lower seam is approximately 40 feet in thickness, but inter-stratified occasionally by bends of carbonaceous shale. The other coal seams are cleaner and should make a good steam coal. On the same line of strike southeast of this property is the coal property of the Pacific Coal Company, who own a large area, approximately 35,000 acres. This property has been thoroughly prospected and several tunnels driven in the lower seam. The southeast end of this property is on a different watershed, viz.: the Pembina River.

Crossing the Pembina River southward to the forks of the Brazeau River, which is one of the main branches of the North Saskatchewan River, a coal property has been located by the Canadian Northern Railway, on which there has been a fair amount of prospecting work completed and the coal field proved. This point is much nearer the mountains than any of the other coal properties. Directly due south of the main fork of the Brazeau lie the coal areas of the German Development Company, who have consolidated with the Canadian Northern Railway and are now termed the Rocky Mountain Collieries, Limited. These large coal areas have been thoroughly prospected by Mr. McEvoy, late geologist for the Crow's Nest Pass Coal Company, and according to his report in the CANADIAN MINING JOURNAL, the coke produced from these coals is at least equal to that produced from the coking coals of the Crow's Nest field. In this vicinity, which is townships 39, 40 and 41, ranges 17, 18 and 19, west of the 5th meridian, other coal areas have been located, but very little work has been done on them. Following the same strike of these coal measures in the vicinity of townships 43, 44 and 45, ranges 20, 21 and 22, other large areas of coal lands have been located and some prospecting work done on them.

Farther to the northwest, on the head waters of the McLeod River, which is the next watershed, coal areas have been located by the Canadian Northern Railway and other parties. These coal lands show an analysis similar to that of the Crow's Nest field. On the head waters of the west fork of the McLeod River a large area of coal lands has been located and fairly well prospected. The outcrops at this point are not so prominent as the strata is at a less angle.

Following the pack trail from the west fork of the McLeod River we reach the head waters of Gold Creek, which is on the watershed of the Athabasca River. About the mouth of Gold Creek and its junction with Prairie Creek, a coal seam about four feet in thickness has been located, of a high bituminous character. At the mouth of Prairie Creek we again reach the line of the Grand Trunk Pacific Railway.

Following the railway westward, passing through the Gap or Folding Mountain, another coal area has been located on Fiddle Creek, on which a fair amount of prospecting has been done. The folding at this point, however, is greater than that to the south, but the coal of a higher quality.

Farther west, towards the summit of the Rocky Mountains, small outliers of cretaceous measures have been located north of the railway, but no work has yet been done on any of them. The summit of the Rocky Mountains and the western boundary of Alberta is reached at Dominion Prairie, where the last outliers of the coal bearing cretaceous measures are found.

Work of Inspection.

The work of inspectors has materially increased during the year. The large number of new settlers who have been locating throughout the province has considerably increased the demand for domestic coal in the outlying districts, and has resulted in a number of small mines being opened in the lignite field. Some of these mines are located a long distance from the railways and it requires as much time to reach one of them and make an inspection as it does a large mine which is conveniently located. At the older mines the underground workings are expanding and becoming more difficult to ventilate, the haulage roads are increasing in length and the transportation of the output is being accelerated, requiring the installation of additional machinery, and as a result more time is required to make a thorough examination.

The new legislation commonly known as the "Eight Hour Law," which came into force on April 1st, has created a new condition at the mines respecting the hours of work, and the inspectors have had to devote a considerable amount of their time to the adjustment of the various difficulties met with in connection with the changes in the methods of operating the mines necessary to conform with the new regulations.

The inspectors have made their regular rounds of inspection of all the mines and investigated all fatal and serious accidents, in each case removing as far as practicable the dangers contributary to such accidents.

The installation of safety lamps and the use of permitted explosives in all the bituminous mines has received careful attention during the year and I am pleased to report that the opposition previously raised by some of the operators to the adoption of these safeguards is gradually decreasing. I might explain that while Alberta has no list of permitted explosives, we have up to the present been guided by the British permitted list.

Accidents.

From the list of accidents for the past year, it will be seen that there have been nine fatal accidents, seven of which occurred below ground and two on the surface. Of the fatal accidents below ground, three were caused by falls of roof, two by mine cars, one by suffocation by noxious gases and smoke from mine fire and one by a miner falling down chute. Both fatal accidents above ground were caused by parties being caught between the drawheads while in the act of coupling railway cars. The three fatalities caused by falls of roof occurred at the working face while the parties were engaged at their regular work. The fatal accident due to falling down chute occurred while the miner was returning from his working place.

All of the above fatalities were fully investigated by the inspectors, and from evidence given at the inquests they appear to have been purely accidental.

The fatal accident due to suffocation was the result of a fire on December 12th, which started from some unknown cause in the main intake airway of the Alberta Railway & Irrigation Company's No. 3 mine. In this case the stable boss, Fred Berresford, while endeavouring to reach the stables and save the horses, which were located some 2,000 feet away from the seat of the fire, was overcome by noxious gases and smoke.

The two fatal accidents caused by mine cars occurred in the mine of the Canadian Coal Consolidated Company, Limited, by parties being caught against chutes while riding on mine cars, in contravention of the special rules and a notice which was then posted at the mine. Had the special rules and notice been observed by the persons for whose guidance they were posted, these accidents would not have occurred, but the most explicit instructions are ineffective at times, and in view of this the inspectors have taken steps to remove this danger as far as possible by requiring such changes in the construction of chutes as local conditions will permit.

Compared with 1908, the number of fatal accidents shows a decrease of two, and the number of non-fatal accidents an increase of seven. However, the production of coal has increased proportionately, so that the average number of tons of coal mined per non-fatal accident remains approximately the same.

Tabulated List of Accidents Above and Below Ground.

Cause.	Fatal. Above	Fatal. Below	Serious. Above	Serious. Below	Slight. Above	Slight. Below	Total
Fall of roof and sides	..	3	..	14	..	4	21
Gas explosions	..	..	..	1	..	6	7
Explosives	..	..	..	1	..	3	4
Mine cars	..	2	6	10	2	2	22
Railway cars in mine yards	2	..	..	..	..	..	2
Falling down chutes	..	1	..	1	..	..	2
Cages and shafts	..	..	..	1	..	1	2
Other causes	..	1	5	3	..	..	9
	2	7	11	31	2	16	69

The following list indicates the average number of tons of coal mined each year per fatal accident for 10 years ending December 31st, 1908, and includes all fatal accidents in connection with the operation of mines above and below ground. It might be explained that the comparison from 1899 to 1905, inclusive, is taken from the reports of the Government of the Northwest Territories, which included the present provinces of Alberta and Saskatchewan, and the comparison for the years 1906 to 1908, inclusive, are for the Province of Alberta only:

Number of Tons of Coal Mined per Fatal Accident.

Year.	Tons.
1899	86,556
1900	22,948
1901	115,549
1902	63,836
1903	103,823
1904	130,488
1905	67,756
1906	138,500
1907	96,566
1908	167,727

From the above list it will be seen that conditions with regard to fatal accidents are gradually improving, as the figures show the average number of tons of coal mined per fatal accident for the period of ten years ending December 31st, 1908, is 99,375, while the period of five years, 1899 to 1903, inclusive, shows an average of 78,542 tons mined per fatal accident, and the period of five years, 1904 to 1908, inclusive, shows an average of 120,207 tons, which is an increase over the five years 1899 to 1903, of 41,665 tons. The records for the years 1908 and 1909 were much more satisfactory, there being an average of 167,727 tons mined per fatal accident for the year 1908, or an increase of 29,227 tons over the highest previous year, and an average of 241, 592 tons for the year 1909, or an increase of 73,865 tons over that of 1908.

Schedule of Accidents in Coal Mines During 1909.

(Above and Below Ground.)

Mine and location.	Resulting Fatally	Serious Injury	Slight Injury	Total of Accidents
International Coal & Coke Co., Ltd., Coleman	1	9	3	13
Alberta Railway & Irrigation Co., Ltd., Lethbridge	1	5	3	9
Canada West Coal Co., Ltd., Taber	1	4	2	7
Bankhead Mines, Ltd., Bankhead	1	4	1	6
Canadian Coal Consolidated, Ltd., Frank	3	1	1	5
Royal Collieries, Ltd., Royal View	..	4	1	5
West Canadian Collieries, Ltd., Bellevue Mine	1	2	1	4
West Canadian Collieries, Ltd., Lille Mine	..	2	..	2
Twin City Coal Co., Ltd., Strathcona	..	..	3	3
H. W. McNeill Co., Ltd., Canmore	..	3	..	3
Ansley-Pruitt Coal Mining & Mfg. Co., Medicine Hat	..	1	1	2
Leitch Collieries, Ltd., Passburg	1	1	..	2
Strathcona Coal Co., Strathcona	..	2	..	2
Pincher Creek Coal Mining Co., Ltd., Pincher Creek	..	..	1	1
Cardiff Coal Co., Ltd., Cardiff	..	1	..	1
Great Western Coal Co., Ltd., Taber	..	1	..	1
Clover Bar Coal Co., Ltd. Edmonton	..	..	1	1
Diamond Coal Co., Ltd., Diamond City	..	1	..	1
McGillivray Creek Coal & Coke Co., Ltd., Coleman	..	1	..	1
Total	9	42	18	69

During the year 1907 there were 24 accidents, including fatal, serious and slight, due to explosions of gas and powder and in 1908 there were 14 accidents due to the above causes, while the year 1909 shows but 10 accidents due to these causes. The decrease in the number of fatal accidents for the past two years is largely due to the installation of safety lamps and the use of permitted explosives. From our records on file it is quite evident that all our most serious accidents which have each resulted in a number of deaths in previous years have had their origin in the flame of an open light or by the improper use of explosives, and it would appear that in order to avoid serious accidents the most effective remedies are the installation of modern and securely

locked safety lamps, permitted explosives, and the careful supervision of shot-firing, in all mines where gas is given off or where dust is present in dangerous quantities.

Wages.

The scale of wages paid in the province during 1909 was practically the same as that paid during the two previous years.

The general wage schedule for day labour is as follows:

INSIDE MEN.

Fire bosses	$85.00 to $110.00	per month.
Shotlighters	$3.00 to $3.50	8 hours
Bratticemen	3.00	8 "
Bratticemen helpers	2.50	8 "
Timbermen	3.00	8 "
Timbermen helpers	2.75	8 "
Drivers	2.75	8 "
Drivers, wet places	3.00	8 "
Team drivers	3.00	8 "
Tracklayers	3.00	8 "
Tracklayers' helpers	2.75	8 "
Rock miners	3.50	8 "
Miners	3.00	8 "
Miners, wet places	3.50	8 "
Locomotive engineers	3.00	8 "
Switchmen	2.75	8 "
Chute loaders	2.75	8 "
Labourers	2.50	8 "
Timber handlers	2.75	8 "
Machine men	3.50	8 "
Machine men helpers	3.00	8 "
Switch boys	1.50	8 "
Door boys	1.50	8 "
Hoistmen	3.00	8 "
Rope riders	2.75	8 "
Couplers, boys	1.50	8 "
Couplers, men	2.50	8 "
Pushers	$2.75 to 3.00	8 "

OUTSIDE MEN.

Pithead men	$2.50	10 hours
Dumpers	2.50	10 "
Slate pickers, men	2.00	10 "
Slate pickers, boys	1.25	10 "
Car oilers, boys	1.25	10 "
Car oilers, men	2.00	10 "
Tally boys	1.25	10 "
Teamsters	2.50	10 "
Blacksmiths	3.50	10 "
Blacksmiths' helpers	2.50	10 "
Mine carpenter	3.50	10 "
Mine carpenter helper	2.50	10 "
Car repairers	3.00	10 "
Power house engineers	3.50	12 "
Tipple engineers	3.25	10 "
Locomotive engineers	3.25	10 "
Locomotive engineers' helpers	2.80	10 "
Firemen	2.50	8 "
Car handlers	2.40	10 "
Fanmen	2.50	12 "
Outside labourers	2.25	10 "
Fan firemen	3.00	12 "
Lampmen	2.50	12 "
Machinists	3.20	10 "
Machinists' Helpers	2.50	10 "
Couplers	2.25	10 "
Sawyer	3.00	10 "

Prospect Work.

The number of new railways which have recently been projected throughout the province has had a tendency to renew the activity in prospecting and locating new coal areas. This is especially the case as regards the bituminous fields.

The coal field in the district lying west of Edmonton has only been partially explored, but several large coal areas have been located, on which a number of seams of good bituminous coal have been prospected and proven.

In the Cascade Basin, or in that part of it known as the Kananaskis Valley, the prospect work which was previously well advanced has continued during the year, and according to the report of Mr. D. B. Dowling, of the Dominion Geological Survey, this field contains a large number of easily accessible coal seams which crop out in various places along the sides of the mountains, and when a railway is built into the field a considerable output can be got in a short time.

The large amount of prospecting work which has been carried on south of the Crow's Nest line of railway, in the district known as the South Fork of the Old Man River, has demonstrated that this coal area is equally as large and will eventually be as important as that which is now being worked in the Frank-Coleman field.

West of Lethbridge, along the Macleod-Lethbridge cut-off, a number of bore-holes have been put down by the Lethbridge Collieries, Limited, which have proven that the coal area known as the Lethbridge coal field extends a considerable distance north and west of the present collieries.

During the past year a number of new mines have been opened throughout the province which are being developed very rapidly and present indications point to a substantial increase in the total output of coal for the year 1910.

Portland Canal Mining Company, Limited

Manager's Report.

Stewart, B.C., October 1st, 1910.

C. H. Dickie, President,
Portland Canal Mining Company,
Duncan, B.C.

Dear Sir,—On September 24th both water-wheels at the concentrating mill were run as a trial. Everything moved off in a satisfactory manner. From that date until yesterday one machine after another was connected, the crusher being started on September 27th. Yesterday the first ore was fed into the jigs and tables and our next work will be the adjusting and gauging of their capacity, bedding the jigs and gradually tuning up the plant for the serious work it has in store.

The mill is a substantial and complete one of which no engineer need be ashamed. It is built primarily with regard to economy of operation and with a future increase of capacity in view. A mill which apparently might answer the purpose could have been built for less money, but it would not have lasted so long, done the work so well, nor operated at as low a cost as this. All the work of construction has been well done and the mill with its magnificent water-power is worth many times what it has cost.

It gives me pleasure to report that the separation of the galena from the pyrite and of both from the gangue is easily effected. The ore concentrates more perfectly

than I expected, and I have not seen any from which the gangue was more easily removed. There has never been any reason to doubt that the ore would concentrate successfully, on the contrary, the tests of two years ago were quite conclusive, but the accomplishment of an undertaking of this sort, even if fully expected, is most satisfactory.

The grade of the feed to the mill is for manifest reasons, low for the present. It would be folly to put high or even average, grade ore through until all the machines were adjusted to make a proper saving. As it is needed a better grade of ore will be supplied until the average ore which the mine can continuously produce is reached. Just what this grade will be no one can possibly tell, but it will not be far from that given by me in my report of August 28th, 1908, as the average from No. 1 and No. 2 ore dumps. Such ore will be more profitable than the tests made at that time would indicate because a much cleaner concentration can be made than was then effected.

Development work at the mine has been uniformly satisfactory. The ore body now being opened by the No. 2 and 3 tunnels is proving larger than any other in the mine. Both are in good ore from which high-grade specimens may be obtained and which will average at least as well as the rest of the ore. At one point nearly five feet in width of almost solid ore is exposed and is notable for the increase of lead which it shows. The next one hundred feet on the No. 3 level is most important ground and will develop splendidly judging from the surface and levels above.

From the A raise a new stope has been started which will supply ore when needed. The assays from this point show a higher gold content than the average and this should make good feed for the mill. The ore is about four feet wide.

The B raise is now up more than half way to the No. 1 level and has about thirty feet more to go. There is three feet of ore in the face of this working to-day. With its completion an underground connection down through the mine will be provided and the ore above No. 1 can be economically extracted.

The tunnel on the Eclipse claim, which develops the vein in place about one thousand feet north from and four hundred feet below the No. 3 tunnel, shows a strong seam of ore, mixed in character and about a foot wide, although it probably is not in an ore shoot. Work here has been discontinued for the present, but should be resumed next summer as this is a most important point from which to prosecute development.

I have so often expressed my confidence in the future of the mine that to repeat it now seems superfluous. Its development is fully justifying my expectations and the ore opened is worth many times the company's expenditures for purchase, development and improvement and at no time in the past has it looked so well or promised so much as it does to-day.

All the new buildings, which were badly needed both at the mill and mine, are completed and occupied. These are commodious and furnish many comforts which should insure obtaining the best of labour for the company's requirements.

I remain,

Yours truly,
W. J. ELMENDORF,
Manager.

The Dominion Government is building a telegraph line between Stewart and Portland Canal.

Le Roi Mining Company in Liquidation

Acting on the advice of the company's consulting engineer, Mr. W. A. Carlyle, of London, the shareholders will not spend more money in exploring in the Le Roi mine, at Rossland, B.C., for other shoots of ore of good grade, but have decided the company shall go into voluntary liquidation. Mr. Carlyle reports that during the last ten years a large amount of exploration work has been consistently done, including much diamond-drilling, of which 27,000 feet have been bored since June, 1906, and of this 15,000 feet within the last twelve months. He says, further, the last of the known pay ore is being stoped out and realized upon. To effectively explore for more ore at least $500,000 would have to be provided, but with the knowledge of the mine now possessed after the extensive exploratory work done during the last twelve months, he cannot hold out any hope that there is a prospect of success, even if the large expenditure of money it would require were made.

The company has valuable assets, free and unencumbered by mortgage, and has no debenture issue. Its debts, outside of current expenses, total about $55,000, against which there is cash on hand and money due for ore and smelter products shipped, together approximately $40,000.

A statement published two years ago showed that from February, 1894, to September, 1908, there had been taken from the Le Roi mine 1,445,246 tons of ore, containing 689,057 ounces of gold, 1,038,906 ounces of silver, and 41,600,740 pounds of copper, together of a value of $20,406,627, or an average of $14.12 per ton. Production since then (the mine continues to make a small output) has been between 40,000 and 50,000 tons, worth, say, $500,000, so that the aggregate production to date has been in gross value, approximately $21,000,000.

The Le Roi Mining Company, Limited, was organized in London, June 17, 1898, under the laws of Great Britain, with capitalization £1,000,000, shares £5 par, fully issued and fully paid. Only £50,000 working capital was provided, but as on November 7, 1899, a dividend of five shillings per share was paid, it has had actually no cash capital from the shareholders for development or equipment purposes. Two dividends were paid in 1906, after Mr. A. J. McMillan took charge of its affairs, one shilling and sixpence in March, and two shillings in November. Prior to sale by its Spokane, Washington, owners to the British America Corporation, London, in January, 1898, the Le Roi had paid its American shareholders $995,000 in dividends. Under British ownership much money has been spent in expensive machinery, equipment, sinking the main five-compartment shaft 1,700 feet, and other important underground development, and purchase of the smelting works at Northport, Washington.

It may be interesting at this time to quote from an address of welcome made by Mr. Campbell Sweeny, manager of the Bank of Montreal, Vancouver, to the members of the Western Branch of the Canadian Mining Institute when they met in Vancouver last January. He said, in part: "We have what I think to be one of the most extraordinary mines in the world, namely, the Le Roi mine at Rossland. It is a fact, gentlemen, that to-day there is not one dollar—not a penny piece—of anybody's money in that mine. There was once put into it a few thousands pounds, but within a short period the money was drawn out again, and since then the whole

of the large amount of development work and the extensive equipment of the property have been paid for out of the products of the mine. Yet people in England will say, 'We don't want to hear anything about your British Columbia mines. We have your damned Le Roi, and we never got a penny out of it.' But they must be prepared to take similar risks in British Columbia mines to what they have done in those of the South African Rand if they would make the mines in this country become profit-producing. Old Country people put hundreds of thousands of pounds into Rand mines before they made any profit out of them. They knew well they had to put it in if those mines were to be properly developed, and having put it in, a return came to them in due time, and ever since then they have been receiving dividends from some of those mines. Money must first be put into mines if extensive and effective development is to be secured, and after we get sufficient money put into our mines we shall have them properly developed, and many of them will yield profits and reflect credit on those operating them." It may be added that, as the senior officer of the Bank of Montreal in British Columbia, which for some years financed the Le Roi mining and smelting enterprise, Mr. Sweeny had been in an exceptionally favourable position for knowing the conditions under which the company had been operating, so spoke with knowledge of the subject.

White Pass and Yukon Railway Rates

Among other matters before the Dominion Railway Commission at its sessions held in Vancouver on September 7 and 8, was a complaint by Col. J. H. Conrad (whose name several years ago was prominently before the public in connection with the development of several mineral claims in Windy Arm district, Southern Yukon) alleging against the White Pass & Yukon Railway excessive freight charges on ores from Carcross (Caribou Crossing, as it was at one time known) to Skagway, and on mining machinery and supplies from Skagway to Carcross.

There is no doubt that in the case of copper mines in Southern Yukon, the railway charges have been considered altogether too high to admit of the mines being worked without loss since the fall in the price of copper, and that consequently they have been idle. But the mines Colonel Conrad represents are not copper mines, it being understood that silver is their chief valuable metal.

According to the newspaper reports, the proceedings before the Commission showed evidence of much bitter feeling existing between Colonel Conrad and Mr. S. H. Graves, the president and general manager of the railway company. The complainant claimed that he went ahead with mining development on the assurance that he would be charged an average freight rate of $2.50 per ton on incoming shipments, and $2 per ton on ore shipments to tidewater at Skagway. The mining companies in which he is interested, the Colonel says, employ several hundred men, while a concentrator in operation at Windy Arm is stated to have a capacity of 200 tons a day. No ore is being shipped from the mines pending a decision by the Railway Commission as to freight rates. The question of excessive passenger rates was not included in the complaint for the alleged reason that sooner than pay a charge of 18 cents per mile, the miners when they got out in the fall walk to Skagway. Great stress was placed by Colonel Conrad on his assertion that the mines he represented had had $800,000 spent on them.

It transpired that the rate charged the Conrad mines was $3.75 per ton, whereas the Atlas Company's Pueblo mine, in Whitehorse copper camp, had been granted, under a secret agreement, a special rate of $2.50 a ton, of which agreement no copy had been filed with the Railway Commission, which default Mr. Graves was informed by Judge Mabee, chairman of the Commission, constituted a violation of the Railways Act. Continuing, he said: "You want to do what you please, but the law says you shall not. It is against these secret bargains and contracts that the law has struck. A man who ships a ton of hay for his cow is entitled to the same rate as a man who ships a thousand tons for the upkeep of a thousand cows. That principle has limitations, but a secret contract in the teeth of a printed tariff certainly does not come within those limitations. If it were left to the railway companies to decide, it would allow them to discriminate to the enrichment of one locality and the impoverishment of another. Surely you, as president and manager of a railroad, are acquainted with the Railways Act. If not, I would advise you to buy a copy of the Act and study it."

The decision of the Commission was, in effect, that the freight charge on ore and concentrates from Carcross to Skagway shall be $1.75 per ton; that the complaining companies shall be granted similar facilities for shipment of their ore as the Atlas Mining Company, in Whitehorse camp, and that a copy of the tariff shall be published and the rates adhered to.

Personal and General

Mr. Absolom Beaton, manager of the Dominion Coal Company's No. 2 Colliery, died suddenly from heart failure while on his way to the colliery on the morning of the 12th of October. Mr. Beaton has been manager of No. 2 Colliery since the beginning of 1908, having previous to that been the manager of No. 9 Colliery. This is the first death that has taken place among the mine managers during the time the Coal Company has been incorporated.

Mr. O. B. Smith, Jr., superintendent of the Granby Consolidated M. S. & P. Company's copper mines at Phoenix, B.C., recently visited Spokane, Wash.

Mr. Wm. Rowe, for years a mine superintendent in the Boundary district of British Columbia, is now superintending development work on the coal lands near Burmis, Southwest Alberta, of the Head Syndicate, Limited, of London. Mr. Leslie Hill, of Nelson, B.C., is consulting engineer and manager in Canada for the syndicate.

Mr. R. W. Brock, Director of the Geological Survey Branch of the Canada Department of Mines, has returned to Ottawa from Los Angeles, California, whence he went to attend the thirteenth annual session of the American Mining Congress, held September 26th to October 1st, inclusive. Among other men formerly engaged in mining in Canada, Mr. Brock met at the congress were Mr. S. F. Parrish, at one time general manager of the Le Roi Mining Company, and Mr. J. Cosgrove, who was at the Centre Star mine, also at Rossland, B.C.

Mr. Robert R. Hedley, for some time in charge of the development of Long Lake mine near Sudbury, is now mining engineer and technical adviser to the Canadian

Mining Operators, Limited, a company recently organized at Vancouver, B.C.

Mr. W. M. Brewer, of Victoria, B.C., recently returned to that city after having spent the summer in the North, in the interests of the Pacific Metals Company, Limited, of which he is president.

Mr. G. G. S. Lindsey has returned to Toronto from a trip to British Columbia. While in the West Mr. Lindsey visited Portland Canal and Sheep Creek mining camps, in both of which numbers of new mining properties are being developed.

Mr. W. H. Aldridge, managing director of the Consolidated Mining and Smelting Company of Canada, Limited, has been paying a business visit to Toronto and Montreal.

Mr. E. J. Conway, who graduated in metallurgy at McGill University in 1909, and afterward was assayer at the Whitewater mines, Slocan district, B.C., is now with the Tyee Copper Company, a mining and smelting company of excellent standing, operating on the Pacific coast.

Mr. John Hopp, one of the largest operators in hydraulic gold mining in British Columbia, has returned to Cariboo from the coast, where he has been recuperating following ptomaine poisoning, from which he suffered during several weeks.

Dr. A. E. Barlow has changed his place of abode from 51 Trafalgar Avenue, Montreal, to 328 Roslyn Avenue, Montreal.

Mr. Alex. H. Smith has returned from Mexico and is at present in Porcupine. Mr. Smith's Toronto address is 19 Wellington Street West.

Mr. R. B. Lamb, of 15 Broad Street, New York, has opened an office in Room 703, Traders Bank Building, Toronto. Mr. Lamb has had long experience in both Australian and American mining and metallurgical practice. For some time henceforward his residence will be in Toronto.

Correspondence

To the Editor CANADIAN MINING JOURNAL:

Sir,—In the summary report of the Mines Branch of the Geological Survey of Canada for the year 1909, page 20, I notice the following, "Mr. Theo C. Denis was intrusted with the examination of the manganese ore deposits which formerly were actively worked in the Maritime Provinces, with a view to investigating the causes which led to their abandonment. It was thought that some of these mines might be re-opened as a source of manganese for the steel industry in Canada and the United States." At pages 58-63 Mr. Denis tells us, he visited four abandoned properties in Nova Scotia and three in New Brunswick. From the examination of these he concludes, "that the manganese deposits of the Maritime Provinces are irregular and pockety" and that "the nature of such deposits does not permit of the installation of plants for economic mining and handling cheaply large quantities of material." There is one redeeming feature, however, "the ores are very high, pure and applicable to the uses which require the greatest purity."

If we are to infer that the report of Mr. Denis is a report on the manganese deposits of the Maritime Provinces or of the "Canadian ores of manganese" then we can only conclude that the total area of these deposits is included in a district in each of the two provinces each having a radius of not more than eight or ten miles. This would be very misleading. If the only information the Department of Mines required was, to know whether these abandoned mines might be re-opened as a "source of manganese for the steel works" it is regrettable that the valuable services of Mr. Denis should have been wasted, when a letter addressed to either of the steel works in Nova Scotia or to their mining engineer would have furnished much more reliable and valuable information than it was possible for Mr. Denis to obtain from local farmers or lumbermen.

I do not for a moment attempt to criticize the ability of Mr. Denis to make an intelligent examination and report on these deposits, if he were allowed the time and had an opportunity to make the necessary examinations, but such a report as that published by the Mines Branch on these deposits is not only misleading but useless and detrimental to the industry.

The geological horizon carrying manganese deposits in Nova Scotia, extends irregularly from Kings County on the west, eastwardly through Hants and into Colchester County. Deposits also occur in the Counties of Pictou, Cumberland, Lunenburg, and the four counties of Cape Breton Island. Within this territory some of the deposits are very promising; as the Loch Lomond deposit in Cape Breton County formerly operated by the late Hon. E. T. Mosley; the East River deposits of Pictou County, where the ore is only suitable for steel manufacturing. Small lots have been mined for that purpose. The deposits at Manganese Mines, Colchester County, Pembroke and Cheverie, Hants County, have all been operated in the past for high grade ore, and some of these show better indications of producing ore suitable for steel purposes than any of the deposits of Nova Scotia visited by Mr. Denis. In Lunenburg County the reported developments during the past few years have shown that the manganese deposits there have greater magnitude and more regularity than any other deposits yet discovered in the Maritime Provinces.

No mention of the above named properties nor of many other prospects has been made in this report; nor has any notice been taken of that large manganese bearing area of the Magdalen Islands, which geologically resembles very closely the deposits in the Batesville region of Arkansas.

It may be true, but very questionable, that the Maritime Provinces cannot produce any valuable deposits of manganese suitable for steel purposes. It certainly is not fair to the country to make public such an assertion on the evidence gathered from Mr. Denis' casual glance at a few abandoned mines which are full of water and offer no opportunity for examination. To one who has made a study of these deposits it is simply ludicrous to speak of these few abandoned properties visited as "The Canadian ores of manganese."

We are told that the ores are "irregular and pockety." This is the same old cudgel that has been beating the life out of Nova Scotian mines for many years. I should like to ask from what source this information that the ores are "irregular and pockety" was gained? It certainly was not gained from underground examination. Will the Department of Mines kindly tell what difference it makes if the ore is pockety provided the pockets are large enough for profitable mining, or if irregular in formation if the irregularities are understood?

Again, from the same source we gather the information that these deposits will not permit the installation of plants for the economic handling of large quantities of material. On this point Mr. Denis' informant was in

error. When the formation of manganese ores is thoroughly understood, then the mining of it is not so uncertain, particularly in Nova Scotia. The principal reason for closing Tennycape mines (one of the abandoned mines visited) was the lack of machinery for handling cheaply large quantities of material. In this mine there are thousands of tons of material carrying from 15 to 25 per cent. of high grade pyrolusite that was wasted for want of machinery to handle it cheaply. This is also true of the 50,000 tons of dump material at this mine which has been estimated to contain 10 per cent. or more of manganese lost for lack of modern concentrating machinery.

There can be no question that the information given by the Department of Mines from time to time has been of great value, but this value does not consist in such reports as the one published on the manganese deposits. It is submitted that not only should it be the aim of the Department of Mines to tell us of what grade our ores are but also to tell us what value they have in the market and what market they are suitable for. This report tells us the manganese ores are of exceptional purity and would probably bring better prices for some other purposes than the steel industry. The advice that the operator should proceed cautiously and look carefully into the markets, etc., is rather obsolete. It would be much better to advise how to proceed economically and intelligently in mining and give the necessary information regarding the uses and demand of these ores of "exceptional purity." How to prepare them for the market so as to get the greatest possible value, and how to avoid the conditions of the past when the miner had to deal with the middleman and thus lose a great part of his profits.

Above all it should be the duty of the Department of Mines to be very cautious in making reports on ore properties without a thorough knowledge of them. A mining engineer depending on his reputation for a living would live but a short time after making such a report as this on the manganese deposits of the Maritime Provinces.

W. F. JENNISON.

Truro, N.S., Sept. 16th, 1910.

The Editor CANADIAN MINING JOURNAL:

Sir,—Your interpretation of the term "intellectual proletariat" in No. 16 of the CANADIAN MINING JOURNAL, though in general correct, is not quite exact. The growing tendency towards university education in Germany in recent years has had the effect of overcrowding the professions to such an extent that the average yearly earning of a medical man in Berlin does not exceed $750, and the most highly-trained chemists and engineers eagerly seek situations which bring them in $600 annually.

This overproduction of "trained intellect" has resulted in the swelling of the ranks of the dissatisfied political party, "the Social Democrats," and later the forming of unions, among medical men for instance, similar to those of the working men over here.

The term "intellectual proletariat" was first used in Parliament by a member who was commenting on the extraordinary increase of the Social Democratic party by men whose university education should have taught them better than to allow themselves to be identified with this party.

Yours truly,

MARTIN NORDEGG.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay: Dominion Coal Output.—The aggregate output for the nine months ending 30th September was 2,608,000, comparing with 2,097,000 tons for the same period of last year. The output for the first nine months of 1908 was 2,867,179 tons. The output for the whole year will be about three and a half million tons, which will be a return to the figures reached in the years 1906, 1907 and 1908. For some years past the Dominion Coal Company's mines have had an output capacity of four million tons per annum, but the Hub mine fire in 1906, the trade depression in 1907 and the U.M.W.A. strike in 1909-10 have in their turn prevented the passing of the three and a half million mark.

The output of the mines for the four months June to September has never been exceeded, and if October outputs reach 350,000, as they probably will, an average of over 352,000 tons per month will have been maintained over the major portion of the shipping season. The actual figures are as follows:

	Tons.
June	358,069
July	354,022
August	350,090
September	348,234
October (Estimated)	350,000
	1,760,415

This is a very good and consistent average, and never before in the history of the company has so much coal been extracted in so limited a time.

The Coal Company is considering the erection of a modern washery to replace the one destroyed by fire several years ago. Quotations have been asked for. The site has not yet been selected. This is a further indication of the company's intention to keep pace with its American competitors in the preparation of coal for the market.

The exhaust-steam turbine and condensing plant at No. 2 colliery are nearing completion. The company has also under consideration the erection of a brick smoke-stack at this colliery to replace some of the steel stacks now in use, and the installation of an automatic coal-handling plant. All these additions will add to the efficiency and economy of the power-producing plant at this colliery.

ONTARIO.

Cobalt, October 19.—Between bad transportation and lack of power the South Lorrain camp has been little more than marking time this year. Now the Mines Power Company, which is producing power at the Matabitchouan five miles away, has received new transformers for the Brady Lake station at Cobalt and is shipping the old transformers to Beaver Lake where the substation to serve the South Lorrain camp is only waiting for the machinery. The company promises to deliver power by the end of this month and it is most probable that compressors in South Lorrain will be running with the juice before the freeze-up.

Before ice on Lake Temiskaming prevents the transportation of ore across to South Temiskaming and Mattawa the Keeley will ship two cars of ore, one high and one low grade. This company, controlled in England, late this summer struck a rich streak of ore in their vein and are raising it regularly from their 100 foot level. The station has been cut at the 170-foot level and the vein which has been dipped slightly will be cut

in a few days. As at the 100-foot level it showed much richer in the bottom of the drift than in the roof, the management has hopes of striking into good ore.

In the third quarterly report of the Crown Reserve for this year the balance shown is $610,595.50. The surplus at the end of 1909 was $549,275.42, and the surplus for the year so far is shown as $61,320.08. At the present rate each dividend means a disbursement of $265,322.10 and this year the Crown Reserve has paid to shareholders $795,966.30. Out of 77 cars shipped 23 cars were of high grade and the remainder low for the year to date.

It is reported that a syndicate of Cobalt and Toronto men is attempting to obtain control of the Silver Bar in order to work it. The amount to be raised, it is stated, is $50,000, and with it the $35,000 owed by the company will be paid and the remainder devoted to development. The Silver Bar continued to develop rather languidly till a year ago, when the shaft house was burned down. It was never rebuilt.

The Buffalo mine shipped seven bars of bullion on Oct. 15. Eight mines have now contributed to the bullion output of the camp. The record reads: O'Brien, Buffalo, Nova Scotia, Temiskaming, Crown Reserve, Cobalt Gem, La Rose, Beaver. Altogether, a value of $274,171 has been shipped in bullion from the camp. Four-fifths of this goes to London, England, to the Bank of England brokers.

At the annual meeting of the City of Cobalt Mining Company it was decided not to declare a dividend this year but to devote the surplus showing to the development of the property and the search for further ore bodies. The balance profit and loss for 1909 was $179,900.51; cash received from smelters, $103,335.16, making total assets of $283,235.67. The royalty T. & N. O. Commission, $5,111.11; concentrator charges, $18,493.11; freight and smelter charges, $7,046.24; balance, $252,585.21. The superintendent's report shows that 253,000 feet of stoping have been done in the mine and 7,750 feet of drifting and cross cutting. In 1910 the City has shipped 361 tons, six cars of screening and low grade and six cars of high grade and concentrates. As reserves, it is estimated that there are 7,000 tons containing 175,000 ounces left in the mine. On the dump there is estimated to be 250,000 ounces, making a total of 425,000 ounces.

In the west drift of the Bailey Cobalt at the 252 foot level a well defined vein carrying high grade silver values has been cut. On the same level four stringers, all carrying good silver values, are being followed. Arrangements have been made with the liquidator of the Cobalt Central to treat some of the Bailey ore.

A Quebec syndicate named La Compagnie Miniere de la Vallee du St. Maurice is going to do some work on an island in Sasaginaga Lake just to the west of Cobalt. A shaft will be sunk a hundred feet and camp buildings erected. Mr. Sydney Smith is the consulting engineer for the property.

The Kerr Lake Mining Company has again declared ten per cent., five per cent. regular and five per cent. extra, for the fourth quarter of the year. The company's record for 1910 now reads 40 per cent., or $1,200,000.

The two veins in the west drift of the Cobalt Provincial mine at Cobalt at the 175-foot level have merged and now show about five inches of ore, considerably richer than when the two ore bodies appeared to be separate.

The whole of the assets of the Standard Cobalt Mines will be sold by public auction on December 28. The assets of the company in a bill of sale are estimated to be worth $1,925,756.03. It is stipulated by the terms of sale that the ore in the bins belongs to the liquidator and the purchaser has to mill it at a fixed rate of not more than $2.75 a ton.

Last month the Savage mine of the McKinley-Darragh group produced 48,700 ounces. In the cross-cut from the No. 4 shaft at the 80-foot level a strong calcite vein carrying cobalt and silver values has been cut. From its location and appearance it is expected to make ore soon.

Taking with them a Cobalt engineer, a number of Montreal business men have gone up to Guibord Township to examine the claims of the Gold Pyramid Company, with a view to purchase if the report is satisfactory. The men interested are directors in the Thelma Gold Mining Company in Bryce Township.

Considerable work is being done at the Maiden Silver Mining Company of South Lorrain. From the 85-foot level a cross-cut has been pushed 75 feet to catch the No. 1 vein which, on the surface, showed smaltite with good silver values.

The Temiskaming Mining Company decided at a late meeting at the mine to pay a dividend of 3 per cent., which will mean a disbursement of $75,000. With this dividend to be paid on Nov. 1st the Temiskaming will have paid 24 per cent., or $584,156.25. The last dividend was paid on April 11, 1909. The vein at the 500-foot level of the mine has been cut but no ore shoot of any high grade value has been encountered yet.

The Right of Way is conducting operations on the south end of the property by means of three shafts. The three principal veins are furnishing good high grade ore and shipments of one car of high and two of low grade are being maintained month by month. Prospecting work is being conducted from the Little Nipissing shaft where a cross-cut is being driven northward to open up unexplored ground.

Gowganda.—The Three claims belonging to the O'Gorman-Sweete syndicate, eight miles south of Gowganda in the Hanging Stone District, have definitely been taken over by the Temiskaming & Hudson Bay Company, who have just made the first payment. Some remarkable surface finds were made and the New Liskeard syndicate did not make first payment until a considerable amount of work had revealed good prospects.

Elk Lake.—At the annual meeting of the Mount Royal Cobalt Silver Mining Company it was decided not to work the property until next season. Stock will be offered in the London market. The Mount Royal owns property on Elk Lake near Elk Lake City.

It is stated that the Beacon Consolidated, working the Cleaves claims at Elk Lake, are determined to put machinery on the property this winter and carry out a considerable amount of underground development.

Porcupine.—It is stated that on the claims owned by Mr. R. T. Shillington and A. Richardson, of Haileybury, a 20-foot vein of quartz showing free gold has been uncovered. They adjoin the Connell veteran claims which have been sold to the Consolidated Goldfields of South Africa.

On the claims under option to Mr. Clem Foster, of Haileybury, work is going to recommence at once. These claims lie near the Dome, and the vein there was first discovered soon after the more famous discovery was made. It has been traced for 2,500 feet, stripped for 500 feet, and is one of the most remarkable ore bodies in the Porcupine camp. It is remarkable for its free gold showings. Two shafts of 50 feet are going to be sunk on the vein to prove it up.

The Government has now cut its road through to Porcupine and a considerable amount of traffic is being taken in on jumpers or stone boats. The heavy rains and the heavy traffic have, however, combined to make the clay trail very bad indeed.

The two Homer veteran claims purchased by Mr. Connell have been sold by him and Mr. Rea, of Chicago, to agents of the Consolidated Goldfields of South Africa. The showing is one of the most remarkable in the whole of the Porcupine camp. Little work has been accomplished on the property to date, but the purchasers are determined to discover the worth of their optioned claim at once.

There has been a brisk sale in Porcupine mining claims during the past few weeks, though the prices obtained are not

nearly as high as currently reported. Good options can be obtained if the seller is willing to take small initial payments.

The Peacock interests in the Silver Cliff Mining Company have purchased five gold properties in the western part of Nova Scotia. The properties sold are the Park and Douglas, Ballou, Nelson, Fisk and Caledonia. The properties are situated in the Molega District of Queen's County, Nova Scotia.

Kenora.—The copper property on Alley Island, Lake of the Woods, located by prospector Moore, the managing of which is in the hands of Dr. S. S. Scovil, is showing very good results up to date. The main shaft is now down over 50 feet and the ore is becoming richer. This property is one of exceptional interest, since in spite of predictions that the native copper which outcropped on the surface would give place below to copper pyrites, the ore is still showing large amounts of free copper in horns, wires, and granules in increasing quantities. The work is still being pushed forward on this property by the original holders, although there is a rumour that American interests, which already control the largest of the copper producers, are about to acquire this property.

The Mikado mine, which is under the management of R. B. Nickerson, is showing up as well or even better than was expected even from the favourable reports made by the engineer before the Kenora Mines Company began to operate. Two new drills have been put in operation on the seventh level. All the stamps are being worked to their capacity. There is a large amount of ore in sight and within a short period now the cyanide plant will be in full swing. It is clear that the confidence displayed in this mine by those citizens of this town who inaugurated the Kenora Mines, Limited, has been justified, for there is no doubt that the property is a good one and with proper management will soon take its place among the gold producers of to-day.

Work is now proceeding on Location K47 on Ziz Zag Point in Clear Water Bay, Lake of the Woods. The shaft is down about 40 feet and the showing is so good that the owners are delighted and are pushing development work as fast as possible. A contract has been let to sink 200 feet on the claim.

There have been several iron claims taken up in the neighbourhood of Dryden and the syndicate interested has been negotiating for the purchase of the 30,000 horse-power falls from the Lake of the Woods into Winnipeg River here at Kenora. The deal, however, has not yet been completed, but if it should go through, there is every possibility of the establishment here of an electrical furnace for the reduction of iron, similar to those successfully employed for such work in Sweden.

The engineer for the Lac Seul Railroad which will connect Kenora with the Grand Trunk Crossing, is on the ground getting together his party to run trial lines for this road. The operation of this road will be of considerable importance to the prospector in this district, as it opens communication between here and the Grand Trunk Pacific and by means of that railroad that district lying north of the Canadian Pacific Railway, which has only been very slightly visited by the prospector.

A new combination has taken hold of West Hawk Lake and Star Lake properties with the intention of finding the necessary capital to proceed with the development of these very promising prospects.

BRITISH COLUMBIA.

Among the topics of particular interest connected with the mining and smelting industries of the province that attracted notice during the first half of October were the annual reports of the Consolidated Mining & Smelting Company of Canada, Limited, and the Granby Consolidated Mining, Smelting & Power Company, Limited, respectively, each of which companies held its annual general meeting of shareholders—the former at the end of September, and the latter early in October. Some comment on these reports is made separately.

In Nelson mining division, much interest was taken in an investigation by the Provincial Water Commissioners into the position of a number of holders of water rights and applicants for records of water from Sheep Creek and its tributaries. The evidence adduced made plain the necessity for system and due consideration for the rights of others in dealing with applications for the right to use water, and that the Provincial Government did well, though its action in this direction was long delayed, in appointing commissioners to straighten out the water tangles and see that only bona fide users of water shall retain the right to same. The particular concern about water in Sheep Creek district has arisen in connection with the water requirements, present and prospective, of mineral claim and mine owners for use in stamp mills, of which there are several in this gold camp, and the erection of others is intended.

In the Boundary district, the recently completed enlargement of two blast furnaces at the British Columbia Copper Company's copper smeltery at Greenwood, the resumption of ore shipping from the New Dominion Copper Company's Rawhide mine, in Phoenix camp; the ore going now to the Greenwood works instead of to Boundary Falls; and the resumption of production at the No. 7 mine, which, after having been inoperative for about eight years, has been acquired and is being worked by the Consolidated Mining & Smelting Company; are noteworthy developments.

In the Coast district, the chief incident in connection with mining, was the starting of concentration operations at the Portland Canal Mining Company's newly erected concentrator, situated within a couple of miles of the mine, and near the short line of railway in course of construction by the Mackenzie & Mann interests, Toronto. A few tons of ore—less than half-a-dozen—were lately sent from other claims to the Tyee Copper Company's smeltery, Vancouver Island, for test purposes, but with this exception the Portland Canal Mining Company is the first in the Portland Canal district to turn its ore to commercial account.

Cariboo.—The secretary of the West Canadian Deep Leads, Limited, in a communication to the London Mining Journal, under date September 20, wrote: "At present we are sinking what we believe is the biggest shaft ever sunk in Cariboo in deep ground, the lead lying at a depth of 253 feet. The dimensions of the shaft are 18 feet by 6 feet, internal measurement, with three compartments, and the present depth is 120 feet." Some time since Mr. L. A. Bonner, resident manager of this company, gave the gold commissioner for Cariboo district the following information concerning this company: "The West Canadian Deep Leads Company was formed to exercise the option held by the original syndicate upon leases of claims situated on Little Valley Creek. Two cross sections were made in 1908 by means of a Keystone drill to establish the depth, gradient, and position of an assumed channel. The results of the borings made, in the opinion of the company's consulting engineer, Professor S. Herbert Cox, A.R.S.M., London, Eng., warrants the outlay necessary to sink a shaft 260 feet to bed rock, to cross-cut the channel and test for gold. Much preliminary work was necessary, particularly in the construction of a wagon road, over which to haul the somewhat heavy machinery purchased for the property. The shaft now started has two winding compartments, each 4 feet 4 inches by 6 feet in the clear, and one pumping compartment 7 feet 6 inches by 6 feet. Two 80 h.p. and one 36 h.p. boilers have been provided. Cameron sinking pumps are to be used as far as their capacity will allow, and two 18-inch Cornish pumps, driven by a cross compound Corliss engine, are to be the station pumps. Should payable dirt be encountered, a hydro-electric plant will be put in for power supply purposes. It is expected about 30 men will be employed while the work of sinking is in progress."

East Kootenay.—Fire at the Crow's Nest Pass Coal Company's slack bins, Fernie, did damage to an extent estimated at between $10,000 and $15,000. It is stated that it will be practicable to continue making coke in the adjacent ovens with little

interruption, there being alternative provision for supplying the ovens with the slack coal required for this purpose.

It is announced that work will again be done on the Estella group, situated on a mountain near Tracy and distant from Fort Steele about 15 miles, on which a considerable amount of development was done in the early nineties. Two lodes have been worked on, one showing gray copper, with copper carbonates and some galena, and the other galena. The property was examined in 1898 by the Provincial Mineralogist, who in his report mentioned having traced the galena outcropping over the hill for from 500 to 800 feet, and finding the width, as exposed on the surface, from 6 to 24 inches of almost solid galena. In his report for 1902 the District Gold Commissioner mentioned that the long tunnel was in 1,250 feet and showed in one crosscut 3 feet of clean galena with some 15 feet of concentrating ore. Lack of transportation facilities has been the cause of this property having been so long idle. Now that the construction of the Kootenay Central Railway up the valley of the Kootenay River is in progress, the prospect of transportation being thus made available has led to the Estella again receiving attention.

Ainsworth.—The long tunnel of the Highlander mine, owned by the Highlander Mill & Mining Company, of Philadelphia, Pennsylvania, is to be lengthened. The mine was examined lately by Mr. F. M. Kurie, of Philadelphia. For the report of the Canada Zinc Commission, Mr. Philip Argall, of Denver, Colorado, stated that this mine had been developed, up to the latter part of 1905, by 2,766 feet of tunnel work, 1,227 feet of drifts, and 430 feet of winzes and raises; total footage of development, 4,423 feet. The vein varies in width from about 2 to 25 feet, and may be said to average 3 feet of concentrating ore in the shoots opened on the main Highlander tunnel-horizon south drift. About 700 tons of lead concentrate and 100 tons of hand-sorted lead ore have been shipped from this mine, average metal contents having been stated at 67 per cent. lead, 4 per cent. zinc, and 22 ounces of silver per ton. The Highlander group of mineral claims aggregates in area 380 acres. In the course of his report Mr. Argall said: "The Highlander property has the appearance of having had far too much money squandered on the main tunnel, in search of elusive veins at great depth, to the neglect of the large vein, which is really a first-class prospect and deserving of thorough development." Little, if any, work has been done on this property during recent years.

Slocan.—Shipments of silver-lead concentrates from the Van Roi mine during the year have now reached a total in excess of 1,000 tons; the Richmond-Eureka group output has totalled 3,400 tons of silver-lead ore; that of the Standard about 1,300 tons; the Ellis Silver Mining Company's Eastmont mine has shipped nearly 600 tons; the Rambler-Cariboo and Ruth-Hope group each about 500 tons, and the Mollie Hughes 300 tons; while smaller shipments have been made from the Slocan Star, Idaho, Bluebird, Hewitt and several other district mines.

Nelson.—The Granite-Poorman 20-stamp mill is being kept steadily at work crushing ore from the mines of that name. Last year's tonnage was between 10,000 and 11,000 tons, so this year's, to date, may be placed at about 8,000 tons, for usually the mill is kept running with little interruption in its work. The price of copper continues too low for profitable operations at the Queen Victoria, so no ore is being sent from this mine to the smeltery just now. Mr. F. W. Guernsey is superintending work at the Molly Gibson mine, recently acquired by the Consolidated Company, and ore will be sent to Trail as soon as it can be shipped with advantage.

Ymir.—An air compressor has been received at the Ymir railway station for the Yankee Girl mine, the output of which for the year is more than 4,200 tons of gold-silver ore, shipped to Trail. The manager, Mr. H. L. Rodgers, has gone to New York to discuss with his directors a contemplated enlargement of operations and the putting in of a concentration plant, which is contemplated.

Salmo and Erie.—The tonnage of lead ore shipped from the Emerald mine, near Salmo, this year now totals more than 1,600 tons, which is 500 tons in excess of its total for the whole of 1909. Both the Arlington and Second Relief, at Erie, have been worked this year; now it is announced that the Big Bump is to have much development done and a stamp mill erected, by a Spokane syndicate.

Sheep Creek.—The Queen, Nugget, and Mother Lode mines continue to be the most active in this camp. Production figures published at Nelson show that some 16,400 tons of ore have been milled at the Queen 20-stamp mill, and 4,300 at the Nugget during nine months to October 1. Important underground development has been in progress in the Mother Lode mine all the year and it is claimed that $1,000,000 worth of ore is blocked out. Several other properties are also being prospected.

Rossland.—Outside of the important work and large production being maintained by the Consolidated Company at its Centre Star group of mines, and the steady progress of Le Roi No. 2, some activity exists. There is a probability of several of the smaller properties in this camp adding a little to the total of production. Both the I.X.L. and Bluebird are being worked, and now the Derby claim of the Spitzee Mining Company will probably be prospected. The Granby Company is developing the Cliff, with good prospects of making a regular producer of it.

Boundary.—Total output of ore from this camp for the year is now nearly 1,300,000 tons, more than two-thirds of which have come from the Granby mines. The B. C. Copper Company is gradually enlarging its operations; the output of ore from its Mother Lode mine is being increased, it is now receiving ore from the Rawhide mine, development and production at its Wellington group are in progress, the construction of a 5-mile aerial tramway from its Lone Star and Washington mines has been commenced, and the enlargement of two blast furnaces at its smeltery completed, this last improvement bringing the treatment capacity of the works up to between 2,500 and 3,000 tons of ore per diem. The Consolidated Company is sending more than 2,000 tons of ore weekly from the Snowshoe mine to Trail, and is preparing its No. 7 mine for making a regular output of ore.

Similkameen.—The Hedley Gold Mining Company has closed another quarter's operations with gratifying profit—more than twice as much as will pay the customary quarterly dividend at the rate of 12 per cent. per annum. The new plant at the 40-stamp mill will add to the gold-saving facilities, so that even better results may be expected from this forward. Efforts are being made to sell stock in the Pollock Gold Mines, Limited, a company projected to acquire and operate a group of half-a-dozen claims near Hedley, assay returns of ore from which are stated to average $17 per ton. The Osoyoos Coal Company, of Nelson, is prospecting its coal lands, in the Princeton district, and the Columbia Coal & Coke Company, of Winnipeg, is putting in a compressor and other plant, to facilitate the opening of the coal seams on its property at Granite Creek.

Yale.—Other parts of the big Yale district, beside the Boundary and Similkameen, in which more or less mining work is in progress are the Nicola Valley, Kamloops, Revelstoke, and Yale divisions. Coal mining in Nicola Valley is becoming quite an important industry, while a collection of metalliferous minerals from here was awarded first prize for a district exhibit at the Nelson annual exhibition. About Kamloops both metal claims and coal lands are being prospected, while in several instances important development work—notably at the Iron Mask mine—has been arranged for. In Revelstoke division there is little mining other than placering in the Big Bend of the Columbia country. Farther northward the mica deposits have been worked throughout the summer and 1,000 pounds of mica sheets sent out, these ranging from 6 by 8 inches upwards. Beside this, half a carload of special mica, 3 by 4 and 4 by 5 inches, was, according to the local newspaper, shipped to England. Be-

tween Hope and the International boundary line, numerous claims have been staked and recorded, and reports of finds of ore giving good assay returns have been received.

Coast.—The Britannia mine, near Howe Sound, has been shipping ore and concentrate to the smeltery at Tacoma, Washington. The further prospecting of the big occurrence of ore near Green Lake has been in progress. Mining on Vancouver Island has been restricted chiefly to coal, of which a large output is being made by the Canadian Collieries (Dunsmuir), Limited, Western Fuel Company, and Pacific Coast Coal Mines, Limited. On Lasqueti, Texada, and Valdes Islands gold-copper ores are being mined, but as yet commercial production is from mines on Texada Island only. Mining on the Queen Charlotte Islands continues to be the development of several copper properties on Moresby Island and the prospecting of coal lands on Graham Island.

In the Portland Canal district, the chief activity is on the respective properties of the Portland Canal Mining Company, Stewart, and Red Cliff. The first-named expects to shortly make its first shipment of concentrates to the smeltery; the Red Cliff is now pushing on its deep-level tunnel, now in about 1,000 feet and with 200 to 300 feet to be driven to reach the ore-shoot it is calculated is that distance ahead. The Pacific Metals Company, Limited, of Victoria, is developing the Red Wing and Red Jacket claims, on Goose Bay, Observatory Inlet, with promising results.

GENERAL MINING NEWS.

NOVA SCOTIA.

Springhill Mines, October 16.—To-day witnessed the first blood shed since the beginning of the long strike. Daniel McKay, aged 20, while on his way home, was stabbed in the back by an Italian. While McKay was receiving medical treatment at the Crescent Club rooms, another young man, George Crummie, was brought in suffering from a pistol shot in the face. The assailant of these men has not as yet been captured.

Halifax.—Cobalt interests are preparing to invest a considerable amount of money in Molega gold district. This is the third or fourth recent instance of the kind.

QUEBEC.

Quebec, October 14.—An action for $250,000 is being heard in the Superior Court before Mr. Justice Lemieux. This is a claim taken by the Bell Asbestos Mines against the King Asbestos Mines, and is based on an alleged encroachment of property.

ONTARIO.

Queensboro.—Manager S. N. Graham, of the Canadian Sulphur Ore Company, Queensboro, is making excellent progress. The main shaft is being sunk rapidly and levels are being run in good ore. Shipments will be maintained throughout the winter. The ore is remarkably high grade. As massive pyrite ore this occurrence is phenomenally pure and is in strong demand.

Madoc.—The G. H. Gillespie talc mill is running steadily. Large shipments are made weekly to Germany, Great Britain and the United States, in addition to various Canadian points.

Toronto.—An order directing the sale of the Cobalt Central property has been entered in the High Court of Justice at Toronto. The sale will be held on December 28th next at the office of the liquidator, E. R. C. Clarkson. The property comprises 240 acres. The total book value of the property is $1,926,753, of which $1,627,238 represents the value of the property and $166,053 of the prospecting and developing work done. The company is capitalized at $5,000,000 and has paid $192,485 in dividends. The stock has a par value of $1 and is now selling around 7 cents.

Toronto, October 20.—The Federal Government, it is learned, will take no action regarding the question of bounties or duties on iron and steel.

Iron and steel bounties—that is, the bounties that are paid on pig iron, puddled bars and steel ingots—will expire on the 31st of December next. The bounty paid on the manufacture of steel rods, however, will not cease until July 1st next. Payment may be made after the 30th of June on rods actually made and sold prior to that date.

The legislation regarding steel rods was passed last session at the instance of Hon. W. S. Fielding. During the discussion in committee on the bill, the question was asked of the Minister of Finance whether a duty would be imposed to take the place of the bounties.

Mr. Fielding replied: "We certainly have no such intention at present. What may come in the future, I cannot say."

Porcupine, October 20.—The Porcupine Mine Owners' Association has received details of the transaction whereby the Consolidated Goldfields Company, of South Africa, has taken over the controlling interests in the Rea Mines, Limited, of Porcupine. This company has been organized to purchase the Connell Veteran claims, a total of 320 acres, situated in the heart of the richest area of the Porcupine district.

Mr. John T. Milliken, of St. Louis, president of the Golden Cycle Company, of Cripple Creek district, of Colorado, is largely interested in this new company. Mr. Louis Webb, of Webb Bros., consulting engineers for the Consolidated Goldfields Company, reported on the Connell properties for his clients. Mr. Webb's examination was so entirely satisfactory that the deal was consummated within ten days after his return from Porcupine.

Mr. T. H. Rea stated to a representative of the Porcupine Mine Owners' Association that the necessary machinery and equipment had been ordered, that camps were being built to accommodate a large force of men and that three shafts will be sunk at once.

The most important vein on this property so far found is from fifteen to sixteen feet in width and for 200 feet carries spectacular gold values on the surface. Two shafts have already been sunk on this vein to a depth of twenty-two feet each and at this depth the values are as high as on the surface.

This is the first Canadian venture of the Consolidated Goldfields Company of South Africa.

The Milliken interests last year took over the Provincial mine at Cobalt, Ontario.

BRITISH COLUMBIA.

Nelson, October 14.—R. F. Tolmie, deputy minister of mines, with Mr. F. H. Shepherd, the chief inspector, has left for the Crow's Nest mining field to establish at Fernie the first of three government rescue-stations in connection with the operating collieries of British Columbia.

Upon the return of officials to the coast arrangements will be made for the installation of the Nanaimo and Cumberland stations. All the apparatus for three stations is now en route.

It is the intention of the mines department also to install a central station at Middlesboro in the Nicola country, to support colliery installations as required by the Coal Mines Regulation Act.

Nelson, October 25.—Le Roi mine, once banner producer of Rossland, with its smelter at Northport, is for sale. At a recent meeting in England, Mr. A. J. McMullen was appointed sale

liquidator, and is now on his way to Rossland to dispose of property. Recent diamond drilling failed to disclose any rich ore bodies, and it is considered cost of extraction and treatment of ore reserves on lower levels is too high to be profitable. Company has balance in bank and one of most complete mining plants in the country.

Victoria, B.C., October 25.—It was disclosed to-day that the action brought by Hon. James Dunsmuir against Mr. William Mackenzie for one million dollars is the second chapter in the litigation arising out of the purchase by the Canadian Collieries, Limited, of the immense coal mine interests of the Dunsmuirs on Vancouver Island. The initial step to bring the dispute into the courts was taken some time ago by W. J. Taylor, K.C., acting for the Canadian Collieries. The latter, in their statement of claim, alleged that Mr. Dunsmuir failed to keep the properties intact during the continuance of the option given to Mr. Mackenzie, but disposed of a large quantity of coal, also that the sum of $400,000, which was in the treasury of the Dunsmuir company at the time the option was taken, was later declared as dividend, and passed into the hands of Mr. Dunsmuir and his associates.

Mr. Taylor will to-morrow apply to the Judge of the Supreme Court for an order to stop the action brought by Mr. Dunsmuir against Mr. Mackenzie, on the grounds of abuse of the process of the courts, and its being vexatious to have two actions for the same cause between the same parties.

COMPANY REPORTS.

MARITIME COAL, RAILWAY AND POWER COMPANY, LIMITED.

At the regular meeting, October 20th, of the Maritime Coal, Railway and Power Company, Limited, which was held at the head offices of the company it was decided by the directors to equip the slopes at Joggins with electric coal cutters and also to install an electric plant of suitable size, not only for the present output, but for future requirements of the mine.

THIRD LA ROSE ANNUAL.

La Rose Consolidated Mines Company and controlled companies report for the fiscal year ended May 31st last, is as follows:

	1910	Changes Inc.
Gross earnings	$1,691,099	$126,031
Expenses	748,003	237,505
Net earnings	$943,096	*$111,474
Dividends paid	910,000	276,910
Surplus	$33,096	*$388,384

* Decrease.

The combined surplus of the company on May 31st last was $469,959, as against $436,863 at the beginning of the last fiscal period.

The income account of La Rose Consolidated follows: Dividends received, $909,993; dividends paid, $898,924; balance, $11,069; administration expenses, $28,995; deficit, $17,926; previous surplus, $21,707; profit and loss surplus, $3,781.

Following is a summary of shipments for the twelve months: Dry tons shipped, 6,313,905; gross ounces silver contained, 3,100,444; gross silver value, $1,620,341; average price received, per ounce, 52.261 cents; received from sales of cobalt, $29,698; gross value silver plus cobalt paid for, $1,650,039; smelter deduction, freight and treatment, $208,065; net value received from ore sales, $1,441,974.

The report shows that the total cost of producing silver during the year was $737,842, and the total marketing expense was $216,936. Mill rock treated during the year was 18,423 dry tons, and the profit on mill rock was $138,218.

The report calls attention to the fact that the company continued during the year to be one of the largest producers of silver in the Cobalt district. During the twelve months the total dividends paid were equivalent to 12 per cent. on the company's capital stock, while the combined surplus at the close of the year of the holding and operating companies was $473,741.

Attention is also called to the fact that the new management which assumed control in October a year ago, deemed it wise to reduce the dividend in order to carry on an extensive programme of development work, with a view to increasing the company's ore reserves and surplus. Ore reserves on May 31st were 5,544,449 ounces.

President D. Lorne McGibbon says that since the close of the fiscal period, ore reserves have been maintained, the available cash assets have been increased almost $200,000,and several discoveries have been made, notably the one in the Princess mine, which is very important. This vein averages about three inches in width, and assays on the average nearly 4,000 ounces per ton.

TRETHEWEY'S POSITION.

In a statement issued by the Trethewey Company on October 15th, when the dividend cheques for the 10 per cent. dividend recently declared were sent out, it is shown that on October 1st the company had cash in bank and due from smelters $207,740.74, ore sacked at mine $12,847, leaving $220,587.74. After providing for dividends and outstanding indebtedness there is a surplus of $102,759.45.

NIPISSING.

The financial condition of the Nipissing Mines Company (operating company), October 1st, 1910, was as follows:

Cash in bank	$572,038
Ore in transit and at smelters	315,141
Ore sacked at mine ready for shipment	457,422
Total	$1,344,601

BUFFALO DIVIDEND.

Buffalo Mines Company, Limited, has declared an extra dividend of 3 per cent. on the capital stock, payable November 15th. In September the regular quarterly dividend of 5 per cent. and 3 per cent. extra was declared.

AMALGAMATED COPPER.

The Amalgamated Copper Company has declared the usual quatrerly dividend of 50 cents per share. The company has now distributed $48.50 per share since organization, or a total of $66,376,364.

BRITISH COLUMBIA COPPER COMPANY EARNINGS.

The British Columbia Copper Company reports net earnings for September of $27,600, and cost of producing copper at 8.3 cents per pound.

CITY OF COBALT DIVIDEND.

At the annual meeting of the City of Cobalt Mining Company on October 15th the following statement of affairs was presented:

Detail Profit and Loss Account.

Balance profit and loss, 1909	$179,900.51
Cash from smelters	103,335.16
	$283,235.67
Royalty, T. & N. O.	$ 5,111.11
Concentrating charges	18,493.11
Freight, smelter	7,046.24
Balance	252,585.21
	$283,235.67

The cash on hand on October 1st was $36.39, while the bank showed merely $12,002.66. The other points of interest at the meeting were that it was not considered opportune at the present time to declare a dividend and the number of directors was reduced.

GRANBY CONSOLIDATED.

At the recent annual stockholders' meeting, of Granby Consolidated, Jacob Langeloth, then president and a director of the corporation, but no longer connected with the corporation in an official capacity, replied to a stockholder's question that there would be no dividend forthcoming in the near future, even though the treasury was in strong position.

Granby is now declared by an official to be in the best position in its history, physically and financially. The company never made any pretence of putting in sight an enormous ore tonnage, but since commencement of operations it has blocked out more ahead each month than was extracted in the same period. The much-talked-of Sussman report on the property did not by any means cover the entire territory. For instance, between the main working property and the Gold Drop mine there is an expanse of fully a mile, somewhat wooded, and known by the management to be mineralized. Dr. Sussman did not take this into account.

When Mr. Langeloth and his associates entered Granby they did it on the recommendation of the same Dr. Sussman, who made the recent report. Their interest, conceded to be the largest individual one, averaged to cost $40 a share on the basis of the present par value of $100.

It will not be long before the entire Granby battery of eight furnaces will be in operation; the capacity of the smelter is 4,500 tons daily. Last year there was treated but little over 1,000,000 tons, whereas 1,800,000 tons could have been put through the plant after completion of all enlargements. This excess capacity will be used for whatever custom business can be secured. There is a great custom field in the Boundary district. It is a vast mineralized territory containing low-grade ores and with a little encouragement small owners and leasers could be induced to mine and ship to a friendly smelter, where there was probability of a profit.

Granby does not owe a dollar, and aside from its mine and plant, has a valuable asset in its large block of Crow's Nest Pass Coal Company, which not only pays a dividend return on the investment, but also insures an ample fuel supply. The water power property, yet in an undeveloped stage, will probably during the next year or two be given attention and put on an operating basis. Transportation facilities with both the Canadian Pacific and Great Northern railroads running up to the ore bins, could not be better. Rates have been scaled during the past few years very heavily.

As to whether the average contents of the ore treated can be improved over the figures indicated from last year's operations—between 18 and 19 pounds of copper per ton—is a question for the future to decide.

CROWN RESERVE.

The general manager of Crown Reserve Mining Company reports to his directors for nine months ending September 30th, 1910, as follows:

The most important development during this period has been the discovery of Vein No. 28 at the 200-foot level, 890 feet east of No. 1 cross-cut; this is probably one of the veins that we cut with the diamond drill. When cut this vein showed from six to eight inches of heavy smaltite ore carrying some silver, also two calcite veins rich in silver, running almost parallel to it, and about two feet away. We have drifted on this vein for about 150 feet in continuous ore, but of erratic values. We have had assays from the six inches of smaltite that have gone over four thousand ounces, but the average assay is probably about one thousand ounces. This vein, however, is just at the contact between the Keewatin and the conglomerate, and we hope to find richer values in the finer conglomerates above as was our experience with veins Nos. 17 and 24.

Victoria Vein.—We have proved up this vein for a distance of 120 feet, the ore being from two to five inches in width and will average about four thousand ounces. We have a winze down twenty feet below the 100-foot level in continuous rich ore.

Carson Vein.—We have during the past nine months only extracted ten tons of ore from the big stope at the 100-foot level, having done most of our work in the stope at the 200-foot level all in rich ore. We are now getting into the conglomerates in this stope, the vein running 10 to 12 inches wide and assaying four thousand ounces.

Veins Nos. 17 and 24.—We have continued stoping on both these veins each being two inches in width and running about 4,000 ounces.

Vein No. 2.—The important development on this vein was the discovery of a bonanza shoot of ore running six inches in width and averaging over six thousand ounces for a length of forty-five feet. This ore was discovered in stoping about fifteen feet above the 100-foot level.

Veins Nos. 3, 4 and 12.—We have drifted on these veins, all of which have shown continuous ore, about two inches in width and averaging five hundred ounces.

Total Development.

	Quarter Year Feet	Half Year Feet	This Year Feet	To Date Feet
Sinking and raising	175	249	424	1129
Drifting	419	610	1029	2854
Cross-cutting	102	1058	1160	3562
	696	1917	2613	7545

During the last three months we have installed in our ore house Richard's jigs to handle a finer product than the old Hartz jig and are concentrating the screenings on a Wilfley table. This means a saving to the company of one hundred dollars net a day in freight and treatment charges.

Our main shaft is now through to the 300-foot level, after putting in the required timbers we will start sinking winzes from the 300-foot level with the object of proving up the Keewatin formation for at least 300 feet and which will give us a depth of 600 feet.

It is also our intention during the next quarter to raise No. 28 vein, so as to continue our No. 22 cross-cut to our eastern boundary line and to drift on some of our smaller veins.

The financial report is as follows:

We shipped during that period 77 cars of ore, 23 cars being high grade and 54 being low grade, of a total net value of	$1,146,203.96
Bank interest	4,100.00
	$1,150,303.96

Our operating expenses for the same period, including a large amount of development work, were		184,128.21
		$966,175.75
Less royalty to the Ontario Government for the same period		108,889.37
Showing a net profit on our operations for the nine months of		857,286.38

Out of this amount dividends have been paid as follows:

No. 8, paid 15th April, 1910	$265,322.10	
No. 9, paid 15th July, 1910	265,322.10	
No. 10, payable 15th October, 1910	265,322.10	
		795,966.30
Leaving a balance which will further strengthen our substantial surplus of		$61,320.08
Surplus, December 31st, 1909		$549,275.42
Surplus as above		61,320.08
Surplus at 30th September, 1910		$610,595.50

STATISTICS AND RETURNS

BUFFALO'S SEPTEMBER RUN.

The mill report for the Buffalo mines for September reads: Mill run, 556 hours; ore milled, 3,718 tons; average assay per ton before milling, 28.35 ounces; ounces of silver recovered, 82,639. Milling expenses—Labour, $3,450.23; power, $1,414.43. Ounces of silver paid for during month (shipped previously), $120,695. No estimates are made of high-grade ore, but returns are included under "ounces of silver paid for," as smelters make settlement. Silver quotation of October 1st, 1910, per ounce, 54⅛ cents.

GOLD OUTPUT OF THE RAND.

The output of gold at the Rand for September was 646,899 fine ounces, valued at £2,747,853.

BRITISH COLUMBIA LEAD RETURNS.

The report made by the Trail smelter to G. O. Buchanan, Dominion lead bounty commissioner, on the amount of lead ores and lead contents received during the month of September contains the names of a number of properties which have not previously shipped for some months and several which have not been on the list for over a year. Among these are the Enterprise, the Fidelity, the Hewitt and the Standard.

The report shows a considerable increase over the former months of the present year and is an indication of the changes which have taken place in the mining situation in this part of British Columbia during the past summer months. It will be seen that the percentage of lead in the ores varies from as low as an eighth of one per cent. to as high as 70 per cent. An interesting feature of the past month's report is that for the first time in many years the St. Eugene takes second place in the totals of lead ore sent to Trail. The Sullivan heads the list with approximately 3,600 short tons. The figures in the following report represent pounds:

Mine	Weight.	Lead.
Bluebird (Rossland)	48,667	2,095
Bismark	34,623	1,731
Emerald	344,484	122,326
Enterprise	46,165	15,142
Eastmount	135,668	18,092
Ferguson	56,769	11,524
Fidelity	663	263
Hewitt	42,985	3,095
Highland	132,061	79,498
Idaho Alamo	142,234	39,056
Molly Hughes	63,556	572
Noonday	29,497	9,999
Mayflower	38,081	990
Ruth	140,893	80,393
Standard	399,072	283,460
Slocan Star	172,890	56,114
Yankee Girl	744,825	19,839
Van Roi	211,395	125,995
E. W. Widdowson (assay office)	2,348	89
Richmond-Eureka	626,147	96,991
Sullivan	7,251,890	1,352,586
St. Eugene	1,183,394	716,034
Total	11,848,307	3,035,884

BRITISH COLUMBIA ORE SHIPMENTS.

The Rossland ore shipments for the year to date, including the estimated amount milled by LeRoi No. 2, pass the 200,000 mark in tonnage this week.

The following are the returns of the ore production and movement for the week ended October 15th, and also for the year to date:

Boundary Shipments.

Granby	13,646	896,534
Mother Lode	9,503	276,163
Snowshoe	2,131	119,192
Jack Pot	329	10,470
Rawhide	2,800	6,700
Other mines	.....	9,523
Total	28,409	1,318,582

Rossland Shipments.

Centre Star	3,730	150,681
LeRoi, No. 2	557	24,990
LeRoi No. 2, milled	300	12,300
Nickle Plate	67	609
Other mines	.....	12,172
Total	4,654	200,752

Slocan-Kootenay Shipments.

Greenwood, B.C.

St. Eugene, milled	2,775	113,775
Van Roi, milled	800	32,800
Queen, milled	420	17,220
Granite-Poorman, milled	250	10,250
Nugget, milled	110	4,510
Highland, milled	450	7,600
Wilcox, milled	75	600
Richmond-Eureka	59	3,371
Yankee Girl	85	4,252
Molly Hughes	34	326
Sullivan	838	15,912
No. Seven	31	104
Other mines	.....	36,400
Total	5,927	247,120

The total shipments for the week, including the estimated amount milled, were 38,990 tons, and for the year to date, 1,766,454 tons.

British Columbia Copper Company's Receipts.

Greenwood, B.C.

Mother Lode	9,503	276,163
Jack Pot	329	10,470
Rawhide	2,800	6,700
Total	12,632	302,672

Granby Smelter Receipts.

Grand Forks, B.C.

Granby	13,646	896,534
Other mines	.....	120
Total	13,646	896,654

Consolidated Company's Receipts.

Trail, B.C.

St. Eugene, concentrates	150	11,843
LeRoi No. 2, part concentrates	557	24,990
Highland, concentrates	71	241
Centre Star	3,730	150,681
Snowshoe	2,131	119,192
Richmond-Eureka	59	3,371
Yankee Girl	85	4,252
Molly Hughes	34	326
Sullivan	838	15,912
Nickle Plate	67	609
No. Seven	31	104
Other mines	.....	34,803
Total	7,753	366,324

The total receipts at the smelters for the week, including concentrates, were 34,031 tons, and for the year to date, 1,565,650 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending October 22nd, and those from January 1st, 1910, to date:

	Oct. 22. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	226,217
Buffalo	52,430	1,949,428
City of Cobalt	.....	348,875
Chambers-Ferland	.....	1,463,900
Cobalt Central	.....	293,286
Cobalt Lake	.....	300,900
Cobalt Townsite	64,000	518,840
Colonial	.....	245,580
Coniagas	62,540	1,623,976
Crown Reserve	.....	5,117,900
Drummond	.....	664,200
Hargraves	42,300	443,470
Hudson Bay	.....	417,925
Kerr Lake	387,700	8,598,324
King Edward	.....	263,406
La Rose	184,740	9,085,271
McKinley-Darragh	174,510	3,345,599
Nipissing	309,310	10,288,937
O'Brien	.....	987,216
Peterson Lake	.....	432,420
Provincial	.....	65,000
Right of Way	62,270	1,470,327
Rochester	.....	60,750
Silver Cliff	.....	268,720
Standard Cobalt	.....	258,951
Temiskaming	141,870	1,913,350
Trethewey	.....	808,580
Waldman	.....	63,992
Wyandoh	.....	48,300

Ore shipments for the week ending October 22nd were 1,481,670 pounds, or 740 tons.

Total shipments from January 1st to October 22nd were 51,773,650 pounds, or 25,886 tons.

Shipments of ore from Cobalt camp for week ended October 15th were 10,229,000 pounds, or 511½ tons, divided among nine mines. Shipments for the year to date now total 50,291,980 pounds, or 25,145 tons. Shipments for the week and year (in pounds of ore) are:

	Week ended Oct. 15.	Year.
Beaver	.....	276,217
Buffalo	57,270	1,896,998
City of Cobalt	.....	548,875
Chambers-Ferland	64,000	1,463,900
Cobalt Central	.....	552,237
Cobalt Lake	40,000	300,900
Cobalt Townsite	.....	454,840
Colonial	52,100	245,500
Coniagas	59,170	1,761,400
Crown Reserve	.....	5,117,900
Drummond	.....	664,200
Hargraves	.....	401,170
Hudson Bay	.....	417,925
Kerr Lake	360,620	8,210,264
La Rose	.....	8,900,234
McKinley-Darragh	117,300	3,371,089
Nipissing	195,900	9,979,627
O'Brien	.....	987,296
Peterson Lake	.....	432,420
Provincial	.....	65,000
Right of Way	76,500	1,408,867
Rochester	.....	60,700
Silver Cliff	.....	268,720
Temiskaming	.....	1,711,430
Trethewey	.....	808,580
Waldman	.....	63,997
Wyandoh	.....	48,300

TORONTO MARKETS.

Oct. 25.—(Quotations from Canada Metal Co., Toronto).

Spelter, 6 cents per lb.
Lead, 3.65 cents per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 38½ cents per lb.
Copper, casting, 13.25 cents per lb.
Electrolytic, 13.25 cents per lb.
Ingot brass, 8½ to 12½ cents per lb.

Oct. 25.—Pig Iron (Quotations from Drummond McCall Co., Toronto).

Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.50 (f.o.b. Toronto).
Hamilton No. 1, $20.00 (f.o.b. Hamilton).
Hamilton No. 2, $19.50 (f.o.b. Hamilton).
Clarence, $20.00 (f.o.b. Toronto).
Cleveland, $20.50 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

Oct. 21.—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.55 to $1.60 per ton.
Foundry coke, prompt, $2.00 to $2.15 per ton.
Oct. 21.—Tin (Straits), 37.25 to 37.37½ cents.
Copper, Prime Lake, 13.00 cents.
Electrolytic copper, 12.87½ cents.
Copper wire, 14.00 cents.
Lead, 4.47½ cents.
Spelter, 5.70 cents.
Sheet zinc (f.o.b. smelter), 7.50 cents.
Antimony, Cookson's, 8.15 cents.
Aluminium, 22.00 to 22.50 cents.
Nickel, 40.00 to 47.00 cents.
Platinum, ordinary, $38.00 per ounce.
Platinum, hard, $41.00 per ounce.
Bismuth, $1.95 per lb.
Quicksilver, $46.00 per 75-lb. flask.

SILVER PRICES.

	New York cents.	London pence.
October 7	54⅜	25 1/16
" 8	54⅜	25 1/16
" 10	54⅝	25 5/16
" 11	54⅞	25 5/16
" 12	Holiday	25¼
" 13	55⅝	25 11/16
" 14	55½	25⅝
" 15	56	25⅞
" 17	56⅜	26
" 18	56⅛	25⅞
" 19	56¾	26 3/16
" 20	56⅞	26¼
" 21	56⅞	26 3/16
" 22	56⅞	26 3/16
" 24	56⅜	25 15/16

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—October 25, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	15
Black Lake	16	17
Dominion Coal	63	..
Dominion Steel	63	..
Dominion Steel Corporation	59¼	61
Granby	..	33½
Consolidated Mining	60	65
Nova Scotia Steel	..	117

Cobalt Stocks—October 25, 1910.

Amalgamated	.02½	.04
Bailey	.08⅜	.08½
Beaver Consolidated	.31	.31½
Buffalo	2.00	2.10
Chambers-Ferland	.18½	.19
City of Cobalt	.24½	.26
Cobalt Central	.06	.06¾
Cobalt Lake	.15¼	.16
Coniagas	4.10	4.20
Crown Reserve	2.80	2.90
Foster	.09	.10
Gifford	.07⅜	.07½
Great Northern	.08¼	.08⅜
Green Meehan	.02½	.03
Hargraves	.34⅞	.35½
Hudson Bay	89.00	100.00
John Black	.05	.06
Kerr Lake	6.60	6.70
La Rose	4.85	4.90
Little Nipissing	.26¾	.26⅞
McKinley	1.17¼	1.20
Nancy Helen	.02	.05
Nipissing	11.35	11.45
Nova Scotia	.26½	.27½
Ophir	.27½	.28½
Otisse	.02⅜	.02⅝
Peterson Lake	.23	.23⅞
Right of Way	.34¼	.35
Rochester	.15	.15⅜
Silver Leaf	.07½	.08
Silver Bar	.05	.05¾
Silver Queen	.03	.10
Temiskaming (Ex. Div.)	.87	.87½
Trethewey	1.19	1.20
Watts	.01	.05
Wettlaufer	.71	.75

New York Curb—October 25, 1910.

Boston Copper	14¼	14½
British Columbia Copper	6⅞	7⅛
Butte Coalition	19	20
Canadian Mines	6¼	6½
Chino Copper	20¾	20⅞
Davis-Daly Copper	2	2⅛
Ely-Consolidated	.25	.30
Gila Copper	..	..
Giroux Mining	7¾	7⅞
Goldfield Consol.	8⅛	8¼
Greene-Canadian	7	7½
Harcuvar Copper	10	15
Inspiration Copper	9	9 1/16
Miami Copper	19⅝	20
New Baltic Copper	4	8
Nevada Con. Copper	..	..
Ohio Copper	1¾	1 3/16
Rawhide Coalition	.05	.05½
Ray Central	1⅜	1 7/16
Ray Consolidated	20¼	20½
Union Mines	⅞	1
Yukon Gold	3⅞	3 15/16

MONTHLY AVERAGE PRICES OF SILVER, 1910.

	New York cents.	London pence.
January	52.375	24.154
February	51.534	23.794
March	51.454	23.690
April	53.221	24.483
May	53,870	24,797
June	53.462	24.651
July	54.150	25.034
August	52.912	24.428
September	53.295	24.567

INTERNATIONAL COAL DIVIDEND.

The regular quarterly dividend of 1½ per cent. has been declared on International Coal & Coke, payable November 1st.

United States Smelting

Refining & Mining Co.

Buyers of ORES and MATTE

Refiners of

BLISTER COPPER, LEAD BULLION

Copper and Lead Smelters, Copper and Lead Refiners, Chrome, N.Y., Grasselli, Ind., Midvale, Utah, Bingham Jct., Utah, Needles, Cal., Kennett, Cal., Pachuca, Mex.

Main Office, 55 Congress Street, Boston

District Offices: 42 Broadway, New York, Grasselli, Ind., Salt Lake City, Utah, Kennett, Cal., Needles, Cal., Pachuca, Mex.

United States Smelting, Refining and Mining Co.

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

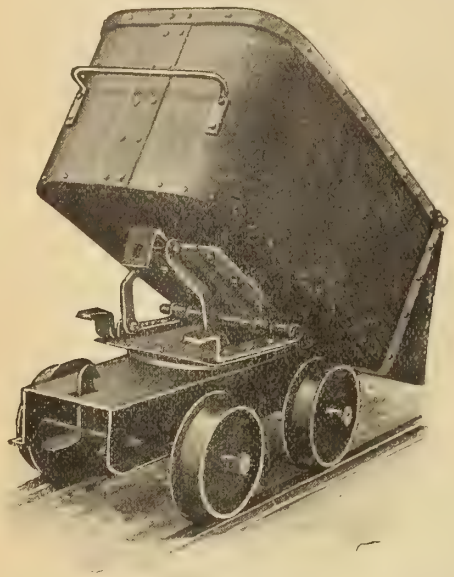
For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent, Board of Trade Bldg., Montreal

J. S. CARTER, Gen. Agent, 450 Main St., Winnipeg, Man.

I. E. SUCKLING, Gen. Agent, S. E. Corner King & Yonge Sts., Toronto, Ont.

STEEL ORE CARS



Dumps on Sides and Rear End

The cars can be made of any capacity and gauge of track to suit requirements. Steel consturction. Very substantial and durable. All our various makes of dumping cars are fitted with special car locks automatic in action, allowing the car to dump to an angle of 30 degrees before the door is released.

A Car for Every Requirement

The Canadian Fairbanks Co. LIMITED

Fairbanks Scales - Fairbanks-Morse Gas Engines - Safes and Vaults

Montreal Toronto St. John, N. B Winnipeg Saskatoon Calgary Vancouver

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Ore Shipments

We take personal charge of your shipments to the Atlantic Seaboard, attend to the weighing, sampling, assaying and all other details

We have been successful because we furnish our clients with returns quicker than our competitors.

Consign your shipments to us and rest assured you will get the maximum returns.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

Want Advt.

Mining Engineer, technical graduate wants position with Coal Co. in Western Canada. Experienced Surveyor, Assayer and Draftsman. Unmarried, age 26. Low initial salary, no objection if chances are good.

Address, Box 653,
Oshawa, Ont.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

Lamb, R. B.
Mining Engineer and Metallurgist
Traders Bank Bldg.
Toronto, Ontario

Loring, Frank C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

Leckie, J. Edwards
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

Longyear & Hodge
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

Ralph A. Meyers, E.M., B. Sc.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

Magee, Boyd
Consulting Mining Engineer
HAILEYBURY and TORONTO

Miles, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: Obadul Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc., and any work connected with the mining profession.

Perkins, Frank Clinton
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

Alexander H. Smith
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

Scott, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

Smith, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

Spencer, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

Sutcliffe & Neelands,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

Walter E. Segsworth
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

Tyrrell, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

Willmott, A. B., M. A., B. Sc.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

Webb R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

Woolsey, W. J.
Mining Engineer
THETFORD MINES, QUE.

Survey of Mining Claims Townsites, Town Lots, Etc.
Mine Surveying Municipal Engineering
CODE & CODE
Ontario Land Surveyors and Civil Engineers
Offices: COBALT and GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

John, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

Carey, Elmer Ellsworth,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

Brown, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - Cobalt, Ont.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office; McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

G. W. DIXON
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

S. F. KAVANAGH, Assayer, Mining Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors. Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
404 Lumsden Bldg, TORONTO.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

JOHNSON, ALBERT
Assessment Work—Drifting and Sinking contracted in Northern Ontario. Absolute Satisfaction Guaranteed.
Thirty Years experience in Gold, Copper and Iron Mining. Mining Claims for Sale.
Cobalt, Ont.

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building,
Montreal

FOR SALE

Two Locomotive Type Boilers of about 125 horse-power; weighing 31,000 lbs. each; for prompt delivery; will be sold at a bargain.

ADDRESS—
THE CANADIAN LOCOMOTIVE CO., LTD.
KINGSTON, ONT.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology as applied to practical mining.* It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

Deloro Mining and Reduction Co., Limited.

Smelters and Refiners
Buyers of Silver—Cobalt Ores

Manufacturers of White Arsenic and Cobalt Oxide

Smelter and Refinery at Deloro Ontario

Branch Office:
806 Lumsden Building
Cor Adelaide and Yonge Sts. - - TORONTO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL
The Canadian Copper Company

Nickel for Nickel Steel
The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

From Niagara to the Sea.

An Ideal Summer Outing



through the famous 1000 Islands and "Shooting the Rapids" of the St. Lawrence via the

Richelieu & Ontario Nav. Co.

For full Particulars, Rates, Folders etc. apply

THOS. HENRY, Traffic Manager, Montreal.

H. FOSTER CHAFFEE, A. G. P. A., Toronto.

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

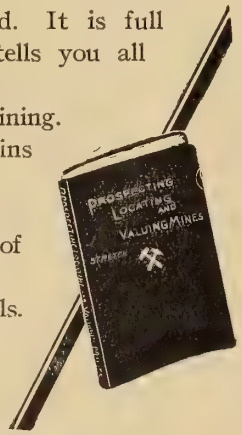


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,
TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co. vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co..... ...xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, C. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd,, Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,
John McDougall Caledonian Iron Works Co., Ltd.

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,
John McDougall Caledonian Iron Works Co., Ltd.

Condensers—
John McDougall Caledonian Iron Works Co., Ltd.
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
John McDougall Caledonian Iron Works Co., Ltd.
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
John McDougall Caledonian Iron Works Co., Ltd.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
John McDougall Caledonian Iron Works Co., Ltd.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

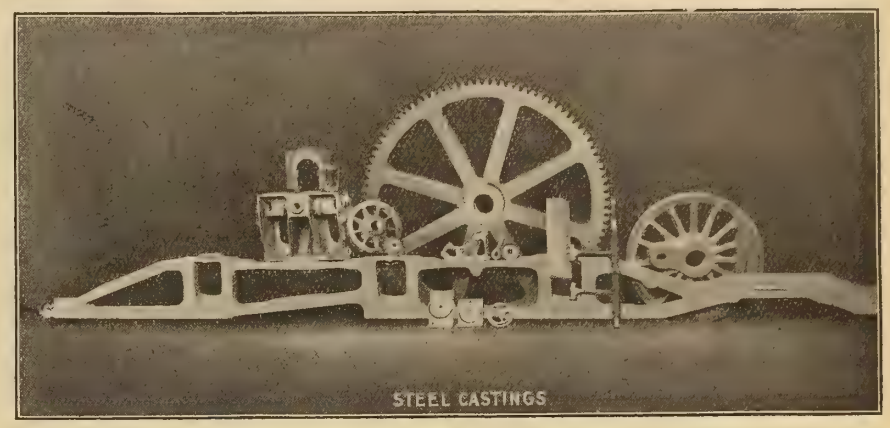
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

THOS. FIRTH & SONS, LIMITED, SHEFFIELD, ENGLAND
"Speedicut" High Speed Steel, Tool Steel, Axe Steel, Saw Steel, Files, etc. A large stock carried in our warehouse

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND
Quotations for Tee Rails, Fish Plates, etc , promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

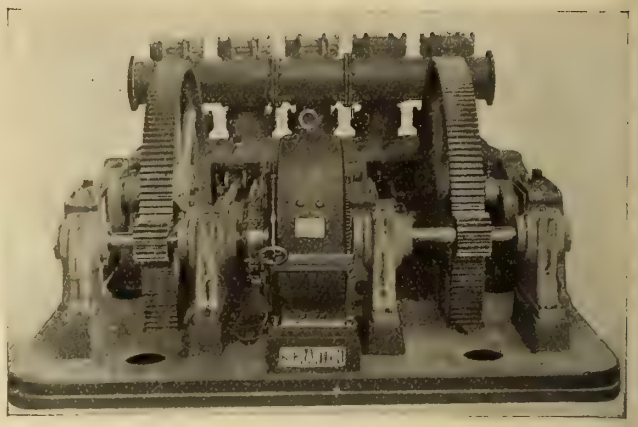
MONCTON, N.B.

Westinghouse Motors
For Driving Pumps

You Do Not Have to Watch Westinghouse Motor-Driven Pumps

They practically run themselves. For intermittent service the motor may be automatically started and stopped by means of pressure regulator, or by variation in height of water. The consumption of power is thereby regulated by the actual work being done.—A Westinghouse Motor is much simpler than any form of engine; it is always ready for instant service; it has no reciprocating parts; no pistons to wear and require packing; no dirt, exhaust steam or vibration to contend with. The bearings are self-oiling and require only an occasional inspection and renewal of oil.

Send for Circular No. 1512



Westinghouse 200 H. P., 500 Volt, Type "E. M" Motor, Driving 11 x 18 Quintuplex Pump, 2,000 gal. Capacity, 250-ft. Head.

Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Foot Magneto Electric Blasting Machine.

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto



ON TIME

One of the most important business transactions which sensible minded men should perform on time is that of making proper provision for those who are dependent on them for the necessities of life.

The only way to do this is by means of life insurance. The only way to do it on time is to act now while in health. The most satisfactory way is to insure at once in the

North American Life
ASSURANCE COMPANY
"Solid as the Continent"

HEAD OFFICE, - - TORONTO

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.

Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora

THE
ASBESTOS MANUFACTURING COMPANY
LIMITED

LA CHINE, P. Q. - - - - CANADA

MANUFACTURERS OF

Asbestos Products

Asbestos Steam Pipe and Boiler Coverings, Asbestos Sheathing, Building Felts and Papers, Asbestos Millboards, Asbestos Sheet and Piston Packings, Asbestos Textiles of every description, Twines, Yarns, Tapes, Thread, Cord, etc. Theatre Curtains.

Asbestos Cement Shingles, Asbestos Corrugated Sheathing, Asbestos Building Lumber, Flat Sheets.

Correspondence Solicited
Quotations Cheerfully Given

Mines. Bell Asbestos Mines,
Thetford Mines, P. Q.

ADDRESS YOUR CORRESPONDENCE TO

The Asbestos Manufacturing Company, Limited

No. 263 St. James Street, Victoria Square Montreal, Canada

THE CANADIAN MINING JOURNAL

VOL. 31 TORONTO No. 22

The Pulsometer-

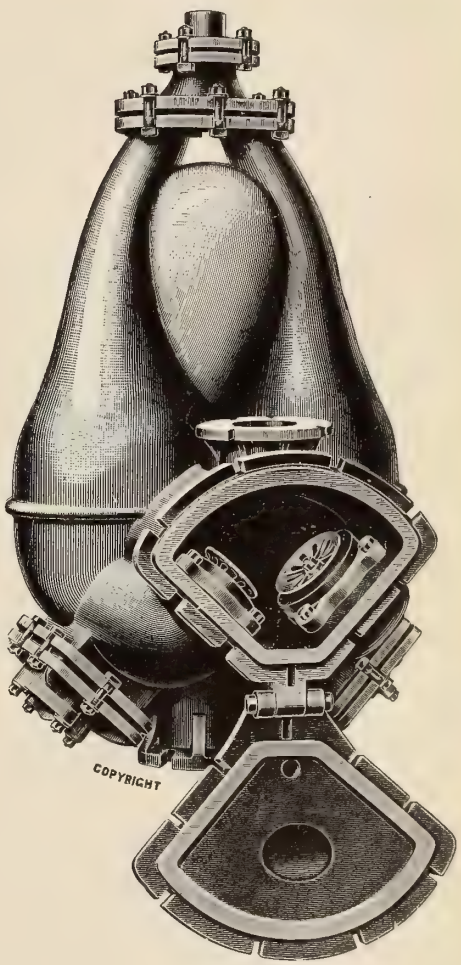
Will give you better satisfaction than any other pump.

It has fewer moving parts and requires less attention.

It pumps dirty and gritty water to perfection.

It will work in almost any position.

It is economical in the use of steam. Don't wait till the last minute before investigating. Let us send you a catalogue now, so that when the time comes you will know just what is best suited to your requirements.

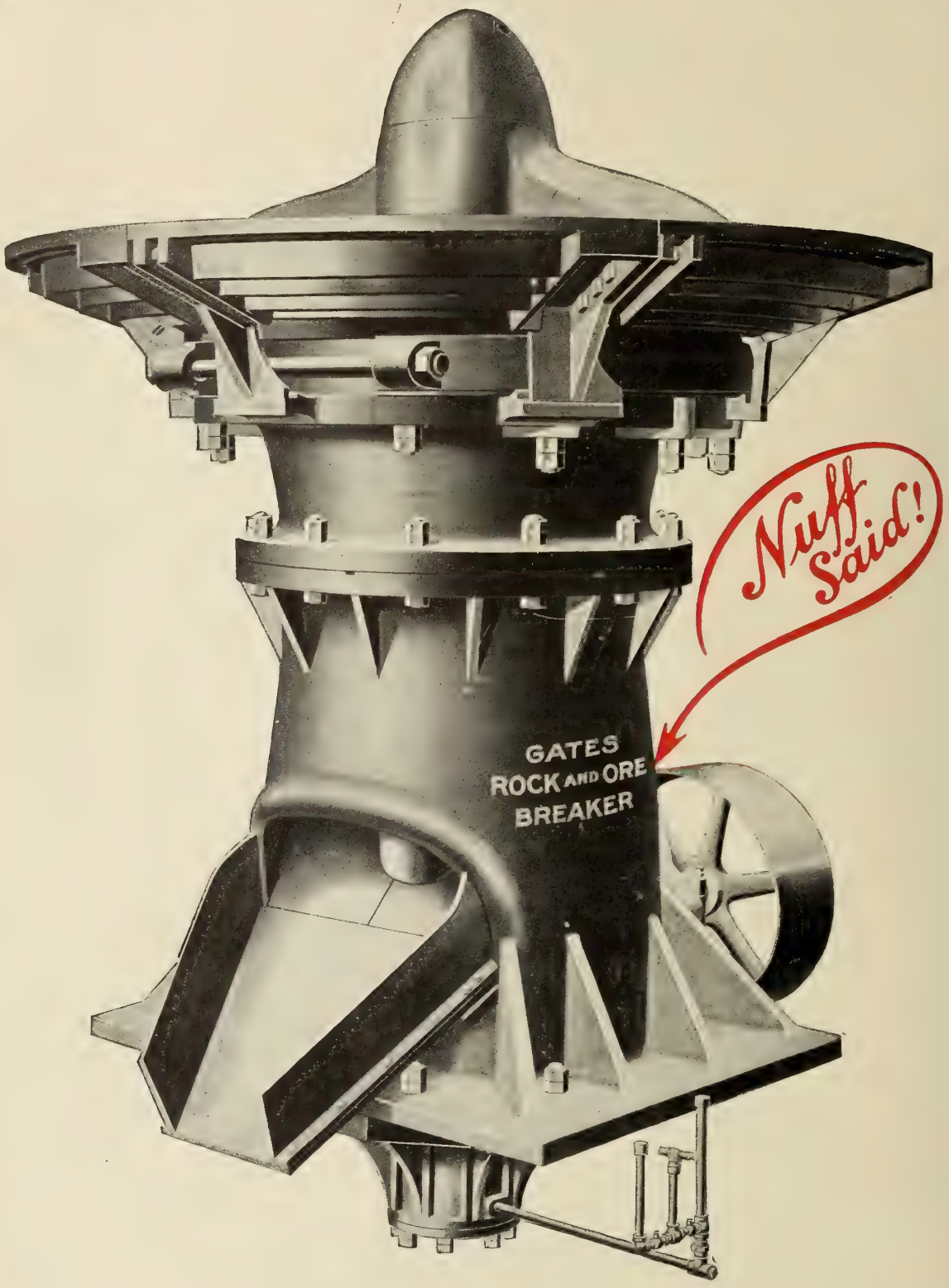


Write for Catalogue No. 39

MUSSENS LIMITED

MONTREAL, 318 St. James St. | TORONTO, 73 Victoria St. | COBALT, opp. Right of Way Mine | WINNIPEG, 259-261 Stanley St. | CALGARY, Crown Bldg. | VANCOUVER Mercantile Bldg

MINING MACHINERY



ALLIS-CHALMERS-BULLOCK

LIMITED

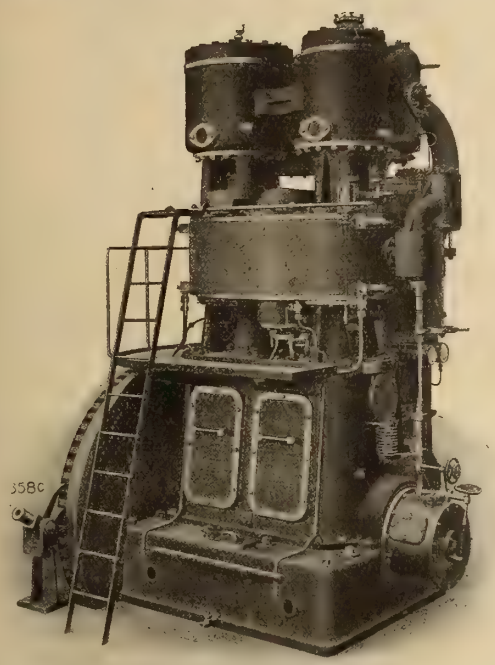
WORKS - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

Belliss Air Compressors



Have earned their reputation

By Their :

EXTREME SIMPLICITY,
NOISELESS RUNNING,
COMPACT DESIGN,
LOW OIL CONSUMPTION,
CONTINUOUS OPERATION,
OVERALL EFFICIENCY,

Used By :

East Rand Proprietary Mines, South Africa.

Mount Morgan Gold Mining Company, Australia.

Oakdale Colliery, South Wales.

Three units on order for National Transcontinental Railway, Canada.

Builders: BELLISS & MORCOM, Limited. Birmingham, England.

Canadian Agents LAURIE & LAMB

211 and 212 Board of Trade Building, Montreal.

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we know, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs per year than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO. LIMITED

COBALT, ONT.
P. O. Box 310

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

SPEED

A single motion is quicker to make than two.

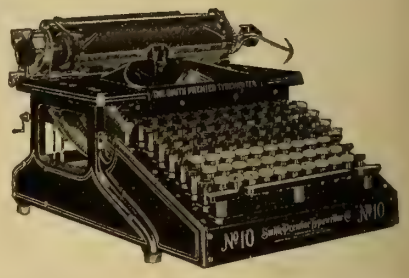
Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of the

easy action
light running **Model 10**

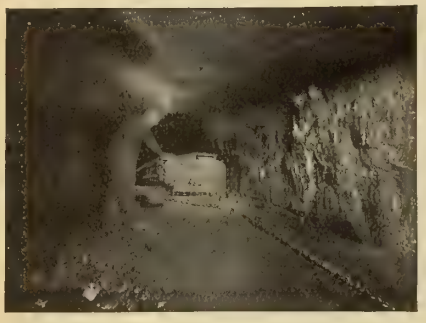
Smith Premier

The Smiih Premier Typewriter Company, Inc.
Syracuse, N. Y.

Canadian Representatives:
National Typewriter Co., 87 Victoria St., Toronto
Wm. H. Hall & Co. 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 1157 Holis St., Halifax, N.S.



There's a Sullivan Coal Cutter,



Continuous Coal Cutters. Bulletin 663-C.



Longwall Air Machine.

Exactly suited to mine YOUR coal with the greatest speed and at the lowest cost.

The Sullivan Machinery Company is the "sole manufacturer" which can recommend to you, without bias, the type of coal cutter which your mines need for safest and most profitable operation.



Pick Machines. Catalogue 657.

There are Sullivan Pick Machines, Sullivan Room-and-Pillar Machines, "continuous" cutter pattern, Sullivan Longwall Chain Machines, air or electric, and Sullivan Shearing Machines—and you may rely on your selection as the most rapid and efficient of its particular class.

Free Catalogues Upon Request.

AIR COMPRESSORS FANS HAMMER DRILLS ROCK DRILLS
DIAMOND CORE DRILLS

SULLIVAN MACHINERY CO.

Claremont, N.H. Chicago, Ill., U.S.A. Cobalt, Ont. Nelson, B.C.

BIRMINGHAM DENVER KNOXVILLE PITTSBURG SAN FRANCISCO PARIS, FRANCE SALT LAKE BUTTE JOPLIN
NEW YORK ST. LOUIS SPOKANE SEATTLE SYDNEY, AUS. EL PASO

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg



BEST FOR MINE BUILDINGS

Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

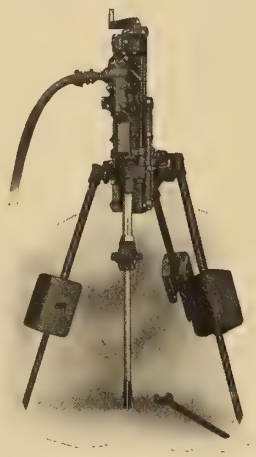
THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.

ROCK DRILL EFFICIENCY

Rock Drill Efficiency is measured by the length of time the drill stays on the job doing good work, standing up to its original capacity without breakage delays.

MATERIALS—The most carefully selected materials are used in the manufacture of **"Rand Drills."** Vital cast parts are made of high-grade open-hearth steel castings and steel parts are made of the finest steel, each selected to perform its particular function in the operation of the machine. Special treatment of steel parts insure the utmost service from each part.



WORKMANSHIP—Rand Drills are built by mechanics who are experts in their line, with years of experience and every facility and incentive for the best work, in a shop equipped with every modern convenience.

—

Can you afford to buy anything but the best—**RAND DRILLS.**

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO. COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



Price $350.00

We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

The Deister Concentrator Co., Ft. Wayne, Indiana, U.S.A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

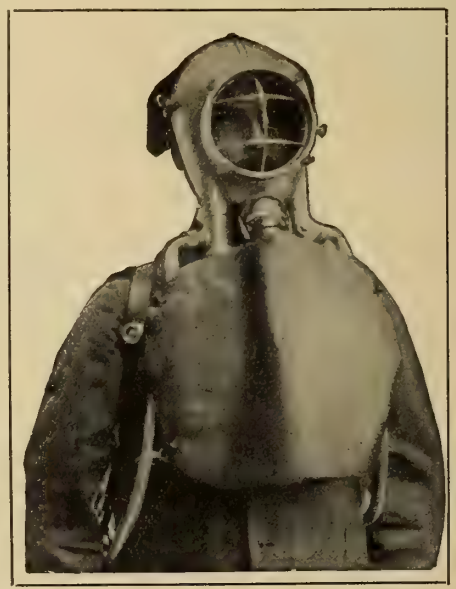
Arrangements have recently been completed under which the branches of this Bank are able to issue DRAFTS on the principal points in the following countries.

Austria-Hungary	French Cochin-China	Norway
Belgium	Germany	Persia
Brazil	Great Britain	Phillipine Islands
Bulgaria	Greece	Roumania
Ceylon	Holland	Russia
China	Iceland	Servia
Crete	India	Siam
Denmark	Ireland	South-Africa
Egypt	Italy	Straits-Settlements
Faroe Islands	Japan	Sweden
Finland	Java	Switzerland
Formosa	Manchuria	Turkey
France	Mexico and elsewhere	West Indies

No delay in issuing. Full particulars on application.

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

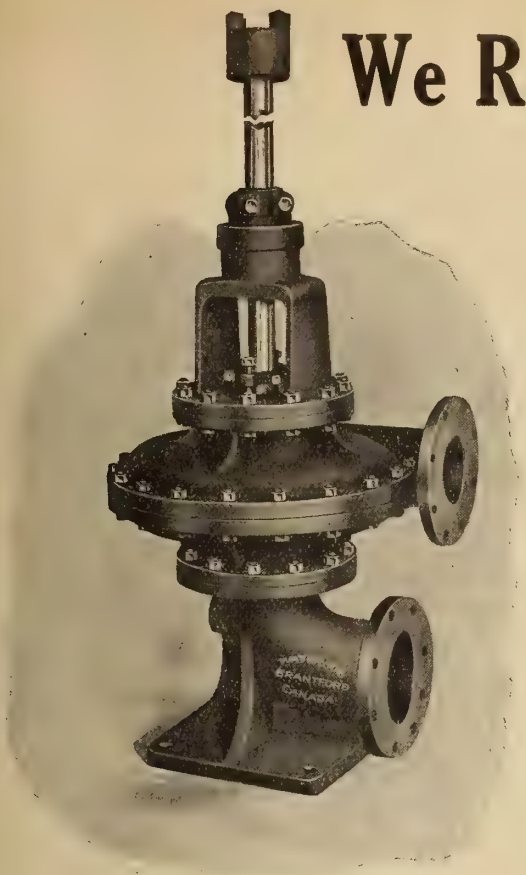
Successfully used at the following EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading English American, French, German, Belgian, etc. Rescue Stations

3,000 IN USE



We Recommend Our Pumps For Mine Work

¶ They are simple, compact, durable and built with few parts.

¶ Anyone can operate them, they require little room, can stand the heaviest work, will not clog up and are readily over-hauled for cleaning or repairs.

¶ They are built in sizes up to 14" discharge opening. In Vertical or Horizontal Types, for dry or wet Pit work, and can be operated with any kind of drive—Belt, Motor or Engine.

We will be glad to forward descriptive Bulletin.

The Waterous Engine Works Co.
LIMITED
BRANTFORD, CANADA

Specify Distinctly "STAG" BRAND Allen's Stag Brand



SOLID OR HOLLOW
Mining Drill Steels
All Sizes and Sections from Stock

SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**
330 ST. JAMES ST., MONTREAL
THOS. HAMPTON, Manager for Canada

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

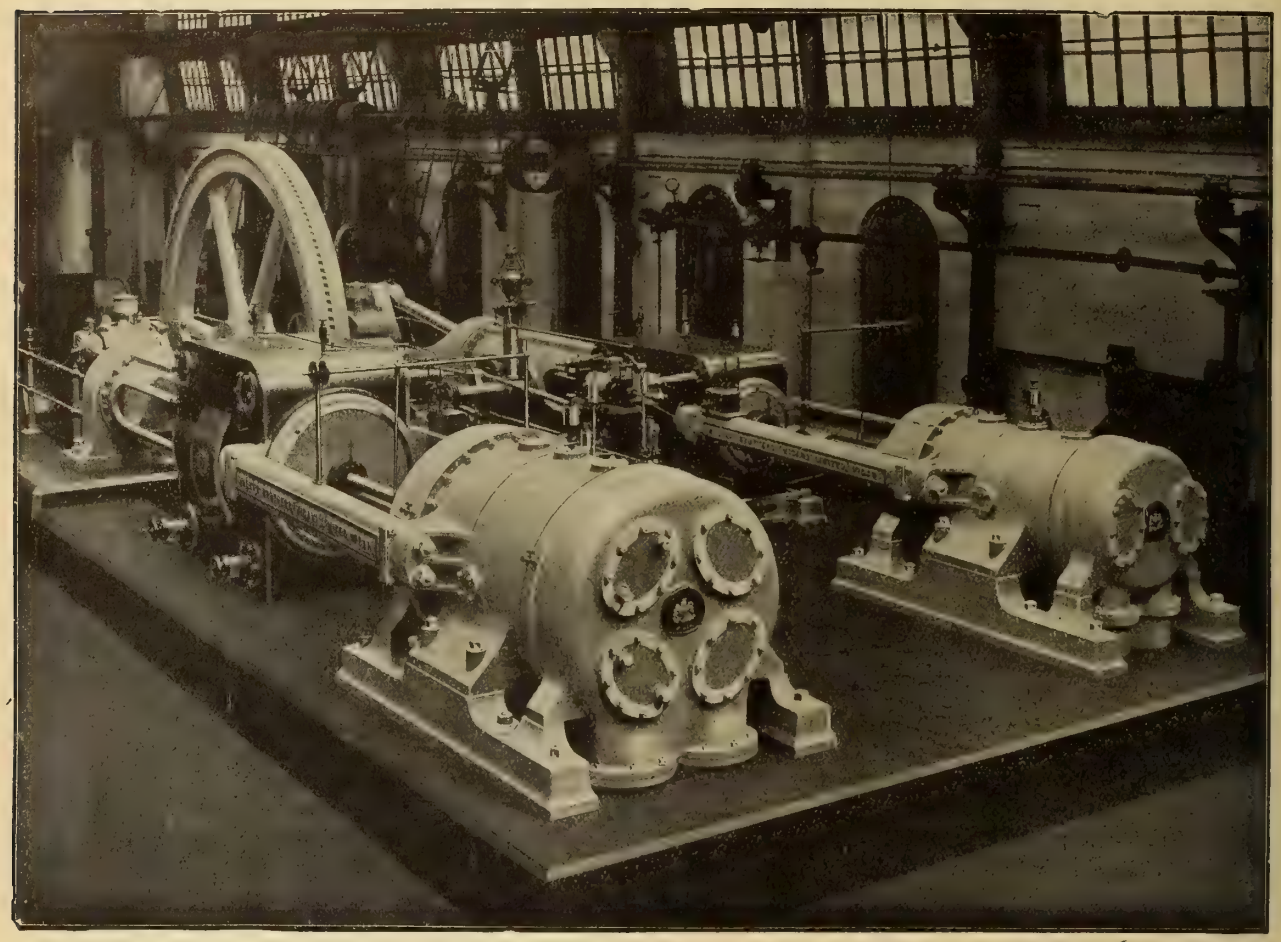
Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department **CANADIAN MINING JOURNAL**

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

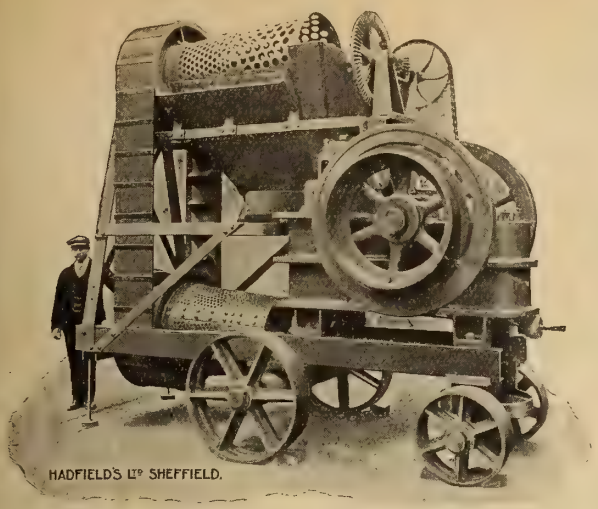
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



HADFIELD'S PORTABLE COMBINED CRUSHING, SCREENING, ELEVATING and LOADING APPARATUS

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of

COMPLETE CRUSHING PLANTS

of every description,

Embodying Hadfield's Latest Improvements

Hadfield's Patent Era Manganese Steel

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings for Collieries, Mines, ETC., Including

WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS, ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield.

PEACOCK BROS.

68 Beaver Hall Hill, - - Montreal, P.Q.

FOR **DYNAMITE, ROCK-CHIEF**

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

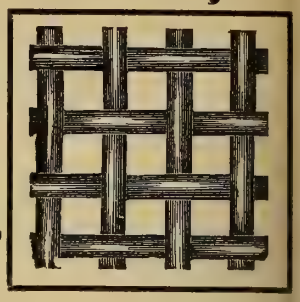
CORRESPONDENCE SOLICITED

THE BROWN MACHINE COMPANY, LIMITED

NEW GLASGOW — ENGINEERS — NOVA SCOTIA

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalogue 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

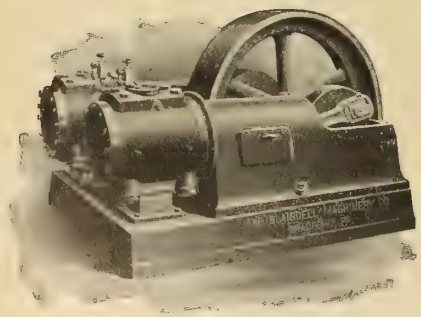
Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



AIR COMPRESSORS

STEAM---ELECTRIC---POWER

FOR ALL CLASSES OF SERVICE WRITE US YOUR REQUIREMENTS

Canada Foundry Company,
LIMITED

Toronto Montreal Halifax Ottawa Cobalt Winnipeg
Calgary Vancouver Rossland

Mine Hoisting Engine

Cylinders 22 inches diameter, stroke 42 inches, about 900 horse power; double drums 8 feet diameter, 5 feet wide.

Corliss valves, steam actuated clutches and brakes. The reversing gear, throttle, brake and other levers are grouped at a central platform.

This engine was completed within the past few months and is thoroughly modern. Write for drawings, specifications and photographs.

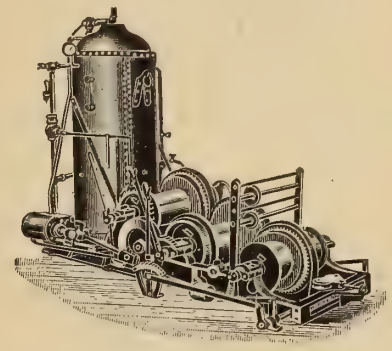
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF

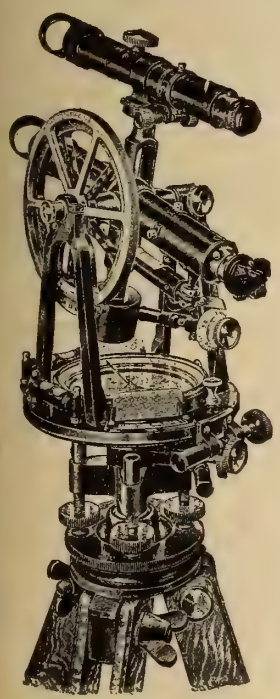


Dredges, Ditchers, Derricks,
Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,
Submarine Rock Drilling Machinery,
Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S
Field Instruments
FOR
Civil, Mining Engineers & Surveyors

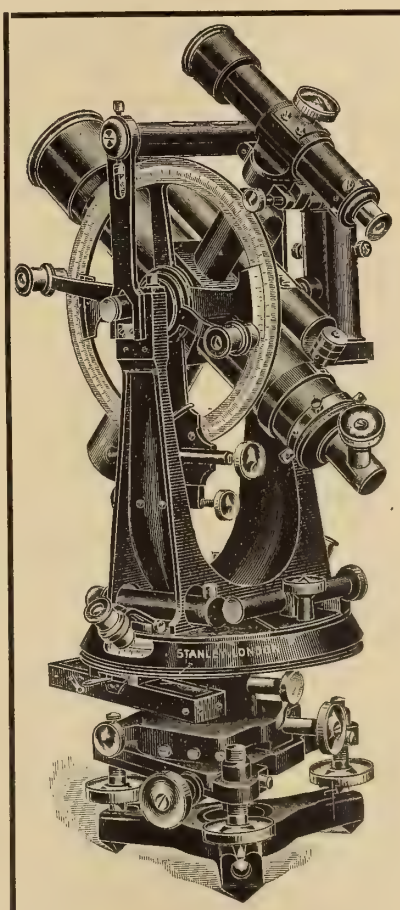


Maufacturers
Instruments of
Precision

also

Engineers and
Draftsmens
Supplies

Eugene Dietzgen
Co., Limited
TORONTO



DUNBAR-SCOTT AUXILIARY TOP AND SIDE TELESCOPE— REQUIRES NO CORRECTION FOR ECCENTRICITY

TRADE
STANLEY
MARK

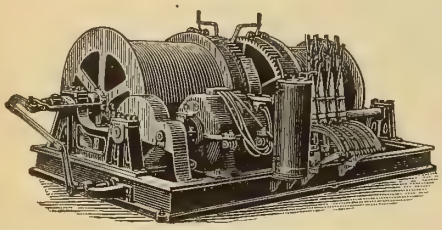
W. F. STANLEY
& Co., Limited
Great Turnstile,
London, ENGLAND

Flory Hoisting Engines

STEAM AND ELECTRIC

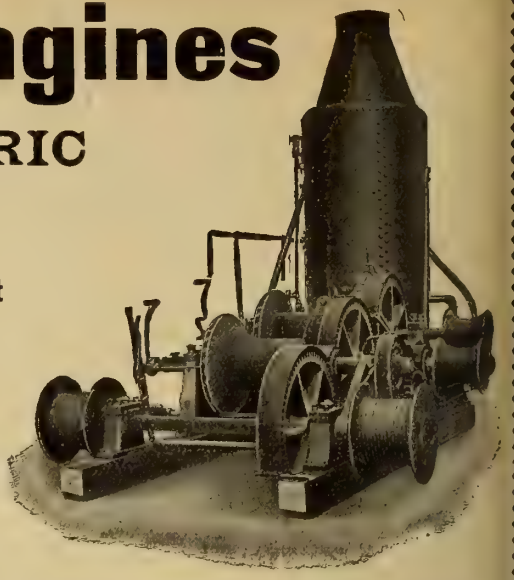
Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

ARE YOU GOING HUNTING?



There are more hunting grounds reached by the Canadian Pacific Railway than by any other line in America

SINGLE FARE FOR HUNTERS

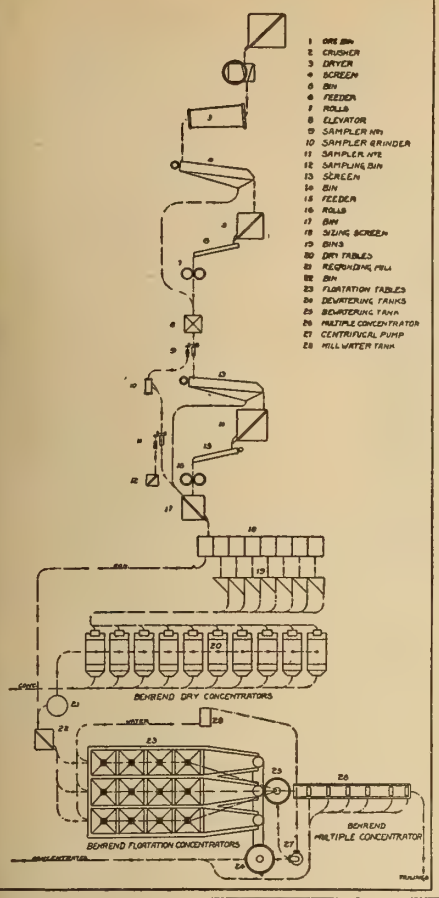
In effect October 20th to November 12th with a return limit of December 15th.

"Fishing and Shooting"
"Open Seasons—1910"
"Hints to Hunters"
"Sportsman's Map"

Handsomely illustrated publications of interest to Hunters. Ask any Agent of

Canadian Pacific Railway

R. L. THOMPSON, D.P.A. 67 Yonge St., Toronto



FLOW SHEET

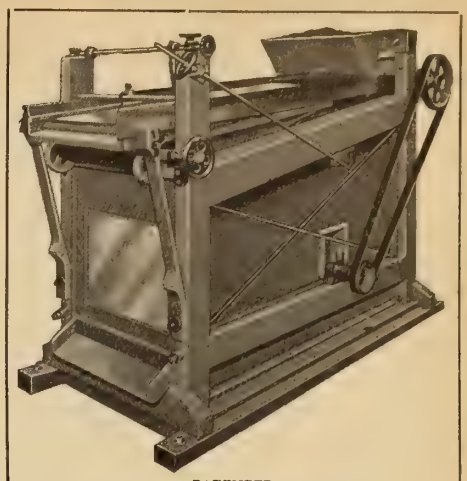
OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM

OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED

32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

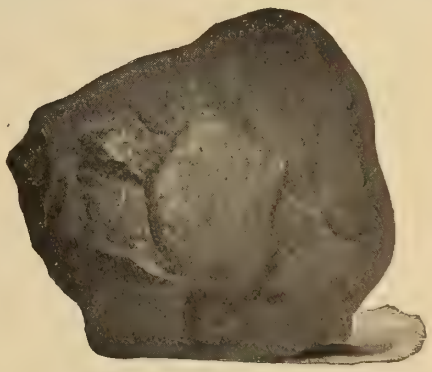
JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

COAL TIPPLES

COAL TIPPLE
of the
Franklin County Construction Co., Benton, Illinois.



Write for Book
"Conveying Machinery
for Coal Mines."

LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK
299 Broadway

PITTSBURGH
1501-2 Park Building

ST. LOUIS
Central Natl. Bank Bldg.

SEATTLE
439-440 N.Y. Block

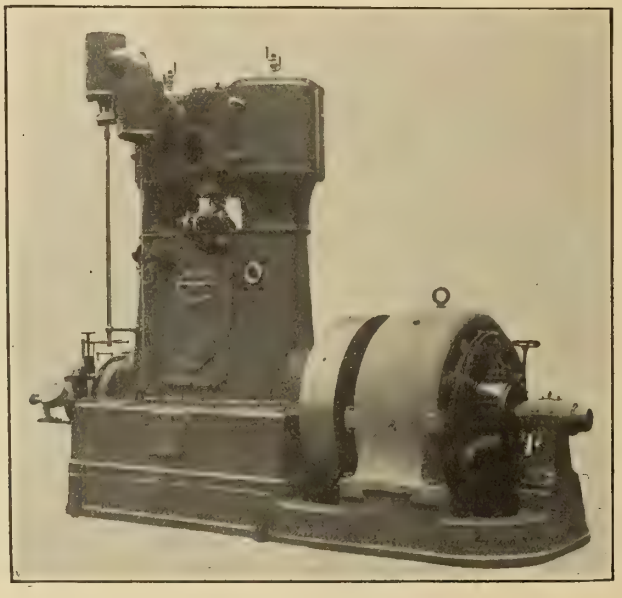
DENVER
Lindrooth, Shubart & Co.

NEW ORLEANS
Wilmot Machinery Co.

SAN FRANCISCO
Eby Machinery Co.

BRUCE PEEBLES & CO., Ltd.

Peebles-
Howden
Marine
Set



Dynamos and Motors for all Conditions of Service.

Reliability and Economy Guaranteed

VANDELEUR & NICHOLS

DINEEN BUILDING, TORONTO.

Eastern Representative, A. P. BURY, Montreal.

A PROPER SAFETY LAMP

SHOULD BE SAFE, STRONG, SIMPLE AND EASY TO MANIPULATE IN THE LAMP CABIN —OURS FILLS THIS BILL.



"Hailwood's Improved Safety Lamp."

By means of Expensive Special Accurate Machinery we produce nothing but the very best possible lamp.

Don't continue risking your Mines with worn out unsafe old style lamps but possess an installation of our goods and follow the example of the majority of the best Colliery Concerns in existence by obtaining from us a complete installation of Oil Lamps, Electrically Ignited and Magnetically Unlocked together with Cabin Lamp Lighting and Unlocking Machines, Oil-filling Machines, Underground Fool Proof Lamp Re-lighting Machines.

ACKROYD & BEST, LTD.

MORLEY, NR. LEEDS, ENGLAND

For Prices and Particulars address:—

ACKROYD & BEST, LIMITED

No. 2 Arrott Power Buildings, Barker Place

PITTSBURGH, PA., U.S.A.

JENA

GLASSWARE

THE BEST IN THE WORLD

Sole Agents for Canada

LYMANS, Limited

(ESTABLISHED 1800)

Laboratory Apparatus and Chemicals

MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

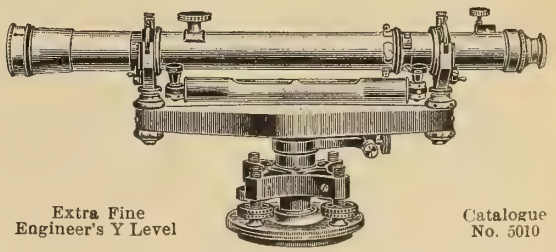
Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa



Extra Fine Engineer's Y Level

Catalogue No. 5010

K & E

Transits and Levels

Give thorough satisfaction. Discriminating engineers select them on account of their accuracy, ease of operation. and general reliability.

Send for our Catalogue, listing every requisite of the engineer for field or office.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

General Office and Factories, HOBOKEN, N.J.

New York, Chicago St. Louis, San Francisco

Mathematical and Surveying Instruments

Drawing Materials Measuring Tapes

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys, Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co, Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd- Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Beath's Steel Kegs

Beat any Shipping Package in the World. Unequalled for Shipping Concentrates, Oxides and in fact everthing requiring protection in transit.

They're **Light, Cheap and Strong.**

Write for Samples and Prices

W. D. BEATH & SON, Ltd. Toronto

The South African School of Mines and Technology, Johannesburg.

Owing to the present Principal and Professor of Mining of The South African School of Mines and Technology having been appointed Consulting Engineer to one of the Witwatersrand Minning Houses, the Council invites applications for the joint position, or alternatively for the chair of Mining alone. The salary attached to the chair of Mining is £1500 per annum. This would be increased by £250 per annum if the Professor were also appointed Principal of the School.

Particulars with regard to the School and the vacant posts may be obtained on application to:—

The Registrar, McGill College and University,

Montreal, Canada.

Applications must be sent so as to arrive in Johannesburg not later than the 30th November, 1910. They should be addressed to :—

THE SECRETARY,
P. O. Box 1176,
Johannesburg.



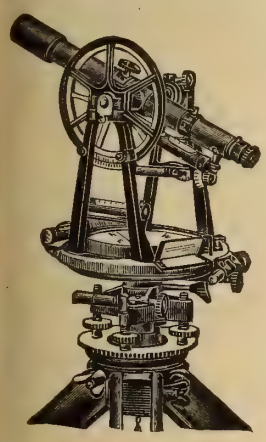
Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology as applied to practical mining*. It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO



C. L. Berger & Sons

37 WILLIAMS STREET
BOSTON, - MASS.

SPECIALTIES :
Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

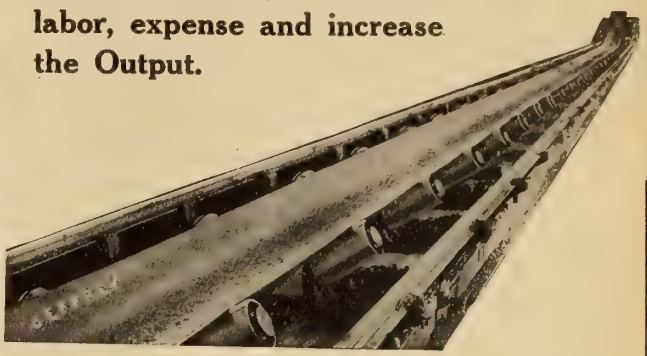
The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

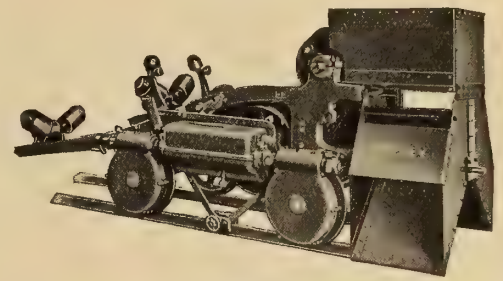
HEAD OFFICE
80 St. Francois Xavier Street, Montreal
Address P.O. Box 196

Jeffrey Rubber Belt Conveyers

Stone Ore Coal, etc. Reduce the labor, expense and increase the Output.



Let our expert engineers study your conveying problems and suggest the best system for your requirements.



Jeffrey Belt Tripper

For discharging materials into bins or at any point along the conveyer line. This Tripper is automatic in operation, compact in construction, all parts carefully finished. Spouts arranged to discharge on either or both sides.

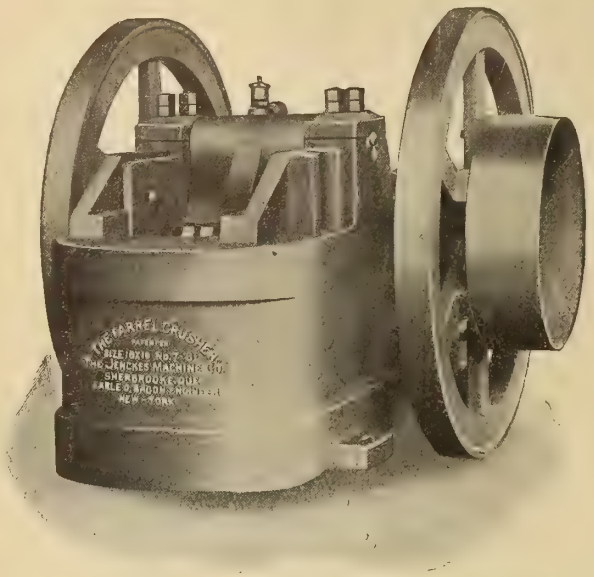
Catalog X81 describing various styles of Jeffrey Conveyers, is yours for the asking.

THE

Jeffrey Mfg. Co.

Canadian Works - - MONTREAL
Cote and Lagauchetiere Streets

Toronto Office, 174 King St. East



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

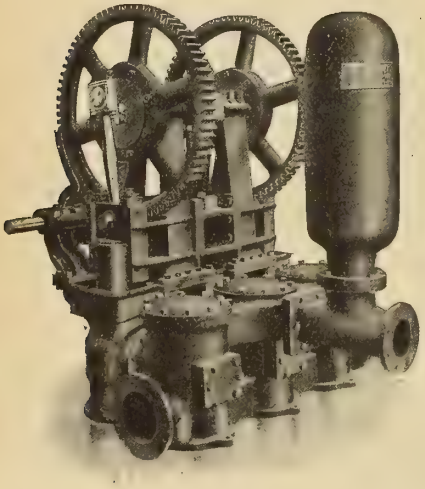
The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices:

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver



WE MANUFACTURE

Power and Steam Pumps, Condensers, Travelling Cranes, etc.

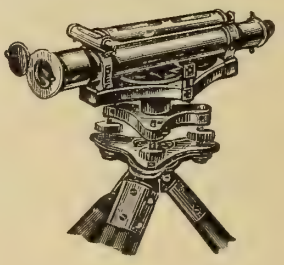
Write for Catalogue

THE

Smart-Turner Machine Co.

LIMITED

Hamilton - Canada



DAVIS DERBY.

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68 BEAVER HALL HILL, - MONTREAL

Write for pamphlet No. 42 M.

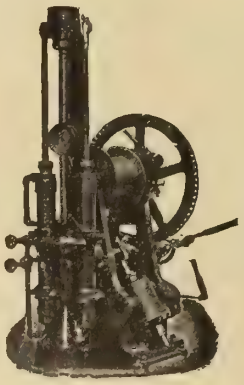
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, Nov. 15, 1910 No. 22

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto
Branch Offices Montreal, Halifax. Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials:
(a) Reciprocity in Coal 677
(b) The Lord's Day Alliance and the Mining Industries 678
(c) Porcupine at Present 679
(d) Gold in Quebec 679
(e) Photography 680
(f) Editorial Notes 680
(g) Correspondence 680
Granby Company Enlarging Its Field of Operations, by E. Jacobs 681
Our London Letter 682
Reciprocity in Coal 684
Mining a Business 686
A New Electric Arc Process for Producing and Refining Steel, by F. C. Perkins 687
Alberta Provincial Coal Mine Officials' Examinations.... 690
Electric Steel Refining, by D. F. Campbell 695
New Mining Field in British Columbia 697
A New Mining Machinery Exhibit at Western Pennsylvania Mining Exposition 698
Personal and General 700
Special Correspondence 700

RECIPROCITY IN COAL.

A pamphlet entitled "Memoranda Respecting Reciprocity in Coal," has been issued conjointly by nine coal companies operating in Nova Scotia. It comprises a memorandum submitted to the Government of Nova Scotia by all nine companies; a memorandum submitted to the Federal Minister of Finance by the Dominion Coal Company, Limited; a letter written by the Nova Scotia Steel & Coal Company, Limited, to the Minister; similar letters from the Acadia Coal Company, Limited, and the International Coal Mining Company, Limited; and, in conclusion, a characteristic paper by the Hon. Robert Drummond.

Time was when the coal operators of Nova Scotia were popularly looked upon as bold, bad barons. And they did little to discourage this view. Now, however, times have changed, and the mine owners recognize the final importance of engaging public sympathy by a full and open statement of their case.

That case can be set forth in a few paragraphs.

The main contentions of the operators are, in effect, that reciprocity in coal will assuredly throw out of employment between 17,000 and 20,000 men and boys, who, with their families, are directly dependent upon coal mining; and, further, that a much larger number of persons will be indirectly affected. This, if we may accept as facts the statements of the operators, is an obvious proposition. How they substantiate their assertions we shall see later.

Other arguments against reciprocity are that, since the sum of $50,000,000 is invested in Nova Scotian coal mines, and since this is preponderatingly Canadian money, and, also, since some millions of dollars have been spent in providing transportation and dockage facilities for the present channels of trade, therefore any re-adjustment of markets would be disastrous. This argument is supported by the fact that the trade with New England ports is constantly decreasing. Moreover, it is pointed out that the United States operator is able, even now, against a heavy duty, to seize an ever-increasing proportion of the St. Lawrence and Quebec trade.

But possibly the most cogent argument of all is the flat assertion that the removal of duties guarantees no reduction in price. In fact, if we may accept the arguments of those opposed to reciprocity, it means merely that Quebec and Eastern Ontario will place themselves at the mercy of United States producers who may at any time cease dumping into Canada when they happen to find a more profitable market elsewhere. It were superfluous here to enter into particulars. It is sufficient to state that there is little chance of Nova Scotia securing

a footing in the New England markets. Nova Scotia's shipments to the United States are constantly diminishing. The recently enacted legislation as to smoke nuisance tends to complete the United States control of these manufacturing centres. Moreover, Nova Scotia cannot compete except in rare instances with the cheaper labour, the more perfect transportation, and the immensely larger organizations that characterize coal mining in the States.

Over and above all these considerations, one fact obtrudes itself. Even if it be costlier at present, and this is a matter of debate, it is demonstrably wiser for Eastern Canada to be self-sufficient as regards coal supplies. A terminable arrangement with a much richer and more powerful nation is decidedly dangerous. We can be afforded no guarantee as to the continuity or as to the prices of coal supplies from the south. Is it not distinctly more advisable to depend upon our own developed resources? How can we safely place hostages in the hands of our commercial rivals?

This, however, is obviously presenting one side of the case. Western coal operators are as ardent for reciprocity as eastern operators are against. The case for the West must not be overlooked. It is quite distinct from the East in principle. But in practice, the same factors obtain, though positions are reversed. The West keenly desires reciprocity. Western operators believe firmly that their future depends upon free access to United States markets. This belief may be modified by the speedy development of local demand, but the physical advantages of West Canadian collieries are such that free trade means expansion.

Looking at the question from a broad viewpoint, it is evident that there is danger of emphasizing special interests at the expense of the country generally. It would be interesting to learn why Nova Scotian collieries could not hold the St. Lawrence market if the present duty were removed. Water carriage, loading and trans-shipping facilities, and established markets are a few of the advatnage that cannot be created rapidly. It is hard to see, therefore, that this heavy part of the market would be lost to Nova Scotia were the present duty to be removed. Neither does it seem probable that the Maritime Province market could not be held. In fact, there seems to be something radically wrong in the contention that Nova Scotian coal cannot on its own merits compete with the United States product. This point needs further explication.

With the statement that a fair share of trade with the United States is not obtainable we are entirely in accord. The position of American collieries is too commanding to encourage intrusion. On the other hand, the assertion that the present duty is the only safeguard against ruinous competition is going too far. Doubtless Nova Scotia would suffer loss were reciprocity to become an established fact. But the probable extent of that loss has been greatly exaggerated.

Western operators have much to gain through free trade in coal. Eastern operators have something to lose. The country as a whole may secure slightly cheaper fuel. Just how far lower prices will obtain can only be guessed. But, judging by past history, it is safe to bet that the reduction in prices will be considerably less than the amount of the duty.

It is well to give respectful attention to such documents as that under consideration. It is well also to keep ever before one's mind the fact that special interests are pleading. It is our deliberate opinion that were our economic conditions sound we would have little to fear from free trade in coal. As it is, the whole problem cannot be dismissed lightly. The situation is by no means a simple one. One of the first requisites is a plain statement of facts and a clear presentation of comparative costs and profits. Such work could well be taken up by the Canadian Mining Institute.

We cannot fairly accept the pamphlet issued by the Nova Scotian operators as conclusive. More facts are needed. Meanwhile, we may take it for granted that there are two sides to the problem. The burden of proof is distinctly on the East.

THE LORD'S DAY ALLIANCE AND THE MINING INDUSTRY.

The institutional church of to-day is the conserver of much good. The efforts of religious societies, and the work of certain non-denominational bodies are manifestations of an earnest desire to cleanse the body politic. But there is something profoundly irritating in the misdirected zeal of that inept aggregation known as the Lord's Day Alliance.

This association has with unbridled vigour fought the insidious Sunday ice-ceram. It has sought, not without success, to suppress such unspeakable sins as bathing on Sunday. In fact, its prime aim is to impose upon all of us the joyless Sabbatical traditions of the Puritan.

In Nova Scotia, in Ontario, and in British Columbia, mining men have suffered from the interference of agents of the Alliance. The latest instance comes from Cobalt, where the Alliance sought to close all concentrating mills at midnight on Saturday, instead of at seven o'clock on Sunday morning. Incidentally, this could do no good to the workmen, and would inflict loss on both employers and employees. Such a consideration does not in the least deter the Alliance.

There is humour in the situation. The Alliance no doubt is honestly convinced that Sunday ice-cream, and Saturday night-work are sapping our national health. But it overlooks certain diseased conditions that may not fall far short of both these horrid crimes. For instance, new mining camps are usually infested with women of ill-repute and with purveyors of unspeakably bad liquor. These cater to a small but reckless part of the community. To the majority of operators and workmen they are unwelcome. We have yet to hear of the

Lord's Day Alliance helping a new mining camp to remove the human carrion that so often soils its skirts. That task is left to public spirited citizens.

Were it worth while, which it distinctly is not, we could point out to the Alliance several channels in which it might forget about ice-cream. We fear, however, that the gentlemen in charge of its vagaries are too detached from real life to grasp the most significant hint. But we most humbly request them to ponder long before they interfere with men who have the good of the nation quite as much at heart as has the Alliance, and whose only fault is that they must continue to be controlled by common sense.

PORCUPINE AT PRESENT.

Porcupine is in a transition stage. Snow has fallen. The rivers and lakes will soon be frozen strongly enough to warrant heavy traffic. Navigation has already ceased. And now, with local transportation charges reduced to a reasonable figure, machinery and supplies can be rushed in as required.

But the snow brings with it not only relief to the operators, but also that type of promoter that can be denominated the "snow-bird." He it is who, availing himself of Canada's winter mantle, becomes the centre of flurries in shares—shares whose value evaporates with the spring sun. The "snow-bird" is always in season and should be shot on sight.

. . . . . .

Our remarks in our last issue on Ontario's duty to Porcupine were based upon the fact that the present Government has reaped a rich harvest from the northland. The auction sales of Cobalt Lake and other properties, and the imposition of royalties have swelled the provincial exchequer. The Government cannot confine itself to the passive role of receiver. It has invited the public to take chances; it cannot refuse to take a few chances itself. The rule works both ways. Hence it is obligatory upon the Government to support and assist Porcupine operators in all legitimate ways. The most important need at present is for postal, railway, and telegraphic communication. The spring will bring other needs.

. . . . . .

In the wake of every successful enterprise in Porcupine will follow a number of doubtful or worthless projects. This is a law of human nature. Sometimes unwisdom, sometimes crookedness is the prevailing factor. For the interested outsider it should be easy to distinguish between spurious and genuine publicity. Advertisement seldom is indicative of merit.

. . . . . .

Beside the multitudinous optioning and giving in options; the vast volume of hotel talk; the hurrying and scurrying of purchasers, and go-betweens, and vendors; there is solid thoughtful work being done in Porcupine. Never before has an Ontario field offered so much professional employment to reputable engineers. Never before have cautious investors shown such willingness to put money promptly into a Canadian mining camp. Thus a strong backbone has been created at the stage when it is most needed.

. . . . . .

Over and above the expenditure in development and equipment, other large projects are on foot. Certain of the most enterprising operators, the Timmins—McMartin—Dunlap group, are providing for the development and distribution of hydro-electric power. Private capital is tackling railway construction, though in a somewhat farcical manner. Machinery companies are making strong efforts to place equipment. Supply houses in Toronto even now feel the benefit of Porcupine money. The telegraph companies are in clover and hotels are doing a rushing business.

. . . . . .

Ore treatment has been the subject of much experiment. On one large property it has been practically decided to cut out concentration, and to cyanide direct after the stamps. Here much of the schist is heavily impregnated with sulphides. On others where the ore is relatively free from sulphides, concentration will probably be part of the flow-sheet. Fully one hunderd and fifty stamps are being or are about to be ordered. This number will be multiplied indefinitely in the near future.

. . . . . .

As in Goldfields, Nevada, so in Porcupine, the disintegrated material affords the best panning. In the early days of Goldfield the gold pan was not a usual part of the prospector's outfit. In Porcupine the pan is perhaps too much in evidence. Except in experienced hands it is misleading. At best it gives but a qualitation idea of the gold content.

. . . . . .

Numerous transactions are under way and are being closed or dropped every day. The nomadic engineer, the speculator, the adventurer, the ubiquitous newspaper correspondent are all in evidence. Everyone is taking a turn at option-mongering. Money is being spent feverishly—especially by the lesser fry. Possibly a boom is impending. We hope not. In any case, much of the interest that is now aroused is distinctly susceptible of good use. Clean publicity never does harm. Exaggeration never does good.

. . . . . .

Porcupine means much to mining in general. Its successful exploitation will set capital flowing in all directions and will create additional capital. We intend to make every effort to keep our readers informed as to its progress. This does not imply neglect of other districts. On the contrary, it will do good all round.

GOLD IN QUEBEC.

One of the first authentic discoveries of gold in the Province of Quebec was made by a young girl, Claudine Gilbert, in 1834. She came upon a nugget of gold as

large as a pigeon's egg at a spot near the junction of the Gilbert and Chaudiere rivers. For many years after that the Chaudiere Valley was the scene of occasional activity. Amongst the most active investigators was Dr. James Douglas, now of New York.

In 1866, another large nugget was found on the Gilbert River, on lot 16 of the DeLery Concession. It weighed 45 ounces, 12 dwt., and was valued at $851.26. It is now in the museum of the Geological Survey, Ottawa. The St. Onge nugget, also found on the Gilbert River, in 1877, weighed 42 ounces and is valued at $756. The Geological Survey secured this. A collection of smaller nuggets from the same locality is in the same keeping.

The only fairly reliable estimate of gold won, both by milling and washing, from the Chaudiere Valley districts, from the first discovery up to about twenty years ago, was compiled by Mr. J. Obalski. He places the total at about $2,000,000. It would seem possible that at least as much more could be obtained by modern methods.

We shall have more to say on the subject in our next issue.

PHOTOGRAPHY.

One of the most neglected of arts is photography. At least it is misunderstood and neglected by the mining engineer. A camera is looked upon as a mechanical contraption with which aim is taken as with a rifle. The photographer is content if a few good shots occur in a multitude of poor ones.

The University of McGill, recognizing the value of photography to the engineer, has begun a course of instruction in the use of the camera. In other countries this has long been part of the curriculum. McGill is, we believe, the first Canadian educational institution to move in this direction.

EDITORIAL NOTES.

Sheep Creek (B.C.) mining properties are changing hands rapidly. The Nugget mine, for which $40,000 was paid, is now being operated by its new owners. Mr. John MacMartin, of Cobalt fame, will soon have completed payments on the Mother Lode mine. A consolidated plant is proposed for four adjacent mines.

The annual report of the Department of the Interior for the year ending March 31st, 1910, gives the receipts on account of Dominion Lands Revenue as $3,007,390.82. On this sum refunds amounted to $121,391.15. Hence the net receipts were $2,885,999.67. Of the amount the items such as sales of coal lands, mining fees and leases, etc., totalled $453,342.60. In other words, the revenue from mining lands and operations amounted to more than 15 per cent. of the total.

CORRESPONDENCE.

Quebec, November 8th, 1910.

To the Editor CANADIAN MINING JOURNAL:

Sir,—In such a letter as Mr. Jennison's, published in your issue of November 1st, re my notes on "Some Manganese ore-deposits of the Maritime Provinces," the underlying current of spite and disappointment is too thinly veiled to mislead your readers.

When I was in Nova Scotia last autumn, I met Mr. Jennison, and at that time, this gentleman stated to me that it was rather unfortunate that I had been given this work, as it was his intention to offer a continuance of his services to the Mines Branch, to take up the subject of Manganese as soon as he got through with his investigations on the gypsum deposits. Enquiry at the Mines Branch elicited the fact that he has not been given the work.

Mr. Jennison states that my field work consisted in obtaining information from local farmers and lumbermen, and of casual glances at a few abandoned mines; he also implies that, had I to rely on my reputation for a living, I would soon starve to death. While your columns are always very hospitable, Mr. Editor, don't you think that it would at times save a great deal of useless unpleasantness and ill-feeling if, before publishing such uncalled-for and idle statements, you exercised your well-known diplomatic tact in advising your correspondents to round off the angles and asperities, and to polish the roughnesses of such letters as Mr. Jennison's?

It would be a waste of time and of space to take up seriatim the various points of your Truro correspondent's letter. I consider my unpretentious and honest notes, as published in the summary report of the Mines Branch, a sufficient answer to his misrepresentations of them.

Yours very sincerely,

THEO C. DENIS.

Cobalt has, up to date, paid $17,500,000 in dividends.

There are about 4,000 shareholders in the Calumet and Hecla Copper Company.

At the mill of the Miami Copper Company, Globe, Ariz., there are 48 Deister concentrating tables installed. The Deister slimers are on the ground and will soon be put in place.

Mr. S. S. Fowler has leased the Enterprise mine, near Slocan Lake, from the English owners. Though once a large shipper, the Enterprise has not been worked since 1905. Smelter returns showed at one time 150 ounces of silver.

The Buffalo mill, Cobalt, is doing satisfactory work. According to the returns for August, ore amounting to 3,303 tons was put through. This contained 41.39 ounces of silver per ton, an aggregate of 136,711 ounces. Of this amount the total recovery was 113,204 ounces or 82.8 per cent.

GRANBY COMPANY ENLARGING ITS FIELD OF OPERATIONS

(By E. Jacobs, Victoria, B.C.)

From Spokane, Washington, has been received information concerning an intended early enlargement of its field of mining operations by the Granby Consolidated Mining, Smelting & Power Company, Limited. As Mr. Jay P. Graves, vice-president and general manager of the Granby Company, has his headquarters in Spokane, and, further, as it has been known to me for several months that the Hidden Creek Copper Company's mine was under offer to the Granby Company, I am assuming that the following statement, received from a publicity agent resident in Spokane, gives a generally correct outline of the transaction under notice. The statement is, in part, as under:

"Eighty per cent. of the capital stock of the Hidden Creek Copper Company, which owns the largest copper deposit in northern British Columbia, was acquired for $400,000 by the Granby Company in Spokane on October 25th, when the deal was closed and a substantial payment made to J. M. Hodgens and Ralph Hodgens, of Butte and New York. M. K. Rodgers, manager of the property, who owns the remaining 20 per cent. of the stock, refused to sell his interest. Mr. Jay P. Graves announced that a matting plant will be erected as soon as sufficient tonnage is developed, and added:

" 'It is our intention to reduce the ore to a low-grade matte, say 20 or 30 per cent. copper, and to ship the matte to Grand Forks, B.C., to be smelted and converted there in conjunction with our Phoenix ore. By so doing we expect to cheapen our cost of operation, through increased tonnage, and at the same time reduce our metal losses in the slag owing to the larger percentage of iron in the charge. The increase in sulphur will enable us to reduce the percentage of coke consumed. The addition of this matte to our smelter charge also will admit of our treating a larger quantity of silicious ore than we can do at present.

" 'We feel confident that in acquiring the Hidden Creek mine we have secured one of the greatest copper mines on the Pacific coast. The main ore body appears to be fully 100 feet wide and, allowing for the considerable mass of low grade ore it contains, we feel we are conservative in placing the copper content at the low average of 3 1-2 per cent. In area the property is nearly as large as that of the Granby mines at Phoenix.' "

The remainder of the Spokane communication is descriptive of the property but since it was visited by Mr. Herbert Carmichael, provincial assayer, in 1909, and his account of it was included in an official bulletin published by the British Columbia Bureau of Mines, it will, perhaps, be better to quote from that publication, which thus deals with Observatory Inlet:

Observatory Inlet.

"Observatory Inlet is a branch of Portland Inlet running practically parallel with Portland Canal but 15 or 20 miles apart. Thirty-five miles from the entrance, Observatory Inlet splits into two arms, namely, Hastings and Alice Arms, the former heading north and south and the latter east and west. Goose Bay is a large sheltered inlet, the outlet being on the west shore of Observatory Inlet, at the entrance to Hastings Arm. While there is a deep waterway of ample width, no detailed survey has been made of these waters and the chart should be used with caution.

Hidden Creek Copper Company.

"This company owns nine mineral claims in the neighbourhood of Goose Bay, namely, Rudge, Revenge, Donald, Alpha, Manson, McKinley, Kenneth, Salamander, and Bunker. The principal work has been done on the Alpha and Revenge. There is an excellent plank road two miles long extending from the deep water at Goose Bay to the main tunnel, which is 530 feet above sea level.

"Prospectors were first attracted by a round-topped hill, about 1,000 feet high, which was more or less covered by a typical 'gossan' or iron cap. Prospecting showed that this gossan was thicker and more strongly marked in some places than in others, and attention was specially directed to these points. The first of this work was done on a large exposure of these oxidized ores, which proved to be 5 feet thick. This gossan was cut with a number of trenches which disclosed a body of mixed pyrite and chalcopyrite ore, and this was prospected by four tunnels, aggregating 200 feet. These tunnels developed a large body of ore carrying 4 to 6 per cent. copper, which was called the 'Cabin Bluff,' and is at an altitude of 700 feet.

"About 500 feet back round the hill and 200 feet higher than the 'Cabin Bluff,' another and larger exposure of ore was discovered and named the 'Mammoth Bluff.' This has been cleared off to a large extent by surface stripping and shows a height of 300 feet of mixed pyrite and chalcopyrite ore, carrying 4 1-2 to 5 per cent. copper. This ore deposit has been prospected by several tunnels, in all 350 feet in length.

"There are several smaller showings on this hill, and these, with the 'Cabin' and 'Mammoth' bluffs, have been prospected by 2,000 feet of open-cut, beside the tunnels. To tap these ore bodies at depth and form a main working tunnel, a long drift has been started on the hillside 200 feet vertically below the 'Cabin Bluff,' and when the property was visited this drift was in 732 feet. At 430 feet in, the ore seen in the 'Cabin Bluff' above was struck, the tunnel cutting through it, the strike of the ore being N. 10 deg. W., dip 65 deg. W. The thickness of the ore body is estimated at from 25 to 40 feet, running from 4 to 5 per cent. copper. Drifts 70 feet long have been run on either side of the tunnel in ore all the way, the direction of the tunnel being 90 deg. from the strike of the ore.

"Round the hill to the south 285 feet, and at an elevation of 100 feet above the main tunnel, a drift known as the 'Pyrites tunnel,' is being run in to connect with an upraise from the main tunnel. For the first 100 feet this tunnel runs through loose granular pyrites, made up of small detached iron pyrites crystals, similar to those found on the Ecstall pyrites deposit, near the Skeena River. At 100 feet in, solid mixed iron and copper pyrites ore was struck, carrying 4 per cent. copper for 10 feet, when a lower grade iron sulphide ore was met, and the tunnel is still in this ore at 200 feet from the portal.

"The vertical height between the main tunnel and the top of the 'Mammoth Bluff' deposit is 450 feet, and with the prospecting done it is reasonable to infer that

the ore shoot is continuous for this vertical distance. The horizontal boundaries of this ore body have not been clearly defined, but it is probably some 600 feet in length by 20 to 25 feet in thickness, carrying 3 to 4 per cent. copper.

"At the 'Cabin Bluff' showing there is a considerable depression in the ground, which appears to have been caused by oxidizing and dissolving out of the pyrites ore body, and there is a large deposit of hematite in a small flat of 10 acres south of the ore showings, where this dissolved ore has been redeposited. Samples of this deposit gave the following assay: Iron, 60 per cent.; gold, 0.10 ounces; copper, 0.2 per cent.

"The country rock in the vicinity of the ore body is made up of altered argillites or shales, traversed by felsite, diabase and porphyrite dikes, these dikes being of later origin than the ore. In some parts of the deposits there is a vein filling of quartz, but the main body is composed of solid sulphide ores.

"There is an 87-foot waterfall on a small creek 1 3-4 miles northward of the main tunnel, where 600 horsepower is developed by an impact wheel of Pelton type. This runs an 8-drill Rand compressor; also a small sawmill capable of cutting 7,000 feet a day of rough lumber.

"Transportation facilities are being provided by the installation of 2,500 feet of gravity tramway and one mile of an electric tramroad on a seven-tenths of one per cent. grade. This will bring the ore to deep water, where it can be shipped to any of the coast smelters.

"The property is under the general direction of Mr. M. K. Rodgers, American Bank Building, Seattle, Washington."

Last summer I was given the following information relative to this property by one who claimed to be well informed concerning it: "The developed ore zone has been opened for a little more than 2,000 feet in length, and from 200 to 500 feet in width. Beside some 1,500 feet of open-cut work, about 1,000 feet of tunnelling has been done. This work has opened a large body of copper sulphide ore, running from 4 to 8 per cent. (with some as high as 12 per cent.) in copper, and $1 to $3 per ton in gold and silver. It is a very favourable ore for smelting, carrying an excess of iron over silica. Much of it is pure copper and iron sulphide, high in both iron and sulphur, so making it a desirable smelting ore, less coke being required for its reduction than for other ores having constituents less favourable from a metalliferous point of view.

"The ore has been cut for a width of 125 feet and down to a depth of between 400 and 500 feet, and it is known to be good to below the 400-foot level. The quantity of ore blocked out is more than 300,000 tons, and the mine is sufficiently developed to warrant the erection of a 300-ton smelter."

The foregoing information will serve to give a general idea of the property the Granby Company has taken under bond. It is probable Mr. Graves is not quite correctly quoted in the statement attributed to him, in effect that the Hidden Creek property is "one of the greatest mines on the Pacific coast." It is likely that his comparison was intended to be restricted to the British Columbia coast district. If not, then the opinion may be expressed that it is premature to express any such opinion in the present state of development of the Hidden Creek mine. Nevertheless, there seems some good reason to believe there is in that mine a large tonnage of copper ore, but of general average grade somewhat lower than the stated 3 1-2 per cent. copper.

OUR LONDON LETTER

British Interests in Canadian Affairs—The Asbestos Trouble—The Tin Market and the Coming of Nigerian Tin—Oil Developments—The "War" With Some Further News of Maikop—Russia's Abounding Copper Production—Copper in Asia Minor and China—Rand Conservatism — Important New Reduction Works on the Rand.

(Exclusive correspondence of CANADIAN MINING JOURNAL.)

Despite the interest that things Canadian on the whole excite in Great Britain that interest does not extend to the Dominion's mines as a rule. In the days of Whittaker Wright there was a boom started by the forming of the British American Corporation and somewhere about $25,000,000 were raised with the utmost ease and companies like Le Roi and others were floated, the shares going easily and big premiums being secured. A few years passed by and there came the Whittaker Wright smash with the suicide of the promoter on the eve of his conviction for fraud. The companies that owed their origin to his skilful manipulation dragged on during the succeeding years and have gradually faded away one by one, Le Roi being practically the last to disappear. This company is now being wound up.

Turning to one Canadian matter that deeply interests English investors the news was definitely published on October 20th here that the Amalgamated Asbestos Corporation was in an unsatisfactory position. This corporation endeavoured to place $15,000,000 in 5,000 first mortgage bonds in London some seven months ago but the response was very small and so far as concerns this country interest in the affairs of the corporation centres in the effect which its fortunes may have upon the United Asbestos Company which is an English undertaking. I understand that no ill effects are anticipated for this English company and that in so far as there is likely to be some alleviation of the intense competition which has prevailed recently the position of the United Company may possibly be improved.

The fierce competition in the asbestos industry has reached a level where it is almost impossible for matters to become any worse. During recent years the English United Asbestos Company, like its predecessor, has adopted a very conservative policy, and the directors have made every endeavour to husband their resources. It seems likely, therefore, that in the event of any revival in business the company would benefit substantially. On this side the position of the Amalgamated Corporation is rather obscure.

The tin market to which I made some reference in my last letter continues to provide plenty of excitement on the London Stock Exchange and in the metal market. Just prior to the date of writing there has been another jump in the price and the cash figure of the metal is practically $100 higher per English ton than at the beginning of August. The Nigerian alluvial tin propositions to whose origin I have in an earlier article made some reference are getting more numerous on the London market. The most advanced company in production amongst them is the Naraguta, which has al-

ready attained an output of 45 tons of tin oxide a month.

The "Oil war" is well with us now. When the news first came to hand that the "Shell" Transport Company "whose interests are now combined with the Royal Dutch Petroleum Company," had torn up its agreement with the Standard Oil Company of America, considerable anxiety was caused among shareholders of European oil companies, especially the recently created Maikop concerns. More mature consideration caused many experts to declare, however, that no war exists and that the cut in prices was merely rendered necessary by the enormous accumulation of oil stocks.

The enormous surplus awaiting consumption, taken in conjunction with the development of the new Russian field at Maikop and the threatened intrusion of further new fields such as that just being exploited in Persia and the deposits discovered in the northern part of the Island of Sakhalin in Siberia, has produced a situation which would practically compel reduced prices. Oil shares have therefore largely recovered the losses sustained when the war was first announced. Oil investors here are encouraged by the theory that the more oil there is produced the more the demand for it will spread. This theory is supported by the results of the use of oil on steamships and on railways where the only difficulty has lain in obtaining regular supplies. It is held, therefore, that if the ultimate result of the oil war is to increase consumption of oil as fuel it will prove a blessing in disguise to those producers who are in a position to readily market their crude oil.

With regard to Maikop most conflicting statements continue to be issued. An interview with the Russian Minister of Finance declares that it is quite a mistaken impression that the Russian Government does not favour foreign enterprise in Russia. With regard to British Maikop companies, the Russian Government may, however, consider it necessary to require some guarantee that the work of prospecting with oil will be substantially carried out. It is possible that some standard of requirements may be fixed to which all companies applying for recognition must conform.

A "Times" correspondent who has recently gone all over the oil field comes to the conclusion that the country is satisfactory. An important factor is, however, developing. It was thought originally by geologists and experts that the Maikop field had a length of some 20 or more miles and a width of at least four or five miles. As the result of sinking wells the latest expert opinion is that for all practical drilling purposes the width of the field may not be more than a mile. In the course of the next few months a great deal of valuable information will be obtainable as the results of many borings become known. Of course, even if the field were to be only a mile in length instead of four or five miles, it could still be a great oil field. What we are waiting for, however, are trustworthy data.

All kinds of delays are taking place in connection with the official recognition of titles, the definition of boundaries, and the right to work. Old and experienced drillers, however, from Baku, Galicia, Roumania and California are actively employed on the field. It is said that 60 wells are sunk or in the process of drilling, with derricks being erected.

Whilst on Russia a word might be said of that empire's rapidly advancing copper production. From being an importer Russia is gradually turning into an exporter, her production having increased in ten years from 445,000 poods to 1,116,920 poods. The imports of copper have shrunk in five years from 1,262,000 poods to 213,000 poods. Electrolysis has been the critical question, but it is now being got over, the production of electrolytic copper advancing by leaps and bounds. The great Russian copper fields are the Urals, the Caucasus and Siberia. The production for the first half of this year shows a further rapid increase which, if continued, will make Russia's whole production for 1910 close upon one and a half million poods. The world's increasing consumption of copper will render it necessary to open up still further copper fields. (One pood equals 36 pounds.)

Many reports are to hand here with regard to fresh great deposits. In Asia Minor, in the neighbourhood of Diarbekir, there already are rich producing mines working ore that has an average of 30 per cent. copper, 40 per cent. iron and 30 per cent. sulphur, but beyond these there are great deposits which have not been tapped extending along the Black Sea shore near to the port of Trebizonde in which copper ores exist to a great, but unknown, extent in conjunction with manganese. Further afield, on the borders of Thibet from the Kansu Province of China, one hears extraordinary accounts of immensely rich and widespread deposits. An experimental plant has been put down to the order of the Chinese Government under British management which may be the beginning of an industrial revolution in that remote part of the country. The spot selected is in a valley about 100 miles west of the city of Sanchowfu and the experimental plant is capable of treating 50 tons a day.

The obstacle to treatment earlier here lies in the fact that the ore has an enormous capping of "loess" which in some places is 200 feet thick. So high is the opinion of the Chinese Government with regard to the copper possibilities of Kansu Province that although gold mining concessions are freely granted there the imperial authorities intend to keep the control of the copper in their own hands.

A private cable from Johannesburg to London states that during September the Rand mines alone crushed 1,835,647 tons of gold, the total profit being $4,711,650. The average yield per ton works out at 28 shillings and 3 pence and as the working costs figure out at 17 shillings and 11 pence, the profit per ton is 10 shillings and 4 pence. It will be observed that in the 30 days of September the tonnage crushed was slightly more than in the 31 days of August with an increase also in the daily average profit as compared with that month.

A special event on the field was the virtual completion of the new reduction works of the City Deep mine. It is curious to note how conservative the Rand has been and what a long time it was in taking the tube mill from Australia and the Butters Vacuum Filter process from the United States and Mexico. Returning to the City Deep, the present plant is designed to handle 65,000 tons per month. Ore coming from the western shaft is dumped by five-ton skips over grizzlies into fine and coarse ore bins up against the steel headgear. The main ore bin has a capacity of 1,000 tons, and above it is the preliminary crushing plant. Hopper bottom doors operated by compressed air are fitted to the bin, and through these doors the crushed ore and fines are discharged into trucks for transport to the mill. A similar crusher station will be erected at the eastern shaft when the scale of crushing is increased.

The line up to the mill is over a mile long, mostly on embankment. The train of ore will consist of four (or more) 40-ton all-steel Klussman trucks. They will be drawn by an electric locomotive consisting of two 25-ton, six-wheeled halves coupled, and will be of 150 h.p The locomotive will operate on 2,000 volt, 50 cycle,

three-phase current as furnished by the power company. A general system of lines connects the mill stores, general yard, workshops and coal siding.

The mill consists of 200 stamps, arranged in units of ten, each unit being driven by a 50 h.p. motor. Weight of stamps when new, 2,000 pounds. The stamps have long heads and short stems. A layer of half-inch felt is placed between the mortar bases and the concrete foundations. There are no king-posts, as the concrete foundations are carried up 14 inches wide, with indented steel bar reinforcing to above the level of the mortar-box tops. On the tops of the foundations is bolted a heavy cast-steel frame, which carries the cam shaft and stem guides. Each cam-shaft rests on 11 bearings, as beside the three bearings there are bearings intermediate between the cams. This is to minimize, if not entirely obviate, cam-shaft breakages by reducing vibrations. The stems run in cast-iron guide blocks bolted to the steel guide girts, but with a wood cushion between. As these stamps are designed for very heavy duty, each set of five stamps is provided with two challenge feeders to feed behind the second and fourth stamps of each mortar-box.

Practically the whole mill is of steel, wood only being used for the bin lining, for minor purposes and for fastening on the corrugated iron. The mill pulp is elevated twice, once between the batteries and tube mills, and second between the shaking tables and the sands collectors.

The tube mill plant comprises nine mills 5 feet 6 inches by 22 feet, driven by a slow-speed motor. In order to avoid crowding together of classifying cone and pebble feed, the driving arrangement is at the outlet end of the tube mill. It is at the inlet where most attention is required, and the presence of driving gear there is both inconvenient and dangerous. Behind the tube mills is the gold recovery house, where all the gold is recovered and handled. Each of the nine tube mills has seven shaking tables, with room left for an eighth if required. It will be understood that, in conformity with most modern practice, no amalgamation is done in the battery itself. There are 18 extractor boxes.

The sands collecting plant consists of one row of six vats built in reinforced concrete, which is the outstanding feature of the whole equipment. From the collectors the sand is taken to the leaching vats, of which there are 12, by means of conveyer elevator belts. Blaisdell distributors and excavators are used, and all power for the operation of the plant is purchased electricity.

RECIPROCITY IN COAL

Its Probable Effect on Nova Scotia—An Eastern Point of View.

(See Editorial Pages for Comment.)

Through the courtesy of Mr. J. H. Plummer, president of the Dominion Coal Company, the CANADIAN MINING JOURNAL reproduces a memorandum concerning reciprocity in coal, which has been submitted to the Dominion Government on behalf of the company.

Following is the statement:

1. Such support as a policy of reciprocity in coal has received in Canada appears to be based on the theory that the Nova Scotia collieries would secure a large market in New England, to offset their loss of trade in Quebec and Ontario. It is assumed that the policy could not be discussed except on this theory.

2. The free access to the United States markets which the Nova Scotia collieries would gain under reciprocity would, however, be an almost empty privilege.

The coal trade in Boston and New England has in recent years been revolutionized by important developments in the mining and transportation of coal. The conditions which formerly existed have entirely been changed, and the ability of the Nova Scotia collieries to find a market there has steadily decreased.

The developments have been general, but are most marked in the West Virginia coal fields, whose products reach the seaboard at about the same distance from Boston as Louisburg. By the construction and equipment of railways, steamers, loading and discharging plants, and other modern transportation facilities of the most modern and most economical type, at an enormous cost, the West Virginia mines have gained a strong hold on the New England market. These developments still continue, and the cost of production and transportation may be further lessened.

The consolidation of the New England railroads has also affected the situation. Their enormous trade of 5,000,000 tons gross a year all goes to American channels, and so far as the supply of coal by rail is concerned, their influence cannot but be entirely in favour of American coal.

3. Nova Scotia coals are generally excellent steam coals, but those from West Virginia are less volatile and are freer from sulphur; they are, in fact, of a different class, make less smoke, and are generally more desirable. The appliances installed by the large consumers are adapted to the use of this coal, and they cannot without inconvenience and expense use Nova Scotia coals, which debars us from their trade.

4. Notwithstanding our efforts to sell coal in New England, our shipments have been steadily decreasing, and even with concessions in price equal to the amount of duty, we have recently found that we could not secure contracts. We made strenuous efforts to place coal in New England during the past year, chiefly to provide steadier employment for our men during the winter months, and were willing to work on a very small margin of profit, but were entirely unsuccessful.

5. These conditions arising out of the natural development of the trade are in themselves conclusive, but, in addition, an absolute bar to the sale of our coal has been created by the legislation passed by the State of Massachusetts in June last, to abate the smoke nuisance. By this legislation the State has practically closed its doors against Nova Scotia coal; the terms of the Act, which is supplemented by local regulations elsewhere, as at Springfield and Worcester, preclude

the use of the high volatile coals in the chief New England markets, except under conditions which are commercially unattainable.

6. So far as we can judge, reciprocity would give us nothing tangible to make up for the loss of other markets, and would lead directly to a decrease of production. It might be that with a lessened production of coal throughout the province, labour would be more plentiful, wages lower and supplies cheaper, and that the collieries capable of being most economically worked might thereby be able to avert the more serious consequences, but this would merely place the burden on other shoulders.

7. It is scarcely necessary that we should refer to the effect on the Province of Nova Scotia; on the provincial revenue from royalties on coal; on the miners and other workmen; on the trade of the province, both internal and with other provinces. The large coal carrying trade on the St. Lawrence would be curtailed, and its benefits to the ports on the St. Lawrence and in Nova Scotia correspondingly decreased.

8. Several objections of a practical nature may be briefly stated:

(a) There are obvious disadvantages inherent in a terminable arrangement; they cannot be eliminated, and a long term agreement would only defer them. During the period of reciprocity new and cheaper lines of carriage would be developed; new business connections and alliances built up; consumers would become used to and provide appliances for a different class of coal, etc. All these conditions would be the more developed as the period is lengthened; they would make the recovery of our lost markets very difficult, and tend to perpetuate the control of our markets by the American coal mines.

The lack of permanency would also affect the installation of the facilities for handling coal, without which the Nova Scotia collieries could not hope to enter the New England market. Wharves, discharging plants, railroad connections, etc., would involve a heavy investment of capital, which would be imprudent under a terminable arrangement, even if the other conditions would justify it.

(b) It must be expected that our American competitors will join with the railways and others to hold the home market; such an alliance would be more effective now than at any time in the history of the trade, because of the conditions referred to above.

(c) The mere removal of the duty would not place us on equal terms; we should be in a foreign market, with everyone who could be moved by patriotic, local or interested motives, working against us.

(d) As regards the anti-smoke legislation, which in itself seems to put the question of reciprocity outside the possibility of discussion, it may be argued that reciprocity would lead to a modification of this law, but the State Legislature and the municipal authorities are not controlled by the Federal Government, and we see every reason to look for a wider application of the principle rather than the reverse. It appeals to the ordinary American citizen as a distinct advance in civic conditions, which incidentally supports a home product, and he would be strongly influenced by both considerations.

10. This memorandum expresses the views of this company only, and does not assume to speak for others, but the judgment expressed above as to the disadvantages of reciprocity to the Nova Scotia collieries is concurred in by producers of 90 per cent. of the coal mined in the province.

Some general considerations bearing on the question are set out in an appendix in further support of our views, and the whole is respectfully submitted for the consideration of the Government.

For the Dominion Coal Company, Limited.

J. H. Plummer, President.

Montreal, 8th October, 1910.

Appendix.

The foregoing memorandum is directed to the situation as more particularly affecting Nova Scotia, but if our belief as to the effect of reciprocity in that province is well founded, it is fair to ask whether the conditions elsewhere call for such a sacrifice of Nova Scotia interests.

2. So far as we are aware no objection to the continuance of a duty on coal exists in the Province of Quebec, except of the most limited character.

Objection is said to exist in the Province of Ontario, which province largely benefits by the demand for machinery, food supplies, etc., created by the coal industries in Nova Scotia, and by the iron and steel industries which depend on and are bound up with them. The following comments on the position of purchasers of coal in Ontario are therefore respectfully submitted:

(a) The manufacturers of Ontario are not handicapped in their manufacturing costs by the duty; the cost of coal to them, duty paid, is about the same as to their eastern competitors. In the case of slack coal, which they use largely, the duty is so low that its removal would have no material effect.

(b) No tax is more fairly distributed. Manufacturers add it to their costs and prices, and, in theory, if it were removed the saving should go to their customers. Railways add it to their passenger and freight rates, and, theoretically again, if the duty were removed their rates should be reduced by precisely an equivalent amount, as the tariffs approved by the Railway Commission are based on the current cost of operation.

(c) It may be doubted whether the removal of the duty would decrease the price of coal in Ontario; it had not that effect in the case of anthracite. It is true that there is more competition in bituminous coal, but the business of mining soft coal in some of the districts which supply Ontario is known to be in a very unsatisfactory state, and carried on without a reasonable profit, and it may, therefore, be expected that with the removal of the duty, the mine owners would try to hold the market at current prices; it would be entirely within their control, and the Canadian consumer would be helpless against any combination that might be formed.

(d) The coal industry of Nova Scotia, with the iron and steel industries which directly depend on it, furnish the chief exports from the province to other parts of Canada, and are the foundation, in turn, of the large purchases made by Nova Scotia from the western provinces. The volume of this trade is unquestionably very great, and it is secured to the farmers and manufacturers of Ontario and Quebec by the tariff.

The cost of these imports is relatively high, and the prevailing wages paid to miners and steel workers are also high, due chiefly to the high cost of living. These conditions are accepted as equitable under a fiscal policy which seeks to protect all parts of Canada alike, but the same consideration requires that no changes which would disturb the general balance of trade, or injure one province to benefit another, should be considered.

3. The importance of the industry to the Province of Nova Scotia is very great. Its entire revenue in 1908 amounted in round figures to $1,783,400, of which $616,900 was derived from royalties on coal. The proportion

was somewhat smaller in 1909 because of labour troubles.

In 1907 the coal mining companies in Nova Scotia paid out for labour and supplies a sum slightly exceeding $10,000,000; this is based on the actual figures furnished by the various collieries. The amounts paid out by the iron and steel manufacturers, whose ultimate prosperity is bound up with that of the coal companies, would not fall much short of the same amount.

4. A comparison of labour conditions may fitly be made. In the eastern and southern coal mining districts of the United States a large number of foreigners and negroes are employed, and from this and other causes the cost of mining as compared with Nova Scotia is much lower.

The men employed in the Nova Scotia collieries are of an excellent class; they are as a whole, very well paid; their standard of living is high, and the provisions for their safety and comfort are far beyond what is customary in the United States. The mining laws of Nova Scotia are as advanced in this respect as in any country in the world, and the coal companies find it to their interest as well as their duty to carry them out faithfully.

We respectfully submit that the difference in labour conditions should be considered when a proposal to wipe out our tariff protection is under discussion. The laws of the province respecting mining, the general influence of our Canadian standards, and the character of the population which supplies the greater part of our labour, make it impossible for us, even if we were willing to use the cheap labour which our competitors are able to employ.

MINING—A BUSINESS.

(Written for the CANADIAN MINING JOURNAL.)

[EDITOR'S NOTE.—This short article was written at the express request of the CANADIAN MINING JOURNAL. To our mind it delimits admirably the function of the mining engineer—although this is not the theme. We are especially in accord with the writer's remarks anent the word "conservative." His strictures are just. That word has been used to cover much moral cowardice. The word that should supplant it is a homely English word—"honest." We earnestly invite comment on this article as we recognize the fact that on all such propositions there is room for difference of opinion. Moreover, we are diffident about forcing our own views upon our readers.]

The untutored have believed, and the general public suspected, that precious metal mining is in all its aspects a pure gamble like roulette. This impression has obtained partly through the sentimental side of human nature, and partly because of misconceptions on the part of those untrained to the business of getting gold and silver. These latter believe that little knowledge is necessary to win a fortune in mining fields. Nothing can be farther from the truth. It can be easily shown that a hard and careful training only can fit men to mine—with success.

In considering this matter, we may conveniently divide our subject into two parts. The indefinite, and the definite. It must be granted that any man or group of men wishing to make a business of mining must be possessed of the necessary capital, or be in a position to control and obtain this capital. And it must be further laid down that no mining operator (using the term operator in the sense of a single capitalist or a group of capitalists), will confine his risk to any one prospect to insure a profitable outcome for his undertaking. In other words, if he is going to make mining a business he must be persuaded or determined to distribute his energies over sufficient number of mining risks (guided by proper advice) to insure obtaining what he seeks; namely, a profitable mine. Those prospects, which we know as mining risks, which fail to satisfy his expectations, must be consistently written off to business losses, and charged against the successful property which he will ultimately control if he prosecutes the business steadily and intelligently. That part of mining which we term the indefinite part, is the prospecting and geological work necessary in the early stages of a deposit giving evidence of some interest to the miner. There is no line of demarcation between the indefinite and the definite parts of the business. As the prospect becomes more developed, competent engineers will readily advise their clients whether it promises a profitable outcome, or whether the venture should be abandoned. The early part of any operator's work must necessarily therefore be regularly guided by the geologist and the engineer, and it will depend upon their advice how much and what kind of work will be carried on. Should the deposit prove commercially valuable, it will gradually pass to the definite stage, and will show profitable mineral in place, and ore reserves that can be determined and the value of which in metallic contents estimated. When we have arrived at the estimation of ore reserves, even at that stage which we know as prospective ore reserves, we may be right in saying that the prospect has passed from that stage into what we may reasonably term a developed mine. If the ore opened by this development would indicate that the amount of money already expended is covered by value existing in the mine, we are right in saying that the mine has passed to the definite stage, and all work done can be, and should be, well done on business lines, and all risk for the capital expended can be almost if not entirely eliminated by a combination of good financial management, good operating management, and proper technical skill.

In every mine we must realize that there is the cooperation of three kinds of talent necessary in the commercial outcome of any mining venture, namely, financial management, or the business of the financier or capitalist, the department of mining which demands the service of the skilled mining engineer and geologist, the equipment and treatment of the ore, or the skilled metallurgist. These latter two divisions may have a number of sub-divisions that merge one into the other, or may be efficiently found to exist in one man; but this is not often the case. In any case it is for the operator to call to his aid the necessary skill that these various departments demand in order to be sure of the outcome of the proposition. Should he fail to seek this advice, his neglect cannot be debited to the mining industry. Mining conducted in this fashion should, and does, recompense and reward those engaged in it very handsomely. In fact, if prospects which are only intended to be gambles from the start are eliminated, it will be found that the percentage of mining failures is less than in any other business that we are acquainted with, and the reward greater than in almost any other business. This fact is amply proved by the history of the Western States and Mexico, where have been built up splendid towns and cities from the profits of the surrounding mines, and it is possible that the mining industry in the snow covered woods of Ontario will do more in a shorter time to build up Eastern Canada than all the other industries combined.

It may be generally accepted as a fact that where a report, described as conservative, has been made, it means little or nothing. An engineer comes to a decision on the facts as they are presented, or as he sees them. That decision represents in the competent engineer a true statement of the conditions, and should indicate an exact valuation for the property, the engineer making the proper and necessary deductions from the result of his examination. It is therefore absurd to describe a report as conservative. A report is either right or it is wrong. It should be neither conservative nor liberal. It is exact within the limits of our knowledge at the present time, and it may be generally stated as correct that where a company is operating without the services of competent engineers, it is not operating the mines in the interests of the investor, but in the interests of the stock market. A company that means to mine seriously is always willing and able to surround itself with competent talent, so that those engaged in its financial management shall not be called upon to explain and bear the burdens of its technical management. This can only be accomplished by employing engineers, geologists and metallurgists who have had not only the necessary training, but the necessary and varied experience that fits them to be competent associates and guides to the financiers who are responsible to the stockholders.

A NEW ELECTRIC ARC PROCESS FOR PRODUCING AND REFINING STEEL

By Frank C. Perkins.

The accompanying drawings indicate the construction and arrangement of electric ladles or furnaces with or without covers and composite electrodes for operating an improved process of producing and refining a high grade of steel low in phosphorus to analysis desired. It consists in electrically treating molten iron from a blast furnace or while cold, or low grade molten steel as taken from a Bessemer converter or open-hearth furnace with electric heat produced by an arc or arcs formed between the slag of the bath and specially designed electrodes. Several forms of composite electrodes are indicated in the drawings, one consisting of a cored carbon or a mixture of carbon, and lime and oxide of iron or other slag producing materials in the form of a pencil. Another shows the slag materials packed in an iron or steel tube, and still another surrounding a carbon or iron rod or rods with or without projections for supporting the slag materials with a binder, such as tar.

The use of the composite or combination electrode, instead of the usual carbon electrode or an electrode of pure iron, introduces the fresh and additional refining slag materials to the bath fused and in a highly fluid state at the hottest points which are at the arcs or at the points of contact of the electrodes and the layer of slag floating on the bath of molten steel.

When two of these electrodes are used in an electric furnace of the double pole type, the current passes from one electrode into the slag and through the slag as a resistance and out the other electrode, the two arcs operating at about 100 volts pressure. One electrode may extend into the slag or down into the molten steel below the slag, a single arc only being employed at this time formed at the other electrode, with a pressure of approximately 50 volts.

The double pole electric furnace is well adapted for practising this composite electrode process similar to the Heroult method, because when the two electrodes are introduced into the refining slag, the latter acts as the resistance and forms one or two arcs according as to whether one or both electrodes are out of contact with the bath and producing the arc or arcs. If one arc is used the other electrode may be raised and lowered by electric motor driven hoist stirring the molten bath by this action.

An ordinary basic lined ladle, crucible or pot, may be used as noted in the drawings without cover, which may be supplied in the same manner as a basic lined two pole electric furnace. This ladle having received the charge of molten steel from a Bessemer converter, is electrically refined by eliminating the phosphorus and sulphur, as far as desired, and is, if necessary, deoxidized and recarburized. The steel is then poured into the ingot molds, after an electric treatment of from a few minutes to an hour or more in the electric ladle, according to the degree of refining desired.

When only one of these electrodes is used in an electric furnace, this electrode extends into the refining slag forming the arc at this point, the current being conducted through the molten bath and out through the bottom of the ladle, similar to the Girod process.

Another construction shows double arc or single arc action taking place when a ring electrode is arranged on a level with the slag. A single arc action only at centre may be employed, the outer electrode dipping into the slag or molten steel.

By this electric arc process the molten metal continually circulates, all particles of the bath coming into contact with the refining slag at the arc or arcs and elsewhere and being rapidly refined, remaining at the highest temperature only a short time, then replaced by other particles of molten steel reaching the slag near the arcs.

It is held that in the Heroult arc steel furnace the circulation in the bath is always active and the average temperature may be kept as low as any other furnace and all parts of the bath come rapidly into contact with the slag. In case a deep bath of say 10 or 12 tons or more is used in the electric ladle and additional circulation is desired, one electrode may be plunged up and down in the metal by a hoist mechanism, as previously mentioned, while the other electrode produces the arc with the slag.

By the use of these special electrodes made with slag producing materials, the highly fluid slag at the arcs causes rapid circulation to take place and the bases are removed, which are often retained in the metal and cause bad steel when poured into the ingot molds directly from the Bessemer converter without electric refining.

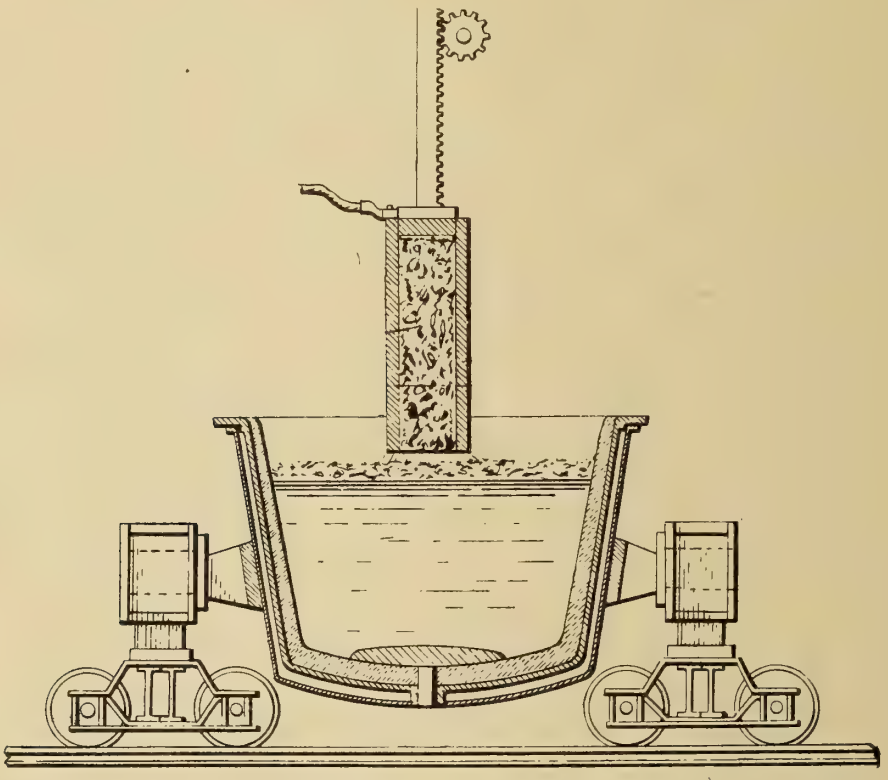
Furthermore, in tbis electric refining process segregation of sulphur and phosphorus are largely avoided, while any quality of steel may be produced regardless of the quality of the raw materials.

It is well known that the Bessemer converter process for making steel is far cheaper than the open-hearth process, but the quality very largely depends on the metal, ore and other materials available, and it is not possible to test the metal during the operation. The resulting steel, therefore, from high phosphorus and high sulphur charges, contains an injurious quantity of sulphur and phosphorus, which cannot be eliminated by the existing acid Bessemer process. Too much or not enough carbon, manganese, silicon or other elements can readily be corrected and gauged by the charge introduced into the converter and subsequent treatment, but phosphorus and sulphur less than .09 and preferably below .05 is desired and this is not attainable by the existing Bessemer process.

tending from 75 to 90 minutes or more, taking molten metal from an open-hearth furnace and electrically treating same with oxidizing and neutral slags, the phosphorus can be brought down to .003 per cent., and the sulphur down below .007 per cent.

By the use of the present invention with composite electrodes containing slag producing mixtures, it is possible to reduce the phosphorus to .03 or .05, which is 10 to 20 times as much as the above in a far shorter time and within practical limits for Bessemer working.

It is also well known that the carbon is always eliminated before the phosphorus, and if it is attempted to carry the reduction far enough to lower the phosphorus, in an open-hearth furnace, the metal is highly oxidized and decarburized. The present invention provides a means of taking the highly oxidized metal from the open-hearth furnace, if carried far enough to eliminate as much phosphorus as desired, and by the electric treatment with the electric arc and these special elec-



This new composite electrode process may be utilized as an auxiliary treatment to the Bessemer process for eliminating the phosphorus by employing an oxidizing slag in the bath as the molten metal is treated in the electric ladle with the arc, the auxiliary slag producing materials in the combination or composite electrode acting instantly on the metal and the slag being in a highly fluid state as it melts in the high temperature of the arc.

The highly oxidized metal from a Bessemer converter overblown may be utilized deoxidizing same in the electric ladle by this process. It may be stated that the desired end to be attained by this electric auxiliary process with the Bessemer converter for rail making, particularly, is the reduction of phosphorus to .05 or thereabouts by the oxidizing slag and electric arc, the other elements being easily controlled by existing Bessemer methods.

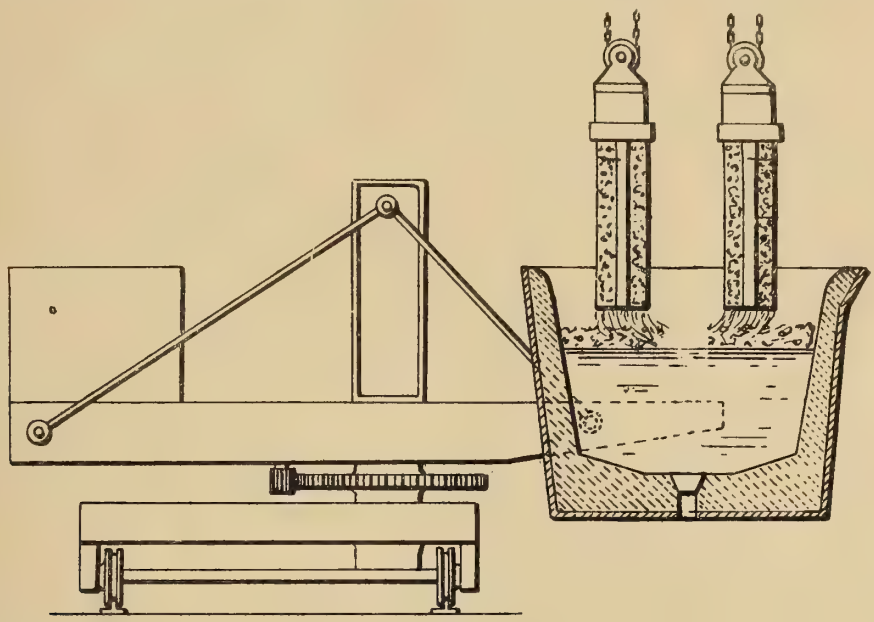
It is well known that with the Heroult electric furnace, having pure carbon electrodes and a treatment ex-

trodes having neutral slag mixtures, it is also possible to eliminate, if desired, nearly the last traces of sulphur, the metal being deoxidized and as much carbon being added as found desirable, producing a finished steel of any degree of perfection desired, according to the length of time the electric treatment is carried on.

It may be stated that in metal taken from an open-hearth furnace, if the reduction is carried on long enough to reduce the phosphorus to .01 per cent. or less than this amount, the carbon is eliminated. It is, of course, true that such a highly oxidized metal would be very unsatisfactory in practice, but by means of the electric furnace treatment with these composite or combination electrodes, the arc and proper slag mixtures, introduced in the molten bath, together with the proper mixture in the electrodes themselves acting as auxiliary slag producers, will bring most satisfactory results, eliminating the sulphur, adding the proper amount of carbon and deoxidizing the steel completely.

The proper mixtures can be introduced into the molten bath and also provided in the electrode mixture to remove the sulphur on account of the high temperature of the electric arc even though the slags selected could not be used by any other than the electric treatment without addition of other slag materials to lower the melting point, and this would interfere with the efficiency of operation. The slag mixture is also melted to a highly fluid state at the arc largely from the mixture in the electrode itself, placed there for this purpose, of slag from oxygen in the air so that no further oxidation takes place.

The determining questions of the electric refining of steel are cost and output. By shortening the time of treatment with the special composite electrodes combined with slag producing mixtures, and refining only down to such percentages of phosphorus and sulphur as are essential for rails and structural steel, the electric power consumed is so low and the time required so short as to be practical for this work.



in addition to that supplied in the ordinary way on the top of the bath.

Ordinarily there is great trouble, and it is very costly to deoxidize the metal by existing processes, and it is claimed that the pipes and blow holes are produced in the ingot and other difficulties result from the presence of iron oxides. It is also maintained that when ferro-silicon and ferro-manganese are used to prevent these troubles, the oxides which result stay in the steel as an "emulsion" in a finely divided state.

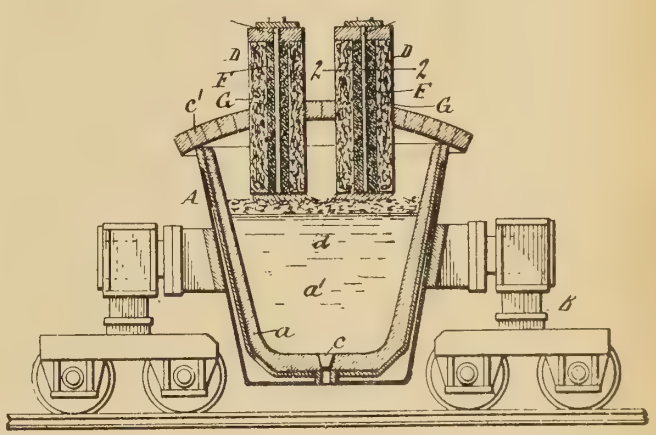
With these special electrodes and the use of an electric arc for refining purposes, materials can be used in the electrodes or added to the bath for a neutral slag, as it is maintained that a thorough deoxidation of the steel is not possible when there are iron oxides in the slag, as they will react to a certain extent with the molten bath of steel.

It is held that adding carbon under ordinary conditions will not result in complete deoxidation, as both iron carbide and ferrous oxide readily exist together. By means of the electric process of steel refining with these combination or composite electrodes, however, carbon or a mixture of carbon and iron may be added to the slag as an auxiliary to the carbon mixture of the electrode, forming calcium carbide and resulting in deoxidation without the slightest difficulty at no great expense, and on any scale desired by providing electric arc apparatus for several electric furnace ladle cars arranged for serving various Bessemer converters or open-hearth furnaces.

The desired amount of manganese can be added for counteracting the bad effects from the ferrous oxide, the carbon reducing the manganese ore which has been added to the slag and taking out the last traces of ferrous-oxide, leaving the steel bath protected by the layer

By this process cheap ore can be used having higher phosphorus and sulphur, these ores being abundant, while high grade ores are nearly exhausted.

By this process of only taking the metal from the converter or open-hearth furnace when it is nearly finished steel and molten, only completing the refining operation electrically, only one-quarter of the electric power and less time is required than when electrically heating from cold metal. It is of value as an auxiliary process to the Bessemer converter and open-hearth fur-



nace, taking the molten metal with little loss of heat and refining same to any degree, according to time taken, the mixtures of carbon and iron or steel combination electrodes used and nature of slags employed.

While this process is specially adapted to the refining of molten steel taken from the Bessemer converter and open-hearth furnaces and treated in an electric furnace

or ladle, it is not confined to this, as the identical process will convert iron into steel from the molten or cold state without being previously treated in a Bessemer converter. Any grade of steel may be made regardless of quality of raw materials, and carbon may be eliminated from electrodes for special steel making, the current being conducted to the arc by the iron rod instead of carbon and iron oxide, or composite electrode.

The neutral slag electrodes may work with a low current arc or dipping into slag and heating by resistance, and the steel may be kept for hours under this molten neutral slag without changing its quality. The metal may be cast, remelted or worked over to a higher or lower grade, or it may be cooled, chilled and melted a second time without injuring the quality of the steel.

The cost of production in this process is low, as most of the work of steel-making is done by the Bessemer converter or open-hearth furnace, only the removal of small percentages of the phosphorus or sulphur from the steel being attempted or the deoxidation of the metal, this being a good product for the larger rolling mills which supply demand of rail, and structural steel interests. The partial removal of the injurious phosphorus and sulphur reduces the time to a few minutes intsead of hours, hence reduces the current required per ton.

It may be stated that the shorter time also lowers cost of linings and refractory materials per ton of metal, as many charges may be treated in same time required for treating one open-hearth charge. This shorter time process only reducing phosphorus from .09 to .05 for rail steel instead of to .003, which is possible by longer treatment, makes it a practical process for rail mills dealing with Bessemer converters treating full charges of fifteen tons in electric ladles, handled by cranes taking same to positions where electrodes are inserted.

After treatment the metal is drawn from the bottom of ladles or tilted and poured into the ingot molds after slag has been removed. These easy methods are of vital importance, as any new process for removing phosphorus and sulphur should not greatly increase the cost of power; should not cause excessive cost of basic linings or electrodes, or slag producing materials, and should be readily used as an auxiliary process in existing Bessemer plants.

ALBERTA PROVINCIAL COAL MINE OFFICIALS EXAMINATIONS

An examination for fire boss certificates was held at Banff and Frank on June 2nd, at which eighteen candidates presented themselves for examination, eleven of whom passed, and the regular examination for mine managers, pit bosses and fire bosses was held at Banff, Frank and Edmonton on November 3rd, 4th and 5th. At the latter examination 86 candidates sat for examination, 58 of whom passed, as follows: Managers, 27 sat for examination, 16 passed; pit bosses, 27 sat for examination, 20 passed; fire bosses, 32 sat for examination, 22 passed.

In previous years the custom has been that the fire boss examination occupied one day and the pit boss and mine managers' examination two days. In connection with the November examination, however, the time occupied by the mine managers' examination was extended to three days, in order to more thoroughly cover the wide range of general mining subjects necessarily included in this class of examination.

The number of candidates who presented themselves for examination during 1909 shows a considerable increase over previous years, and with the steadily increasing number of mine officials qualifying each year, the operators should soon have no difficulty in securing certificated men to fill all official positions at the mines. A number of provisional certificates have been issued during the year, but the number of certificates of this class issued each year is gradually decreasing.

The following are the questions set at the examinations held at Banff, Frank and Edmonton on November 3rd, 4th and 5th, 1909:

Mine Manager Examination.

Paper No. 1. Time allowed, one and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 70 per cent. of the allotted marks to pass.

COAL MINES ACT.

1. What is the interpretation of "mine" as laid down by The Coal Mines Act? (10)
2. What are the provisions of The Coal Mines Act with reference to register of employees? (10)
3. What are the provisions of The Coal Mines Act with reference to the employment of boys in or about the mine? (10)
4. What are the provisions of The Coal Mines Act with reference to the reporting of accidents? (15)
5. What are the requirements of the Act with regard to keeping a mine plan? (15)
6. Name the different registers and report books to be kept at the mine under The Coal Mines Act, 1906, and The Coal Mines Act, 1908? (20)
7. What are the requirements of the Act regarding ambulances, etc.? (10)
8. What does The Coal Mines Act state regarding the inspection of machinery? (10)

Mine Manager Examination.

Paper No. 2. Time allotted, two and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 70 per cent. of the allotted marks to pass.

GASES AND SHOT-FIRING.

1. Give the names, composition, specific gravity and chemical symbol of each of the four different gases commonly found in coal mines. (15)
2. Where are the gases mentioned in Question No. 1 found, and how are they produced? (10)
3. What noxious gases are produced by fires and explosions of firedamp in mines? (10)
4. Name six essential features of a good safety lamp for general work. (10)
5. What principles are involved in the construction of a safety lamp that would render one lamp more sensitive in the detection of gas than another? (10)
6. What instructions would you give in reference to the care and preparation of safety lamps before giving them to the workmen, and how would you instruct the workmen as to their use? (15)

7. Explain the proper method of thawing dynamite cartridges. (10)

8. What are the dangers arising from the use of powder in dry and dusty mines, and how would you guard against them? (10)

9. Do you think coal dust will explode without the presence of inflammable gas; if so, what would you do to prevent such an explosion? (10)

Mine Manager Examination.

Paper No. 3. Time allowed, three and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 70 per cent. of the allotted marks to pass.

VENTILATION.

Coefficient of Friction, .00000002.

1. Define the terms motive column, regulator, coefficient of friction, ventilating pressure. (10)

2. Explain the principal features to be considered when contemplating the erection of a ventilating fan? (10)

3. What are the advantages of frequent splitting of the air current, and when is the limit in the number of separate ventilating sections reached? (10)

4. Find the rubbing surfaces of three airways each 6,000 feet long and all of the same sectional area, namely, 75 square feet. The forms of the three sections are as follows: The first, A, is rectangular, and is 5 feet high and 15 feet wide; the second, B, is square; and the third, C, is circular. (15)

5. (*a*) Determine the length of the motive column when the temperature of the downcast is 50 deg. F., and that of the upcast 130 deg. F., the depth of each shaft being 300 feet. (*b*) If the barometer reading in each is 29 inches, what is the pressure producing ventilation? (10)

6. If, with a water gauge of 1 inch, 40,000 cubic feet of air are obtained in an airway 10,000 feet long, what should be the water gauge when the length of the airway is extended to 20,000 feet, all other things being the same? (10)

7. If it is necessary to double the amount of air in a mine, how should the pressure and power be increased, respectively? (10)

8. What power will be required to give a current of 60,000 cubic feet of air per minute in a mine having four equal splits, the airway in each split being 6 feet by 8 feet by 5,000 feet? (10)

9. To find the percentage of mine gases given off by a mine the air at the inlet was measured and found to be 137,500 cubic feet per minute at a temperature of 61 deg. F., the air at the outlet measured 150,200 cubic feet per minute at a temperature of 76 deg. F., what is the percentage of mine gases present in the air leaving the mine? (15)

Mine Manager Examination.

Paper No. 4. Time allowed, three and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

PRACTICAL WORK.

1. If you had a number of men in a certain district and fire was to take place in an intake airway, state how you would proceed to rescue the men. (10)

2. If you were in charge of a gaseous mine and an explosion should occur during working hours: (*a*) What would be your first action? (*b*) Describe in detail how you would proceed into the mine to recover dead bodies or rescue persons still living. (10)

3. Make a sketch showing how you would construct an overcast. (10)

4. What useful purpose do overcasts and undercasts serve in mine ventilation, and which kind would you approve of and why? (10)

5. Show by sketch how you would divide a shaft you were sinking into the various necessary compartments, one compartment to be used for water, air pipes, and ventilation until connection with the escapement shaft is made. Answer fully. (10)

6. In developing a flat seam of coal, opened up by a shaft, and which is giving off a large quantity of explosive gas, how should the mine be planned in regard to ventilation and haulage so as to insure the greatest degree of safety to the employees? (15)

7. How do mine fires originate, and what precautions are necessary to prevent them? (10)

8. Give your reasons why different methods of mining are used and why one method will not answer for all mines. (10)

9. Describe by sketch some of the methods used in working incline seams. (15)

Mine Manager Examination.

Paper No. 5. Time allowed, three and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

MACHINERY.

1. What is a unit of work and how many are there in a horse-power? (5)

2. What care should be taken of steam boilers to secure the best results from their use? (10)

3. How may radiation from boiler pipes and engine cylinders be prevented? (10)

4. What is mean effective pressure? (5)

5. The diameter of the piston of an engine is 10 inches and the length of stroke is 15 inches. The engine makes 250 revolutions per minute with a mean effective pressure of 40 pounds per square inch. What is the horse-power of the engine? (10)

6. At a shaft 200 feet deep, there is a sump 250 feet long, 20 feet wide and 6 feet deep. If this sump fills in three hours' time, find the horse-power of the pump that should be installed to handle the water. (10)

7. A 300 horse-power engine has a cylinder 22 inches in diameter, and a stroke of 18 inches. When making 200 revolutions per minute, what must be the mean effective pressure (M.E.P.)? (10)

8. What weight will a double cylinder engine of the following dimensions lift (allowing one cylinder to overcome friction): Diameter of cylinder, 10 inches; length of stroke, 15 inches; average steam pressure on pistons, 40 pounds per square inch; engine shaft geared 5 to 1 on drum; diameter of drum, 5 feet? (10)

9. To what use is electricity applied in a coal mine? What are the names of the four electrical units in common use and explain their meaning? (10)

10. What in your opinion constitutes an efficient and safe hoisting appliance for a coal mine? Describe in detail from the foundation of the engine to the delivery of the carriage at the tipple. (10)

11. What classes of air compressors are best adapted to operate haulage locomotives? Give reasons. (5)

12. Using compressed air of 60 pounds gauge pressure, if there is required 1,100 cubic feet of free air for the operation of twenty-five 2-inch drills at sea level what quantity of free air would be required for the same work at an elevation of 5,000 feet above sea level where the barometer reads 25 inches? (5)

Mine Manager Examination.

Paper No. 6. Time allowed, three hours.

The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

LEVELLING.

1. Describe a levelling rod and its use. (15)

2. Describe an engineer's level and its use. (15)

3. Fill in the following level notes, showing the height of instrument and the elevation of each station. Stations are 100 feet apart: (20)

Station	B.S.	H.I.	I.S.	F.S.	Elevation.	Grade.	Remarks.
	feet.		feet.	feet.	feet.		
0 B.M....	7.50	....	....	....	20.00	.....	.....
1.....	....	....	5.00	....	.....	.....	.....
2.....	....	....	2.50	....	.....	.....	.....
3.....	....	....	2.00	....	.....	.....	.....
4 T.P....	....	....	....	1.50	.....	.....	.....
.....	8.00	....	....	....	.....	.....	.....
5.....	....	....	7.50	....	.....	.....	.....
6.....	....	....	6.00	....	.....	.....	.....
7.....	....	....	4.00	....	.....	.....	.....
8.....			2.00	....	.....	.....	.....
9.....	....	....	2.50	....	.....	.....	.....
10.....	....	....	4.00	....	.....	.....	.....
11.....	....	....	6.00	....	.....	.....	.....
12.....	....	....	4.50	....	.....	.....	.....
13.....	....	....	3.50	....	.....	.....	.....
14.....	....	....	2.00	....	.....	.....	.....
15 T.P....	....	....	....	0.00	.....	.....	.....
.....	7.50	....	....	....	.....	.....	.....
16.....	....	....	8.50	....	.....	.....	.....
17.....	....	....	7.00	....	.....	.....	.....
18.....	....	....	4.00	....	.....	.....	.....
19.....	....	....	....	2.50	.....	.....	.....

4. Draw a profile from the above notes, using a scale of 10 feet to the inch for heights and a scale of 100 feet to the inch for horizontal distances. Mark on the profile the number and elevation of each station. (20)

5. What is the average grade from Station 0 to Station 19? Show grade by line drawn on profile. (15)

6. How would you determine whether your instrument was in proper adjustment? (15)

Mine Manager Examination.

Paper No. 7. Time allowed, three and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

SURVEYING AND MAPPING.

1. On starting to make a survey underground, what instruments, tools and materials are used? State fully how you would proceed to make an underground survey. (10)

2. Why are stations invariably placed in the roof? (10)

3. In setting up a transit, how do you determine the exact place to set the instrument when the point is in the roof? (10)

4. In starting from a true base line OON, you turn an angle to the right 23 degrees 15 min. What is the bearing of this course? On the next station you turn an angle to the right of 87 deg. 10 min. What is the bearing of this course? Is there any way by which these bearings can be checked? (10)

5. A distance measured on a pitch of 35 deg. is 150 feet. What is the horizontal distance? (10)

6. Plot the following survey, reducing angles to corresponding bearings. This survey commences at Station O on an established base line which is true north and south, and the readings are as follows: (10)

Station 0-1	Right	31 degrees	15 min.	Dist., 590 feet.
Station 1-2	Right	1 degree	38 min.	Dist., 505 feet.
Station 2-3	Right	127 degrees	04 min.	Dist., 190 feet.
Station 3-4	Right	61 degrees	29 min.	Dist., 102 feet.
Station 4-5	Left	1 degree	58 min.	Dist., 190 feet.
Station 5-6	Left	5 degrees	25 min.	Dist., 600 feet.
Station 6-0				

7. Calculate by sines and cosines the bearing and distance from Station 6 to Station 0. (10)

8. How would you plot the mine workings of a pitching seam on a plan to be used by the pit boss? Give your reasons for such. (10)

9. What is the deflection of the needle in this locality? Why is the needle weighted? (10)

10. Why is it advisable to make a contour map before planning the development of a mine? (10)

Pit Boss Examination.

Paper No. 1. Time allowed, one and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

COAL MINES ACT.

1. What is the interpretation of "pit boss" as laid down by The Coal Mines Act? (5)

2. What are the provisions of The Coal Mines Act regarding an adequate amount of ventilation in a mine? (10)

3. (*a*) How often does the Act require the air current to be measured? (*b*) By whom measured? (*c*) When must the air reports be sent to the office of the Mine Inspector? (10)

4. What does The Coal Mines Act state with regard to the withdrawal of workmen in case of danger? (15)

5. State what dangers are met in approaching old abandoned workings and what precautions are necessary under The Coal Mines Act. (15)

6. What does The Coal Mines Act state about signals and manholes on underground planes which are self-acting or worked by machinery? (10)

7. What are the requirements of The Coal Mines Act regarding manholes on travelling roads where the produce of the mine exceeds 10 tons in one hour? (10)

8. What does The Coal Mines Act state about a person having charge of machinery in a mine where persons are lowered and raised by such machinery? (10)

9. What does The Coal Mines Act state regarding a supply of suitable timber? (10)

10. What are the requirements of the Act regarding the fencing of machinery? (5)

Pit Boss Examination.

Paper No. 2. Time allowed, two and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

VENTILATION.

1. Name the gases met with in mines, giving, also, the symbol and specific gravity of the same. (10)

2. What proportion of atmospheric air and carburetted hydrogen are necessary to form a highly explosive mixture? (10)

3. What are the most common causes of ignition of gases in coal mines? (10)

4. The ventilating fan of a mine is of ample capacity but the ventilation at the face of the workings is insufficient. What would be the probable cause of the fan's inefficiency in producing sufficient air at the face of the

workings? How would you proceed to overcome the difficulties or defects? Explain fully. (10)

5. A rectangular airway is 6 feet high, 12 feet wide, and 2,500 feet long; what is the rubbing surface in square feet? (10)

6. Which is the more effective, the exhaust or forcing fan? Give your reasons. (5)

7. In a gangway having a 7-foot collar, 12-foot spread, and 7 feet high, what is the area and what quantity of air is passing when the velocity is 375 feet per minute? (10)

8. The velocity of the air passing in a circular shaft 8 feet in diameter is 300 feet per minute; what is the quantity of air passing per minute? (10)

9. The water gauge is 1.5 inches, the quantity of air in circulation is 85,000 cubic feet per minute; find the horse-power in the air. (10)

10. Explain the principle discovered by Sir Humphrey Davy and embodied in the safety lamp. What is the standard size of wire gauze used in the Davy lamp? (5)

11. What instructions would you give in reference to the care and preparation of safety lamps before giving them out to the workmen and how would you instruct the workmen as to their use? (10)

Pit Boss Examination.

Paper No. 3. Time allowed, three and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 50 per cent. of the allotted marks to pass.

PRACTICAL WORK.

1. When would you consider that the coal in a seam is properly mined where blasting the coal is necessary? State your views fully. (10)

2. When the fire boss reports in the record book certain dangers that he has discovered during his examination, what would be your duty as pit boss? (5)

3. Assuming that falls of roof, slate, coal and sides are the cause of the greatest number of accidents in mines, what precautionary measures would you adopt as a pit boss to reduce their number? (10)

4. An entry is rising at the rate of 7 feet in 100 feet and the ventilating current of air is flowing up the grade where you are compelled to place a door on the pitch of said entry near its entrance, and the height of the door is equal to the height of the entry; explain how you would prepare the place so the door would close by gravity and show by sketch how door is placed. (10)

5. Make a sketch of an overcast. (10)

6. Show by sketch how you would timber a roadway having a bad roof and sides, also soft fireclay bottom that heaves. (10)

7. What method is the safest for using dynamite in sinking a shaft and what will give the least danger to life or limb? Explain fully. (5)

8. Describe a creep, its effect, and the precautions necessary to prevent and check it. (10)

9. A dam in a tunnel supports a vertical head of 80 feet of water; the sectional area of the tunnel is 70 square feet. Find the total pressure on the dam. (5)

10. Do you consider coal dust an element of danger in a non-gaseous mine? If you found much dust in the mine what precautions would you adopt to prevent any danger to life and destruction of property that might occur from its presence while mining operations were being carried on? (10)

11. What are the causes that lead to mine fires, not taking into consideration spontaneous combustion, and how would you guard against them? In dealing with mine fires what dangers are likely to arise to life provided care is not exercised by the persons dealing with them, and what precautionary measures should be adopted to insure safety? (5)

12. Explain in detail the causes of accumulations of fire damp, and the probable effects of allowing such accumulations to exist in a mine. What precautions should be taken to avoid such accumulations of gas? (10)

Pit Boss Examination.

Paper No. 4. Time allowed, three and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 50 per cent. of the allotted marks to pass.

MACHINERY.

1. What is the principle of the siphon and to what height can it be applied to raise water? How would you start the flow in a siphon? (10)

2. What is it that causes a pump to raise water through a suction pipe 20 or 25 feet? (10)

3. For what purpose are bearings bushed? What metals are generally used and why? (5)

4. What is a unit of work and how many are there in a horse-power? (10)

5. What is the horse-power of an engine with cylinder 20 inches in diameter, length of stroke 30 inches, making 50 revolutions per minute, with an average steam pressure of 30 pounds per square inch?

6. State the method you would employ in making an examination of the rope, cage, and safety catches in use at a coal mine. (10)

7. In laying out a siding or main parting where mechanical haulage is in use, what are the chief points to be considered with reference to safety, economy, and the speedy handling of the coal? (10)

8. Give a sketch showing various forms of rope capping. Which form would you prefer and why? (10)

9. Name the different kinds of safety valves and give the characteristics of each. (5)

10. If the diameter of the water cylinder of a pump is 10 inches and the discharge column is 150 feet in height, what would be the total pressure in pounds on the piston, disregarding friction? (10)

11. A pipe running full of water is one foot in diameter and is leading from the mine to a surface opening that is draining said mine of its water; the velocity of the water in the pipe is 4 feet per second, how many gallons of water would be discharged therefrom in one minute? (10)

Pit Boss Examination.

Paper No. 5. Time allowed, three and one-half hours.

The value attached to each question is given in parenthesis. Candidates must obtain 50 per cent. of the allotted marks to pass.

SURVEYING.

1. Give the order of the letters on the face of a compass and the reason for such arrangement. (15)

2. What is meant by the declination of the needle? (10)

3. What is the most suitable and accurate instrument for measuring distances? (10)

4. Where are stations in mine surveying generally placed and why are they so placed? (10)

5. In setting up a compass, how do you determine the exact place to set the instrument when the station is placed in the roof? (15)

6. Plot the following compass survey to a scale of 100 feet to the inch:

Stations 1-2 N. 15 degrees, E. 220 feet.
Stations 2-3 N. 40 degrees, E. 160 feet.

Stations 3-4 S. 12½ degrees, E. 300 feet.
Stations 4-5 S. 50 degrees, W. 140 feet. (20)

7. Find the bearing and length of the closing line from Station 5 to Station 1. (10)

8. How often should a mine be surveyed and mine plan brought up to date? (10)

Fire Boss Examination.

Paper No. 1. Time allowed, one and one-half hours. The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

COAL MINES ACT.

1. What is the interpretation of "fire boss" as laid down by The Coal Mines Act? (10)

2. What is the interpretation of "shotlighter" as laid down by The Coal Mines Act? (10)

3. Give a detailed account of the duties of a fire boss from the time he reaches the mine at the beginning of his shift until he leaves at the end of his shift. (20)

4. What does The Coal Mines Act state with reference to places not in the actual course of working? (10)

5. State fully the provisions of General Rule 8 regarding the use of any explosive in the mine? (20)

6. State the provisions of General Rule 7 regarding the use of safety lamps, also state under what conditions the use of safety lamps is required. (20)

7. What does The Coal Mines Act state regarding the appointment of stations at the mine? (10)

Fire Boss Examination.

Paper No. 2. Time allowed, two and one-half hours. The value attached to each question is given in parenthesis. Candidates must obtain 60 per cent. of the allotted marks to pass.

VENTILATION.

1. Name the different gases found in mines. Which are explosive and which non-explosive? State where you would look for them and how they are detected. (10)

2. If an explosion of gas occurred in your safety lamp, what would you do? (10)

3. What are the dangers arising from the improper care and handling of safety lamps by the workmen? (10)

4. In case the light in your safety lamp became extinguished while you were making an examination of a gaseous mine, how would you proceed and what provisions would you make for such emergency? (10)

5. What care and attention should safety lamps receive in the lamp room and how should lamps be inspected before they are handed over to the workmen for use? (10)

6. State the use of the water gauge and where you would apply it. (10)

7. What are the advantages of splitting air currents and for what purpose are regulators used? (10)

8. What are the anemometer, barometer and thermometer used for in coal mining? (10)

9. In an airway 10 feet 6 inches wide, 4 feet 6 inches high, we find the velocity of the air to be 300 feet per minute; what is the area of the airway, and how many cubic feet of air per minute are passing in the airway? (10)

10. Find the number of square feet of rubbing surface in an airway 4 feet high by 9 feet wide and 1,000 feet long. (10)

Fire Boss Examination.

Paper No. 3. Time allowed, two hours. The value attached to each question is given in parenthesis. Candidates must obtain 50 per cent. of the allotted marks to pass.

PRACTICAL WORK.

1. What, in your opinion, is a miner's first duty on entering his working place in the morning? Who should have preceded him there according to law? (10)

2. Name the precautions you would require a miner to take when about to restand a prop knocked out by flying coal from a blast? (10)

3. Show by sketch how to set props in a level seam. (10)

4. How would you set a single post on a pitching seam? (10)

5. State how you would commence to remove a large body of fire damp, and what precautions you would take. State what danger there may be in doing the work. (10)

6. State the character of brattices to be used in gaseous mines, and how should they be constructed? (10)

7. What are the principal things to be looked after in haulage roads? (10)

8. What dangers arise from lack of judgment in placing shots in coal mining? (15)

9. What is coal dust? State what dangers arise from the same when blasting is carried on where it is present; also, what you would do to prevent a possible accident due to the presence of coal dust. (15)

Fire Boss Examination.

Paper No. 4. Time allowed, one and one-half hours. The value attached to each question is given in parenthesis. Candidates must obtain 50 per cent. of the allotted marks to pass.

ARITHMETIC.

1. Multiply twenty thousand and seven by eighteen thousand seven hundred and four. (15)

2. Add the following numbers together: 768, 9476, 8, 93268, 396, 18, 64538, 9654, 9273642, 7. (15)

3. Divide 9878546 by 298 and work the answer to three decimal places. (15)

4. From 9350008 subtract 8370109. (10)

5. The velocity of the air in an airway 7 feet wide by 5 feet high is 750 feet per minute. What is the volume of air passing in the airway in an hour? (15)

6. From an entry 9 feet 6 inches wide and 5 feet 6 inches high, driven at the rate of 4 1-2 feet per day, how many cubic yards of material are taken out in five days? (15)

7. A shaft measures 7 feet by 15 feet and is sunk to a depth of 160 feet. How many cubic yards of material were removed in sinking it? What did the work cost at 15 cents per cubic foot? (15)

An underground lake, discovered in exploiting the Campine coalfields in Lower Belgium, is to be used as a source of supply for the country round about. The region is ill supplied with water. What available surface water there is, is often contaminated. The water from the underground lake is pure except for the presence of a small proportion of ferruginous matter. This can easily be removed. At present rain water is the principal direct source of supply.

The report of the Alaska Treadwell Gold Mining Company for the year ending May 31st, 1910, shows record results. The tonnage crushed was 744,226 tons. The yield per ton was $2.79, 58 cents higher than the average for the year previous. The cost of mining and milling per ton was $1.57, but the profit per ton was $1.22, almost twice as much as heretofore. The ore reserves are calculated at 5,899,364 tons.

ELECTRIC STEEL REFINING.

By D. F. Campbell (London).

(Paper read before the Iron and Steel Institute.)

The use of electricity for the refining of steel has now taken its place amongst established metallurgical processes, and many papers have been written on the subject of electric furnaces, but the author proposes to discuss briefly the general aspects of the subject, and what he considers the probable and possible developments in the immediate future in England. The electric furnace is at present used in various works for the refining of steel from the Bessemer converter in the manufacture of rails and all classes of railway material and castings, and more commonly in connection with the basic open-hearth process for the manufacture of various products of intermediate quality, castings and tool steel of all kinds. These are the purposes for which it has been most widely adopted, notably in America, Germany and France, although it is also used for melting and refining charges of cold scrap of cheap quality for the manufacture of tool steel and small castings, and its high efficiency is now generally acknowledged. The refining of steel that had been previously melted was the first use to which the electric furnace was applied commercially; but now that single furnaces have been producing over 200 tons a day for more than sixteen months, it is obvious that the field for the process has widened, and already many furnaces are in construction or operation in this country.

The author is of opinion that the electric furnace is especially suitable, and will be widely adopted, for any class of work in which raw materials of a high degree of purity are now used.

A wider application for rails and sections may occur when working in connection with the Talbot furnace, for the charge can be taken to the electric furnace as soon as the carbon is down, and the necessity of removing the sulphur and getting a teeming heat is avoided, as this is done in the electric furnace both economically and completely. Thus the capacity of the Talbot furnace is substantially increased, and this covers the greater cost of electric refining.

Again, in the case of a basic open-hearth plant, using 60 per cent. of molten pig iron and 40 per cent. of scrap, a 40-ton furnace might have 15 tons removed to the electric furnace for refining, and a similar charge put in every two hours. Thus the capacity would be increased, the quality improved, and, in addition, a reduction in the cost of raw materials can also be made in some cases, as a low quality of pig iron can be used.

Similar conditions occur when working in conjunction with an open-hearth plant for making castings, and a thoroughly dead melt and extreme fluidity can be obtained, while the commonest raw materials can be used, and refined completely. This gives economy both in the amount of gits and runners, and also in the reduction of wasters. Even in the case of foundries engaged in ordinary open-hearth casting work, in which the margin of profit is now exceedingly small, the electric furnace is considered necessary for an improvement in quality, while in a small foundry making light and intricate castings from crucible steel, an economy of several pounds per ton may be expected to result from the adoption of the electric furnace, judging from the reduction of the costs in works in Germany where crucible furnaces were replaced by this process.

There is little doubt that crucible steel, Swedish billets and products of intermediate quality, such as are used for the Sheffield trade and by tube-makers of Staffordshire and South Wales, can be economically replaced by steel refined by electricity, and made in Middlesbrough, Cumberland, or the larger steel works in the Sheffield and Rotherham districts.

The use of the electric furnace is not likely to become general for rail steel manufacture at the present time, except in cases where the conditions are exceptional. In certain cases, such as at South Chicago, it has been adopted for that purpose owing to the economic conditions, notably the scarcity of good Bessemer ores and the demand for better rails. The electric furnace in such cases may save Bessemer plants from the scrap heap, or, at any rate, prolong the life of present installations, and at the same time make it possible to produce rails of a quality better than the best open-hearth steel, thus avoiding heavy capital expenditure.

In the electric furnace, almost any degree of refining can be economically effected, and the removal of sulphur, phosphorus, and oxygen is especially easy. This is probably due to at least three causes:

1. The intense heating of the slag, which is the place at which refining takes place. Owing to this high temperature and the extreme fluidity of the slag, the rate of the refining reaction is very great, because the velocity of reaction rises very quickly for high temperatures, and not in direct proportion to the temperature.
2. The extremely basic slag that can be kept in a very fluid state, and the calcium carbide formed by the action of the arc on the calcareous slag, are especially advantageous for desulphurization.
3. The violent motion of the steel, which results from the convection currents produced in the bath, due to the two intensely hot areas caused by the arc below the electrodes, increases the volume of steel exposed to the hot and fluid slag area, and hence the rate of refining.

The usual procedure for the use of the electric furnace in connection with the Bessemer converter is to charge the steel, holding back all slag in the ladle, after putting on the bottom of the furnace, lime and mill scale or iron ore. This produces an oxidizing or dephosphorizing slag, which may be carefully skimmed or poured off. On the bath of steel carbon is thrown to carbburize to any required degree, and then a second highly basic and desulphurizing slag is added. The arc acting on the calcareous slag produces calcium carbide, which may combine with sulphur to form calcium sulphide. As neither gases nor air enter the furnace, and the conditions are almost completely reducing, no sulphates are formed, a dead melt is easily obtained, and when the slag is molten and the requisite heat obtained, the steel is teemed. In the open-hearth or any oxidizing furnace these reactions cannot take place so completely and efficiently.

With steel from the basic open-hearth furnace, the procedure is similar, but when the quantity of phosphorus to be removed is small, it is only necessary to use one refining slag for the elimination of sulphur and any small amount of phosphorus remaining. The usual practice is to put the carbon necessary for carburizing in the bottom of the furnace and then add the steel, and the basic slag materials. As soon as the teeming heat is obtained, the necessary ferro-alloys are added and the steel will be completely refined.

Another point of interest is the rarity of blow-holes in electric steel when properly made, and this leads to the question of the cause of these troubles. It is well known that any ingot of steel when placed in a vacuum evolves nitrogen, and this is about equally true whether it be made in the crucible, the Bessemer converter, or the electric furnace. Blow-holes contain nitrogen, but this is probably not the cause. It is far more probable

that they are due to the combination of oxides with the carbon in the process of cooling, and that the carbon monoxide so formed at a high temperature causes blow-holes in the cooling steel, and owing to the diminution of volume of the carbon monoxide on cooling, a partial vacuum is formed, and nitrogen is sucked into the blow-holes. In electric steel, oxides do not occur in any quantity, and consequently the prime cause of blow-holes is reduced.

Again, the quality of electrically refined steel is better than a material of similar chemical composition made in any oxidizing furnace. This is probably due to the reducing conditions under which it is finished.

It must not be forgotten in discussing these special qualities of electrically refined steel, that some inferior material has been made by incompetent melters or in ineffective furnaces, and that the electric, just as much as any other furnace, requires trained men, and most careful designing by metallurgists who have made a special study and had practical experience in this subject.

The question of the cost of applying this process, which must be considered before all others, is more difficult to discuss generally, owing to the great variety of conditions. The following are the chief points, all of which must be carefully considered in each particular case:

1. The possibility of saving in cost of raw materials, since the best qualities of steel can be made from impure raw materials. For example, in the case of refining steel from open-hearth furnaces in the South Staffordshire district, the use of local pig iron as compared with hematite iron would effect a saving of several shillings per ton owing to the high railway rates.

2. Possibility of increasing the output of present furnaces with improvement of product. For example, in the case of Talbot and other open-hearth furnaces, where a large expense is incurred in the removal of sulphur and getting a teeming heat, the steel can be advantageously transferred to an electric furnace for desulphurization and the output materially increased. The Talbot or other tilting furnace is especially satisfactory owing to the facility with which charges can be transferred to the electric furnace, whenever required.

3. The cost of power and possibility of using blast-furnace or coke-oven gas, exhaust steam, etc., will be the determining factor in regard to deciding whether, in the manufacture of steel, electric refining can be economically adopted. In the case of cheap power or valuable products scrap may be economically melted and refined in the electric furnace at a current consumption of 700 to 800 kilowatt-hours per ton, or if the price of power be high, the steel may be merely desulphurized and deoxidized, after melting and dephosphorizing in a basic furnace, with a power consumption of 100 to 150 kilowatt-hours per ton.

4. The possible reduction of capital expenditure at certain works where the present products are not sufficiently good for modern specifications. This may involve the entire re-organization of the works, but it is often cheaper and more efficient to add an electric furnace to a Bessemer plant, than to replace the latter by open-hearth furnaces.

The author does not wish to compare the different types of electric furnace in this paper, but the figures given are taken chiefly from Heroult furnaces in America, England, Germany and France, as this type has been far more widely adopted, and is used in larger units than any other, and single furnaces are now refining 250 tons per day. This furnace is similar to a basic open-hearth furnace, and seems to present more simplicity and to embody more of the desirable features of electric furnace design than any other, which, in the the author's opinion, are—

1. The best basic open-hearth design should be followed as closely as possible. A bottom homogeneous and solid and banks free from embedded electrodes are important, and above all simplicity of design.

2. All electric mechanism, in the form of generators, transformers, etc., should be entirely separate from the furnace, should work under ordinary conditions of standard electrical practice, and should be of standard design, so as to avoid all unnecessary risks and complications.

3. A high-power factor must be maintained, thus reducing the capital cost of machinery, and increasing the general efficiency of the power house.

4. To avoid excessive cost of refractory materials, the roof should be protected from the direct radiation of the arcs by the electrodes themselves, and the intensely heated area of slag should be as large as possible, to increase the surface of refining action. The Heroult furnace has an advantage over the open-hearth furnace in that the heat is applied to the centre of the bath, so that the banks are not quite so hot as the middle of the furnace and the wear of refractories is consequently less.

5. The heat should be applied to the slag, as in the basic open-hearth furnace, and the temperature of the slag should be maintained above that of the steel, which allows of extreme basicity and fluidity being obtained and gives an intensely active refining action. The conditions in the furnace should be oxidizing, neutral or reducing, at will.

The adoption of electric refining will cause some re-adjustment in the steel trade. As soon as the Sheffield steel smelter has become acquainted with the process, and accustomed to the working of electric furnaces, electrically refined steel will largely replace crucible steel. This has already occurred in Germany and America, where electric furnaces are used to make all classes of special and high-speed steels, the usual practice being to refine metal from a basic open-hearth furnace. Large crucible plants and small open-hearth furnaces engaged in the manufacture of small and intricate castings, such as motor-car parts, etc., may be replaced by electric furnaces, because the high degree of fluidity and dead melt obtained is especially advantageous.

In many cases manufacturers of axles, guns and tubes will abandon the use of Swedish raw materials, and refine steel made from low-grade ores, thus reducing the value of high-grade ore deposits and the quantity imported; for, by the use of electricity, Cleveland stone will produce a steel equal to the best hematite ores. The capacity of many Talbot and basic open-hearth plants will be increased and the quality of the product improved, while much of the power that is now going to waste will be utilized for steel refining.

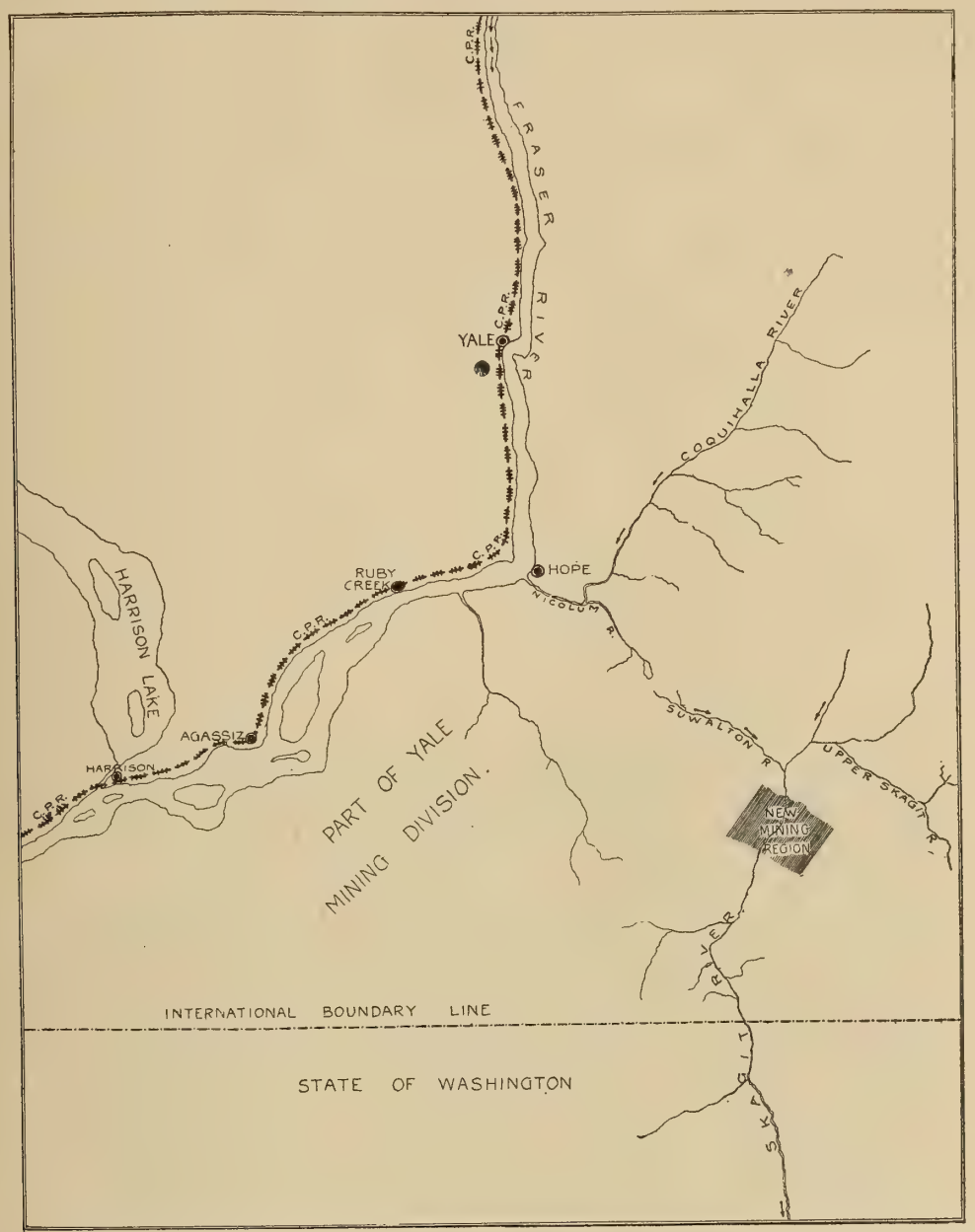
From the electrical engineer's point of view, the electric furnace is an attractive load, as it is more or less in continuous operation. In the case of the Heroult furnace the power factor is 0.88 to 0.90, though much less with large induction furnaces. Single, two or three phase current of any frequency from 20 to 60 has been used without any difficulty, though it is preferable in the case of a two-phase system to transform to three-phase current, which can be done without additional difficulty or expense. The load factor will be most favourable, the usual practice when refining, for example, in a 15-ton furnace, being to use 2,000 kilowatts for 20 minutes after charging, while the steel is being heated. The current is then reduced to about 1,500

kilowatts for 45 to 75 minutes until the steel is ready for teeming. There is then an interval of ten to fifteen minutes during which the furnace is teemed, fettled and charged, which allows the transformers or generators time to cool before the period of overload commences. Current fluctuations occur for a few minutes, while there is an evolution of gas from the steel, which makes the bath boil up and touch the electrodes. This, however, is not sufficient to be objectionable, provided that the electrical machinery is properly designed for the purpose, and the extent of these variations is not so great as in the case of many rolling mills, the fluctuations in voltage being only about 3 per cent. in the South Chicago works, where a 2,000 kilowatt furnace has been working steadily since May, 1909.

The subject of electric steel refining is now receiving the attention of many steel makers, and it is hoped that these notes may lead to a stimulating discussion, not only of the many interesting and debatable questions in relation to the operation and design of these furnaces, but also of the more important and far-reaching economic and commercial problems which this process has created.

NEW MINING FIELD IN BRITISH COLUMBIA.

Vancouver newspapers have lately published accounts of a new mining field in which mineral discoveries, said to be promising, have been made during the last three or four months. The locality is in Yale mining division, which is a small subdivision of the district of Yale, the latter embracing a large area in the central southern part of the Province of British Columbia. The first locations of mineral claims in connection with the recent local excitement were made on what is known as Steamboat Mountain, but some of the later locations are in other parts of the Hope Mountains, scattered over the country for several miles around the claims first staked.



A newspaper account states that the field is easy of access, but now that snow has fallen it is difficult to get about the mountains and, of course, there can not be any effective surface prospecting done until next spring. The Steamboat Mountain field is described as being on the Skagit River about 40 miles south of Hope, and it is reached from Hope by the Sumallow River trail and thence down the Skagit. The last-mentioned stream flows south, into the adjoining State of Washington. Hope is on the Fraser River; it is distant from Vancouver 89

miles by C.P.R., and is 13 miles south of the town of Yale. Both Hope and Yale were centres of placer mining activity in the time of the great gold excitement of the Fraser 50 years ago.

No official information is yet available relative to the new field, for it has not yet been visited by either Federal or provincial officials of the respective departments of mines. It has been stated, though, in published accounts of the district, that the formation is andesite, with intrusive sheets of quartz porphyry, with visible free gold sometimes occurring in the latter. Generally speaking the ore is, so it is stated, of a milling character; assay returns from specimens have given value ranging from $15 to $200.

Of course, it is yet early to offer an opinion as to the merits of the new field, for little prospecting has been done, and no development of importance. It is not unlikely, though, that some payable mines will be opened, but this may not now be taken for granted. From the notice the field has already attracted, it is probable some of those who have acquired claims will develop them next season. Meanwhile this is only a preliminary intimation of the fact that this new district is receiving the attention of prospectors, and a suggestion of the possibility of its eventually being developed into a camp of some importance.

A MINING MACHINERY EXHIBIT AT WESTERN PENNSYLVANIA MINING EXPOSITION.

Thousands of daily visitors, including a large number of coal operators and mine superintendents, were afforded in their visit to the Jeffrey exhibit, a view of modern mining machinery, the feature exhibit at the Western Pennsylvania Mining Exposition.



No. 1.

This exhibit, occupying a space of over 3,000 square feet, reaching over 100 feet in length by 30 feet wide, was placed in the northwestern corner of Machinery Hall. It was designed and built entirely by the Jeffrey Manufacturing Company, Columbus, Ohio, being in the form of a model mine room, showing their latest and most improved types of mining machines, electric drills, as well as electric mine locomotives, in actual operation; and for all practical purposes as they would be operated in underground workings. Every operation is explained by the demonstrators.

This mine room had a coal face 45 feet long and 6 feet high, constructed of large lumps of bituminous coal, which were brought from the Hazel mine of the Pittsburg-Buffalo Company. Practical demonstrations were daily conducted by the operators actually undercutting and drilling the coal and hauling it out of the room.

Photograph No. 1 shows a 28-A Short Wall Machine undercutting the coal across the face. At the left of this machine is a self-propelling steel truck, equipped with an automatic cable reel, which winds up the electric cable, as the truck moves out of the room. This machine unloads itself from the truck, makes the sumping cut at the right hand rib, from which point it cuts across the face until the left hand rib is reached. A steel feed cable wound on a power-driven drum at the front end of the machine pulls it across the face of the coal at a speed regulated by the hardness of the cutting and upon the nature of the coal or rock in which the cutting is done. Another cable which has no connection with the power, serves as a guide, holding the machine to its work and at a proper angle for its greatest cutting efficiency.

When the machine is finished in the room, it can be loaded on to the truck with its own power. Its narrow cutter-head and short length of machine from the coal face when cutting, make it especially valuable for cutting ribs and pillars of coal which have a tendency to come down when undercut.

Photograph No. 2 shows a Jeffrey A-5 Electric Augur Drill in operation, drilling a hole in the coal face. This drill is operated by an electric motor and will drill any material in which an augur drill will stand up. The photograph also shows another corner of the mine room with a 21-A mining machine equipped with a flame and gas-proof motor and starting box. In other respects, it is similar to the well-known Jeffrey 17-A electric coal cutting machine, being especially adapted for the hardest cutting encountered in any coal mine.

Another distinctive feature about the exhibit was the fact that it was the first public exhibition of any Jeffrey "Armorplate" Electric Mine Locomotive; designed and

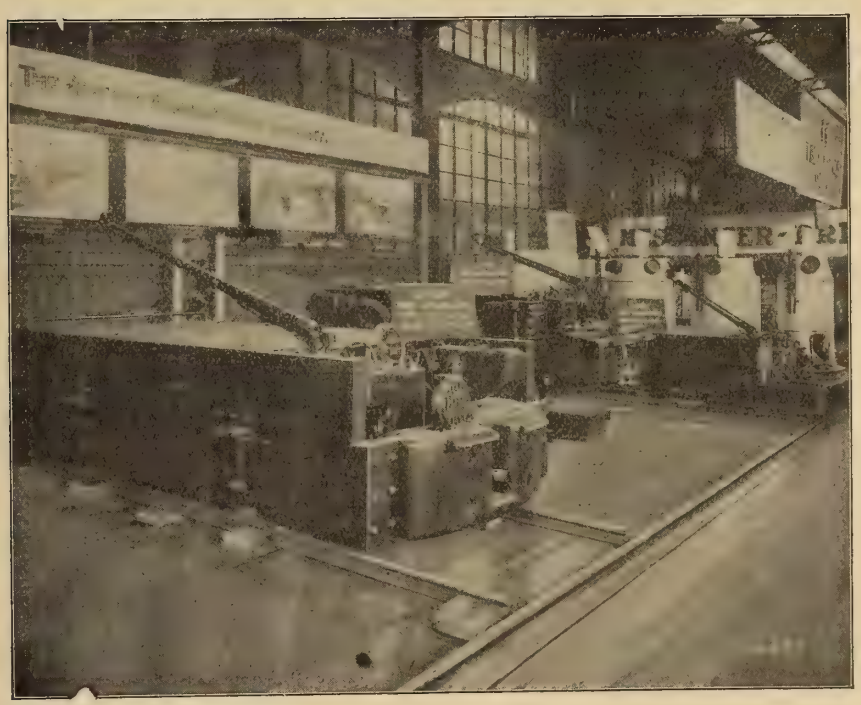
constructed for surface or underground mine haulage.

Photograph No. 3 shows a view of a locomotive on the foreground. The complete frames on all sides are made of solid steel armor plate, which is made to special Jeffrey specifications, practically making this type of locomotive indestructible, as well as adapting it for the most severe service encountered in mine haulage.

Two other Jeffrey locomotives are also shown in this photograph, being built entirely of structural steel frames and equipped with motor capacity sufficient to slip the wheels and to stand continuous mine service. Each of these locomotives has mounted on the front end an independent motor driven crab, having a drum which holds 300 feet of 3-8-inch flexible steel rope. Daily demonstrations were made with the use of this crab device. A pressed steel car was hauled from one end of the room to the other end, demonstrating how loaded mine cars are pulled from the face of the mine room while the locomotive remains in the entry.



No. 2.



No. 3.

China's silver coinage in 1908 amounted to $24,498,653. In the same year India's silver coinage ran up to $58,773,220, whilst that of the United States totalled $12,391,777.

PERSONAL AND GENERAL.

Mr. Wm. Fleet Robertson, provincial mineralogist for British Columbia, has returned to Victoria from an official visit to the Portland Canal district.

Mr. W. F. Ferrier, of Toronto, has been visiting British Columbia. While in that province he investigated mining conditions and prospects in the Portland Canal district.

Dr. Eugene Haanel, Dominion director of mines, was in British Columbia late in October, in connection with the investigations his branch of the Canada Department of Mines is making relative to the treatment and profitable utilization of zinc ores, of which there are known to be large quantities in several districts of that province, especially in the Kootenay.

Mr. Elias Rogers, president of the Crow's Nest Pass Coal Company, was in British Columbia last month. After spending a short time at Fernie, southeast Kootenay, he paid a brief visit to Victoria.

Mr. Anthony J. McMillan, liquidator of Le Roi Mining Company, has returned to British Columbia from London, having reached Rossland during October.

Mr. W. J. Elmendorf, manager of the Portland Canal Mining Company, was in Victoria, B.C., early in November, after having been to Tacoma, Washington, with Mr. C. H. Dickie, president of the company, to discuss with the smelting company there matters connected with the treatment of silver-lead concentrate from the mining company's mine in Portland Canal camp.

Mr. W. H. Aldridge, managing director of the Consolidated Mining & Smelting Company of Canada, Limited, has returned to Trail, B.C., from a business visit to Toronto and Montreal.

Mr. Edmund B. Kirby, of St. Louis, Missouri, who during the time of the Gooderham-Blackstock control of those mines was general manager of the Centre Star and War Eagle, at Rossland, B.C., has returned to the United States from the Skeena district of British Columbia, where he had been examining mineral claims.

Mr. John McMartin, formerly of Cobalt, who is developing a gold mine at Sheep Creek, Nelson mining-division, B. C., went to San Francisco lately with his consulting engineer, Mr. W. Watson, of New York, in connection with the intended early erection of a stamp mill at the Mother Lode, Sheep Creek.

Mr. H. H. Webb, consulting engineer of the Consolidated Gold Fields of South Africa, is in Porcupine, and has assumed active direction of the Rea Mines properties, recently taken over by the Consolidated Gold Fields Company.

Mr. Frank G. Stevens, who for the past ten years has been mining in British Columbia and Mexico, is taking special work in economic geology and metallurgy at Queen's University. His present address is 95 Clergy Street West, Kingston, Ont.

The action brought by Mr. Clifford E. Smith against Dr. Milton L. Hersey, et al, has been dropped. The words of Mr. Smith's counsel sum up the position: "I feel in duty bound, as counsel, to say that I am convinced that there is nothing in the charges spread out on the record . . . The plaintiff authorizes me to . . . withdraw entirely in the fullest and freest and frankest way, all charges of wrong-doing or fraud against Mr. Brook, Dr. Hersey, and the other defendants in this action. Both action and counter claim were dismissed without costs.

Mr. J. B. Tyrrell brought to this office a large specimen of native copper found on the Coppermine River, Mackenzie district, draining into the Arctic Ocean. The specimen weighs about two pounds.

Mr. J. B. Tyrrell has opened up an office in Porcupine for the Anglo-French Company.

Twenty-one members were present at a dinner of the Montreal Branch of the Canadian Mining Institute, held on Friday, November 4th. Mr. John E. Hardman occupied the chair, and Professor Dulieux acted as vice-chairman. At the close of the dinner the following nominations were made for next year's council:—For president, Dr. F. D. Adams; for vice-presidents, Mr. Thos. Cantley and Dr. A. E. Barlow; for councillors, Messrs. Dulieux, Denis, and Bancroft.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay: Dominion Coal Output.—The output for October was lower than was anticipated, reaching only 329,000 tons. The decrease was occasioned by delays to shipping caused by bad weather conditions. The month was exceptionally stormy, and a succession of gales and rainstorms in the Gulf greatly hindered shipping.

Consequent upon the death of the manager of No. 2 Colliery, a number of changes have been made in the appointments of colliery managers. Mr. Alex. S. McNeill, formerly manager of Dominion No. 9 Colliery, is now manager of No. 2 Colliery; Mr. D. L. Mackay removes from No. 7 Colliery to become manager of No. 9, and Mr. P. Pendergast, formerly manager of No. 8, is appointed manager of No. 7 Colliery. Mr. Michael McIntosh is promoted from the position of underground manager at No. 5 Colliery to the managership of No. 8 Colliery.

A portion of the general office staff of the Coal Company has been moved to the general office of the Dominion Iron & Steel Company in Sydney. The heads of Coal Company departments now in Sydney are the general manager, the superintendent of shipping and general freight agent, and the comptroller. Mr. Plummer, the president of the two companies, recently spent a week in Cape Breton.

A correspondent in the United Mine Workers' Journal refers to Hon. Robert Drummond, the editor of the "Mining Record," in the following pleasant terms: "A bi-monthly jaundiced journal, edited by an old, unnatural, green-eyed prutresence of antiquity, who, with rotten heart and gangrenous brain, can jabber and grimace against all discontent, etc., etc." This is a fair sample of the language which the leaders of the U. M. W. A. cause have been in the habit of using in Cape Breton. Those who know the editor of the "Mining Record" and his power of repartee will await with interest the retort courteous. It is quite apparent that the feelings of the correspondent of the U. M. W. Journal must have been hurt in some way.

Reciprocity and Nova Scotian Coal Mines.—To those whose interests are bound up with the coal trade of Nova Scotia, the desire that is now being manifested in the West to deprive our coal mines of the protective duties under which they have grown and prospered carries with it the gravest menace. Reciprocity, so called, or the free admission of United States coal into Canada, does not present itself to the miner of Nova Scotia as a question in political economy. With him it is a question of existence—a matter concerning his bread and butter. The reasons that prompt the coal companies to oppose any change in the present tariff are concisely summed up in a letter addressed to

the Dominion Government by the president of the Dominion Coal Company, which is re-printed in full elsewhere in this issue of the Journal. The president of the Nova Scotia Steel & Coal Company also has written to the Government protesting against any change in the coal duties, and he makes the very serious pronouncement that reciprocity in coal with the United States would mean "not only the closing of the coal mines, but the ruin of the steel industry."

These letters cover so completely and definitely the reasons against a change in the coal duties, that it is unnecessary to detail these reasons here. Both Mr. Plummer and Mr. Harris oppose strongly the main argument of those who favour free coal, which is that the removal of the duties would give to Nova Scotia the New England coal market. Mr. Plummer writes: "Notwithstanding our efforts to sell coal in New England, our shipments have been steadily decreasing, and, even with concessions in price equal to the amount of duty, we have recently found that we could not secure contracts." This is the experience of the Dominion Coal Company, and, if that corporation cannot sell coal in New England, it is certain that no other Nova Scotia coal company can hope to succeed.

There is also a national aspect in connection with reciprocal free trade in coal with the United States which has not as yet been greatly urged. Canada, in comparison with her great stretch of territory, is but poorly provided with coal seams. In modern times no country has achieved greatness that has not been well provided with coal. The United States, Great Britain, Germany, and France are the world powers of to-day, and they are also the four greatest coal producers. One of the best guarantees for the continued prosperity of great Britain is that new coal-fields are being discovered even in that old and travelled country. This insures her against a shortage of that fuel without which her factories would be idle and her ships rust in port. The United States produces over three hundred million tons of coal per annum, and one coal company in the Union alone has a yearly output three times larger than the entire coal production of Canada. Few countries have been so favoured with natural stores of coal as the United States; but, even there, the tremendous depletion of the coal-fields is being viewed with alarm, and the suggestion has even been made that an export duty should be imposed on coal sent out of the United States—a measure, by the way, which was long ago taken by the British Parliament.

In a recent publication of the Canadian Geological Survey it was stated that the main stores of Canadian coal were situated at a distance from the great centres of population. But some day the population will move to the coal-fields, and these, as in all other parts of the world, will become the foci of industry and the great producers of national wealth. If Canada desires to become a self-contained and completely autonomous nation and to hold her ground with the great nation to the south of us, she must develop and yet conserve her own national stores of coal. Glancing at the map of the United States, nothing would appear more natural than that Nova Scotia coal should supply New England and that Pennsylvania coal should supply the territory round the head waters of the St. Lawrence. But, for various reasons, sometimes referred to as history, Canada is politically detached from the United States, and, in national affairs, boundaries and frontiers oftentimes take precedence of natural facilities. Even supposing that under free trade in coal the Nova Scotian mines secured a market in the United States as great or greater than the one they now have, would it be for the ultimate benefit of Canada to exhaust the only coal-field she possesses between the Atlantic and Saskatchewan to supply the homes and factories of a rival nation?

QUEBEC.

Buckingham.—The Buckingham Graphite Company is now operating its mill to full capacity, 60 tons of ore per day, producing about 5 tons of all grades of flake graphite. A ready market is found for the whole output in the United States. The mining plant and the mill are modern in all respects. A considerable profit is already being made.

The property, covering 400 acres, is situated 7 miles due west of Buckingham. During the coming winter the mill will be enlarged to a daily capacity of 100 tons of ore.

The same syndicate that controls the Buckingham Graphite Company, also owns and controls about 12,000 acres in the Townships of Buckingham and Lochaber. At a point 3 miles west of Buckingham a new 200-ton mill is in course of erection. It is hoped that this mill will be completed by May 1st, 1911.

The products at present being turned out are as follows:—

	Per Cent.
Crucible graphite	93 to 95
Lubricating graphite	85 to 92
Stove polish, facing, etc.....	70 to 80

These analyses indicate that the problem of separation has been solved. Everything about the re-organized venture is most encouraging. Much credit is due to Mr. H. P. H. Brumell, who has stuck to his guns through years of discouragement.

ONTARIO.

Cobalt, Nov. 7.—Within the past two weeks various strikes have been made or new developments have been made known that have changed the whole viewpoint of the Cobalt camp. The Lawson shows every evidence of coming back and several new leads have been struck on the Kerr Lake, which to all appearances, will for some time enable the Lewisohn Company to pay its ten per cent. per quarter.

The Northern Customs concentrator will add twenty stamps to their battery in order to handle the 50 tons per day of milling ore from the Cobalt Townsite. A year ago the Townsite appeared to be moribund; to-day it is shipping almost every week. A number of good surface finds have been made round the shaft near the Buffalo line and sufficient milling ore put in sight to make a year's contract with the Customs mill.

In a recently issued statement of the Trethewey Cobalt it is shown that the company had cash in the bank and due from smelters, $207,740.73, ore sacked at mine, $12,847, leaving $220,587 after providing for dividends and all expenses.

The long drawn out suits between the Crown Reserve Mining Company and W. J. Parker and A. G. Fowler Ross, members of the promoting syndicate, have been settled out of court.

In spite of the unfavourable interpretation given to the annual report by various interests, the Kerr Lake Mining Company has declared its usual dividend of 10 per cent. per quarter to be paid on Dec. 15.

The physical condition of the Kerr Lake mine has materially improved since the issuance of the annual report. From the No. 3 shaft in the diabase entirely new ground has been opened up at the fifth level and good high grade has been discovered. Under Kerr Lake to the east towards the Drummond six new leads have been cut, some of them carrying good ore. This is practically unexplored ground, as the company would not drift under water until they had attained considerable depth.

The Thelma Gold Mining Company has let a contract for the sinking of a shaft to the depth of 75 feet. Some spectacular gold has been taken from this claim, which is situated between Elk Lake and Earlton on the T. & N. O. Railway. The company is formed of Montreal merchants.

The Bailey Cobalt has run into a shoot of rich ore on the 232-foot level in the west drift. They are also mining from the Cobalt Central workings on the other side of the line in order to reach the Bailey vein at the fourth level. All the ore is being milled at the Central mill with, it is understood, good results. Four and a half tons of table concentrates have produced 1,645 pounds of jig concentrates and 94 pounds of bullion.

After working their optioned claims at Hangingstone Lake in the Gowganda district, the Temiskaming and Hudson's Bay Company has decided to make the first substantial payment. It is understood that development so far has been quite satisfactory.

At the City of Cobalt's annual meeting it was definitely decided that no dividend should be paid. The balance for 1909 was shown as $179,900. This year 361 tons have been shipped, six cars of screenings and low grade, and six cars of high grade and concentrates.

The mill report of the Buffalo Mines for September reads: Mill ran 556 hours, ore milled, 3,718 tons; average assay per ton before milling, 28,35; ounces silver recovered, 82,639; milling expenses, labour, $3,450; power, $1,414.43; ounces of silver paid for during the month, 120,695.

The Drummond has commenced to mine again. A contract has been let to sink a 100-foot shaft near the Hargrave line to catch the Hargrave vein, which has been traced definitely on to their property. The Hargrave has mined high grade ore within 40 feet of their boundary. It has also commenced to ship and has sent out 400,000 pounds of low grade ore in one week.

That there is an increased demand for Cobalt's ores is proven by the number of firms who are now striving to obtain contracts or have got them. The Swansea Smelting & Refining Company of Toronto is now definitely an dactively in the market, and several other new incorporations are looking over the situation.

On their south Coleman claim the Black Consolidated Mines have commenced work again. They are sinking again on their massive smaltite vein.

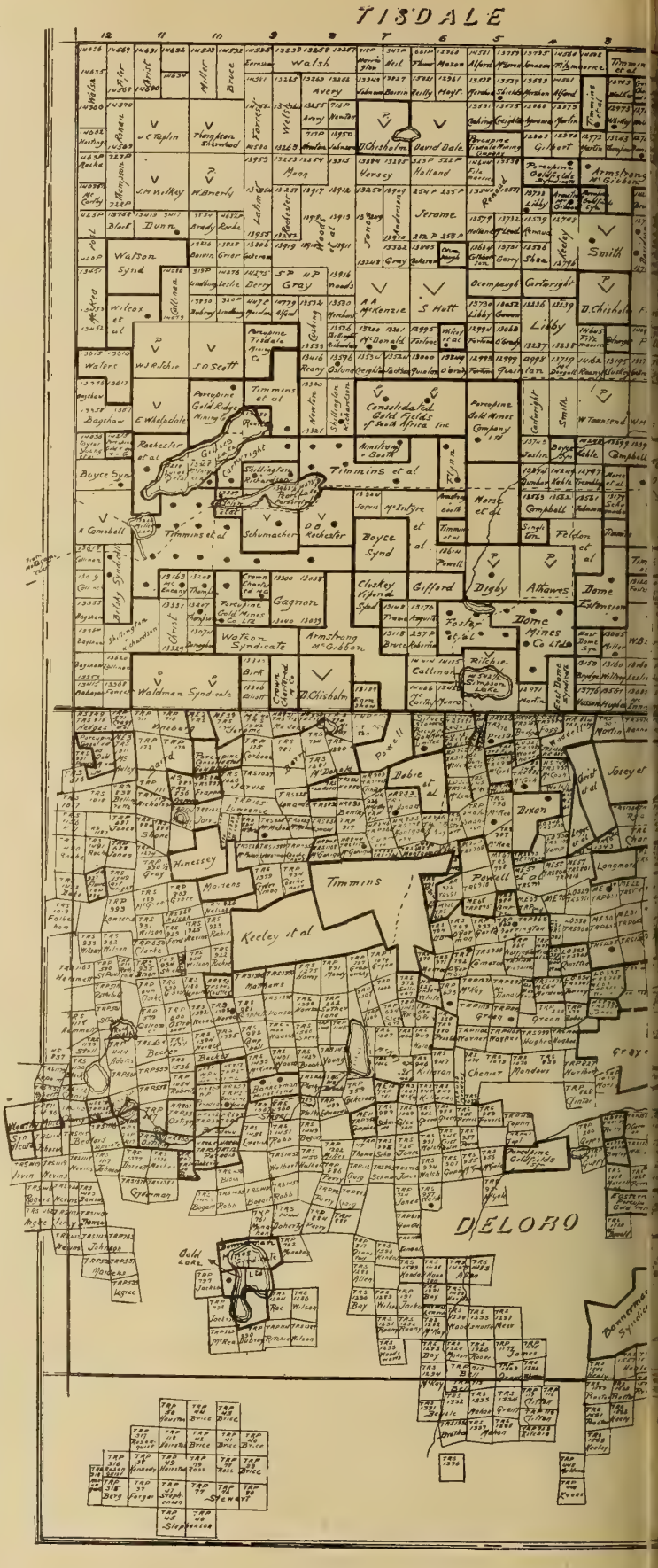
At 200 feet, forty feet from the bottom of the No. 8 shaft, a body of high grade ore was encountered on the Lawson. Now it has been driven on for 20 feet and the ore of the richness seen on the surface averages nine inches of solid metal. So far all ore bodies on the Lawson (with the exception of No. 2) had pinched out at the 88-foot level. No. 8 vein, in which the good ore was found at depth, was no exception. There are so many and so rich veins on the Lawson that the indication that they may make at depth alters the complexion of the Lawson situation very greatly.

The bullion shipments for the camp read:

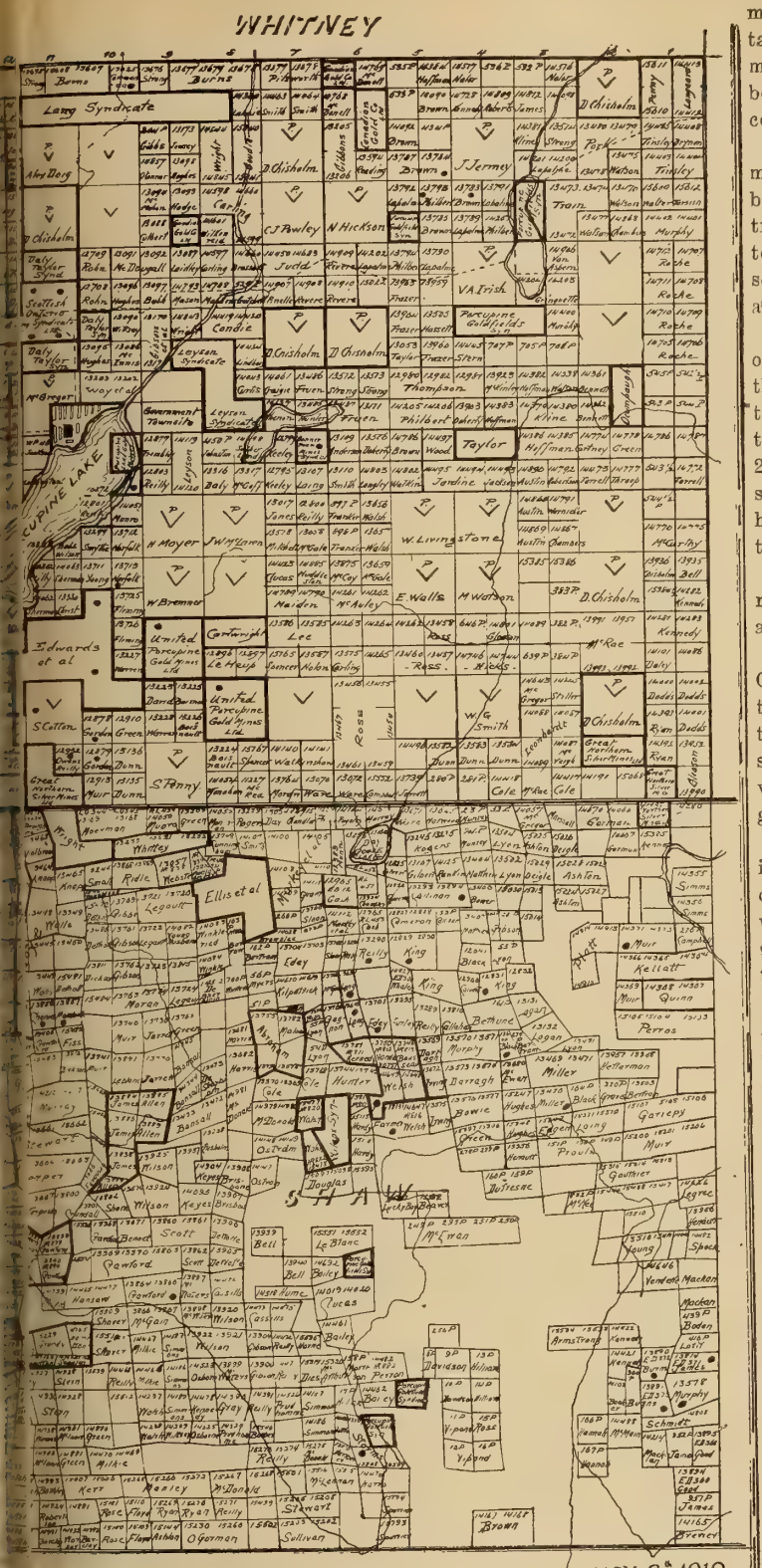
	Ounces.	Value.
O'Brien	288,406	$153,928
Nova Scotia	120,483	71,670
Temiskaming	86,691	42,629
Buffalo	98,012	50,999
Crown Reserve	15,931	8,623
La Rose	44,057	23,339
Cobalt Gem	10,000	5,800
Beaver	3,168	1,820
Colonial	1,008	623
	668,556	$359,431

Since the O'Brien plant commenced operations they have made fourteen bullion shipments worth $153,928. Last month, the most successful in the history of the mill an extraction of 93.4 per cent. was obtained, the heads averaging 40 ounces. On an average 20 tons of ore per day are treated and the only ore shipments made are of jig and table concentrates and an occasional bunch of high grade. All this winter ore from the various shafts will be trammed to the central shaft near the mill and raised there, instead of being transported by surface cars. Some interesting new ore bodies have been opened up at the old No. 1 shaft.

At the Cobalt Provincial mine 200 feet of continuous ore has been opened up at the 175-foot level. The excavations for the foundation for a small 40-ton mill have been commenced near the shaft and camps to accommodate 40 men are being rushed up.



The old shaft house built by the Government has been dismantled, as this section of the ground will be worked from the Savage shaft. A car of high grade ore has been assembled and will be shipped before the end of the year.



GOUDIE'S MAPS
OF
THE PORCUPINE GOLD FIELDS.
ISSUED BY A.C. GOUDIE.
621 TRADERS BANK
TORONTO.

The statement of the Temiskaming which accompanied the dividend cheques shows a profit for the nine months of the present fiscal year of $579,364.30. The profits for the quarter ended October 31 were $284,762.93, or at the rate of $94,920.98 per month. Of the 1,531,096 ounces produced, 1,104,532 were obtained by hand sorting and 426,564 ounces recovered at the mill. At the 500-foot level it is reported the No. 1 vein has been drifted on for 162 feet and silver values have been encountered throughout interspersed with shoots of rich ore.

South Lorrain.—It is most likely that by the end of this month or the beginning of next the companies in the camp will be taking power from the Mines Power Company. Two 375 h.p. transformers have been moved from the Kerr Lake substation to South Lorrain and are now being set up. Service lines to several of the mines have already been run, so that it is probable that power will not be much longer delayed.

The Lewisohns have taken up their option on a large block of Wettlaufer stock, but it is understood not sufficient to give them control. From the 190-foot level a winze has been sunk to the 250-foot and the shaft will be put down to that depth to connect. From the winze level another winze has been sunk 22 feet and at the bottom of this the ore has widened out into six inches of 3,000 ounce. Three or four cars, two at least of high grade, are being shipped before the waterway transportation is closed up.

The Keeley mine also expects to ship before the closing of navigation. It is now mining good ore at the 100 foot level and has struck good high grade at the 170 foot.

Porcupine.—Development on the purchase of the Gold Fields Consolidated of South Africa has to date been most satisfactory, and it is stated on expert authority that it is now the third best surface showing in the camp. Free gold shows in some places sensationally for 220 feet in a two and a half foot vein and in the shafts sunk to date the values are equally as good at the depth attained as on the surface.

The British Canadian Power Company, at the head of which is Mr. A. E. Wallberg, of the Mines Power, has now secured control of the undertaking to run a railroad into Porcupine and work has already commenced, as the country offers few engineering difficulties, it is expected that it will be of use some time next summer.

The winter trail to Porcupine will be opened up in a few days. All navigation has ceased on the lakes and sleighs are running on the winter roads. Directly it is known that the winter roads are good for heavy freight there the trail will be almost as thronged as the Gowganda trail two years ago.

Till supplies can be taken in over the winter road the Dome Mining Company and the Timmins have laid off all the men they can. The stock of provisions laid in before the break up last spring has now run very low and the expense of replenishing them at once caused several properties to close down for the time being or reduce their staff.

Operations have been resumed on the Foster near the Dome and machinery will be taken in as soon as transportation allows. It is the intention of the management to sink two shafts 600 feet apart.

The only machinery to be taken in over the summer routes was the boilers and hoist of the Porcupine Gold Mines, the New York company working the Vipond or Flynn claims. They were drawn up the Porcupine River in big pointers drawn by gasolines. A small mill went with them.

In readiness for the time when transportation is good, the Dome Mining Company has ordered a 12-drill compressor from the Canadian Rand, while the Timmins people have ordered their mill equipment from the Allis-Chalmers Company.

Mr. A. B. Stewart, who was formerly at the Nova Terra mine in Fabre Township, has sold the Carson-Hennessey Walker claims to English capitalists. There are many large English interests in the north country now bidding eagerly for promising claims, and Mr. Stewart has options on 60 for the London market.

With the near approach of better transportation much greater activity is apparent in the townships on the border of Porcupine. In Langmuir, Carmen, Thomas and Deloro there are many

men now working and many strikes reported, some of which are authentic. So far it has been almost impossible to do systematic work as it required half the labour of the gang to provide the camp with necessaries.

BRITISH COLUMBIA.

Exhibits of minerals from Kootenay, Boundary, Kamloops, and Nicola Valley districts have been made during recent months at several annual fairs. The largest display was at the Interstate Fair held at Spokane, Washington, where the display of specimens of minerals from British Columbia was particularly large and attractive. It has been claimed that recent displays were the best ever made of collections of minerals from this province, but it is probable those making this claim lost sight of the really large and thoroughly representative collection from British Columbia included in the unusually excellent exhibit of Canadian minerals made at the Alaska-Yukon-Pacific Exposition held at Seattle, Washington, last year. In quantity, variety, and quality, the splendid exhibit got together last year by Mr. R. L. Broadbent, of the Geological Survey branch of the Dominion Department of Mines, without doubt excelled any other collection of mineral specimens from British Columbia yet made. But having conceded this, as a simple matter of fact, it may be said that good exhibits were made this year at Nelson and Spokane, and in smaller measure at Vancouver. There was practically no competition at the last-mentioned place, but at the Spokane fair, held recently, conditions were the opposite. From a published account of the latter it has been ascertained that the British Columbia display included mineral specimens from 148 mines; that from Idaho, 110 mines; from Montana, 38 mines; from Alberta, 11 mines; from Oregon, one mine; and from various other sources, 29 exhibits. The general excellence of the British Columbia exhibits is indicated by the number of awards made to them. Of seven silver cups offered for competition, four were won by British Columbia, while the exhibits from this province were awarded twelve of the 22 silver medals offered. Most of these awards were made to exhibits from West Kootenay, ores from which constituted by far the greater part of the British Columbia collection. The cup for the best mineral display at the fair was won by British Columbia; other cups were won as follows: By Ainsworth, for silver and lead ores; by the Lucky Jim mine, Slocan, for zinc ores; and by the Crow's Nest Pass Coal Company, for coal. Among the exhibits awarded silver medals was one of nickel-cobalt ore from East Kootenay, and one of gypsum from Nicola Valley. Medals were also won by the following British Columbia mines: Nugget, Sheep Creek; Lucky Boy and Arlington, Erie, Eureka, Eagle Creek (all in Nelson mining division); Iron Mask, Kamloops; Standard, Silverton camp, Slocan; Highland, Ainsworth; Centre Star-War Eagle group, Rossland; Granby, Boundary; and Copper Chief, Trout Lake. Montana, Idaho, and Washington States each won a silver cup, while silver medals fell to those states in the following proportions: Montana, one; Idaho, five; Washington, four (including one to the First Thought mine, at Orient, which ships ore to the smelteries at Trail and Grand Forks, both in British Columbia).

Ymir.—There is now more activity in this part of Nelson mining division than at any previous time for years. Among the active mines are the Yankee Girl, which has shipped much ore during the last two years, Wilcox, Dundee, and several others. It has been reported that the old Ymir mine, formerly a dividend payer, is to be re-opened, and development at lower levels than those already worked to be undertaken.

Rossland.—Ore production is being well maintained at the Consolidated Mining & Smelting Company's Centre Star-War Eagle group of mines, and in less quantity at those of Le Roi No. 2, Limited. Among the smaller properties an encouraging feature is the recent finding of a fine shoot of ore of good value in the Blue Bird mine.

Slocan.—The mines that were deprived of railway transportation facilities last summer by the burning of many trestles and bridges of the Kaslo & Slocan Railway, have not yet resumed ore production on a normal scale, but some are making provision for the shipment of ore soon. Those chiefly affected are the Whitewater group, Lucky Jim, and Rambler-Cariboo. As the Whitewater mines shipped little crude ore, the great bulk of their product being concentrates, they must await the building of a concentrating mill, to replace that destroyed by fire in July, before they will again be in a position to make shipments. Mines situated near Sandon, which are provided with an outlet for their products over the Nakusp & Slocan Railway, are being operated as usual. In the Slocan Lake part of the district there is little change to note.

Lardeau.—There is an improved outlook for more development and production in this district, which has been neglected of late years to a considerable extent. It has been announced that the Ferguson Mines, Limited, an English company which has for years worked the Silver Cup and Sunshine mines with little intermission, sending out about 100 tons of high-grade silver-lead ore monthly, will again also work its Nettie L. mine, situated near Ferguson. Preparations are being made for a resumption of ore production at the Beatrice mine, near Camborne, Lardeau mining division; while reports are to the effect that several other properties in Lardeau division, and still others in Trout Lake division, will also be worked during the ensuing winter.

Similkameen.—In addition to the good progress made in Hedley camp, where is situated the Hedley Gold Mining Company's dividend-paying Nickel Plate mine, there is gratifying advancement in connection with the development of the coal resources of the Similkameen. The output of coal from the Princeton colliery is being steadily increased. At Granite Creek, the Columbia Coal & Coke Company is putting in a power plant and making other provision for the development of the several coal seams on its property. The Osoyoos Coal Company is prospecting its coal measures and opening coal reported to be of good quality and in considerable quantity.

Nicola.—Coal mining is becoming a more and more important industry in Nicola Valley as time passes. The Nicola Valley Coal & Coke Company is the only comparatively large producer of coal at present operating in the district, but development of other properties than that of this company is being steadily advanced. Railway construction is being proceeded with, the chief object in view being the connection, by as direct a route as shall be found practicable, of this fuel-producing locality with the Boundary mining camps which are looked to as an eventual market for much coal and coke from Nicola Valley. The metalliferous mineral resources of the country about Nicola have not yet been largely developed, but it is believed copper mining and smelting will yet be added to the industries of the district.

Coast.—While ore production continues small in this district, there is much work being done, so that it is reasonable to look for a much enlarged output within a year or two. At the Britannia mine, on Howe Sound, exploration of the big ore bodies is being continued, though only a restricted production of ore is being made while the price of copper remains low. At Green Lake, in about 30 miles from the head of Howe Sound, some large copper showings are being exploited. On Vancouver Island mining is chiefly for coal, and a greatly enlarged output of this mineral is planned for the early future. Texada Island has two valuable mines in the Marble Bay and Cornell, both of which have been producing fairly large tonnage of copper-gold ore of good average value. Lasqueti and Valdes Islands continue to have attention, development being in progress on both. Farther north, on Princess Royal Island, a locality in which some Maritime Provinces people were interested from five to ten years ago, a syndicate, including several Vancouver city men, is about to reopen a mining property. Other Coast dis-

tricts are dealt with under the several following heads:

Portland Canal.—The lower adit at the Red Cliff mine had been driven 1,013 feet from its portal by October 6. It is expected that before the end of November it will be under the ore cut in the upper adit about 300 feet vertically above the lower working. In the upper adit there is what has been described by the manager of the company as a chamber of chalcopyrite, 8 by 8 by 10 feet, opened some months ago at 80 feet in from the portal of the adit. The Red Cliff Company has been operating since May a Canadian Rand 10-drill compressor, which was hauled over the snow last winter, the distance from the landing at Stewart to the claim being about 12 miles. Steam for power purposes is supplied by three 60 h.p. boilers, which, as well as an air receiver and 6,000 feet of 20-pound tram rails, was hauled in last winter. Other equipment at the mine includes a Canadian Westinghouse generator, belt-driven by a 25 h.p. Comstock engine and having a capacity of 250 electric lights. A trial shipment of 3,028 pounds of Red Cliff ore, sent recently to the Tyee Copper Company's smeltery, gave a net return at the rate of 20 ounces per ton.

On October 8th the first trial shipment of high-grade silver-lead ore made from a mine in this camp was sent by the owners of the Lordigordy mine, of which Mr. H. B. Williams is manager. It consisted of four tons, practically one ton from each of four open-cuts. A local assayer's sampling gave a value of $220 per ton in gold, silver and lead. It is probable this ore will be treated at Trail.

Skeena.—Reports from reliable men concerning the occurrences of silver-lead ore in various parts of the district about Hazelton indicate that there is much promise of a productive mining field being opened there as soon as the Grand Trunk Pacific Railway, now being constructed, shall provide the transportation facilities requisite for conveying in the machinery and supplies, and carrying out the ore to smelting points. In the Babine range, east of Hazelton, development work has already been done on two or three properties, with results that seem to warrant the expenditure of more money when the cost of transportation shall be much less than now.

Atlin.—Beside the Engineer or Northern Partnership group of gold-quartz claims, situated on Taku arm, there is the Gleaner property, from which 75 sacks of free-milling quartz, believed to contain high gold value, reached Vancouver in October. Those interested in the Taku arm gold-quartz claims are confident profitable mines will be developed there.

Queen Charlotte Islands.—Not many particulars of mining work on the Queen Charlotte Islands have been printed in Coast newspapers lately. It is known, though, that development work is being proceeded with on both gold and copper claims on Moresby Island of this group, while in the coal measures of Graham Island prospecting is also in progress.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

Cardiff, Wales, Nov. 8.—Wild scenes were enacted in the disturbed colliery districts to-night where thirty thousand miners are on strike. Bands of youths, supported by women, stormed the colliery buildings and looted the stores in several towns, scattering the goods in the streets. The police, who were largely reinforced during the day, attacked the mobs with their batons, the rioters replying with showers of stones.

More than one hundred men were treated at the local hospital for scalp wounds. A number of the police also were injured, but they succeeded in getting the upper hand. Police reserves and troops arrived quickly at the scene of the greatest disturbances, and have been posted in the storm centres. They are prepared to prevent further disturbances, and should the strikers maintain their defiant attitude bloodshed is anticipated.

Mr. Winston Churchill, the Home Secretary, has offered his services to compose the differences between the men and their employers.

Cardiff, Wales, Nov. 9.—The action of the authorities in rushing troops and London police to the mining districts, where strike riots occurred last night, overawed the strikers, and the situation appeared to be well under control to-day.

GERMANY.

Statistics of the petroleum import trade of Germany for the first eight months of the present year show that in all 849,398 tons of petroleum were imported, as compared with 815,054 tons in the corresponding period of 1909.

ROUMANIA.

During August the Roumanian petroleum refineries treated 109,166 tons of crude oil, from which 18,769 tons of benzine, 26,394 tons of illuminating oil and 2,800 tons of lubricating oil were obtained. The remaining residues and coke amounted to 59,100 tons.

SOUTH AFRICA.

A cablegram from Johannesburg states that during September the mines of the Rand alone—that is, excluding outside mines—crushed 1,835,647 tons. The average yield per ton was 28s 3d, working costs 17s 11d, the profit per ton 10s 4d and the aggregate profit £942,330. In spite of the fact that September was a 30-day month the tonnage crushed was slightly more than for August, with an increase also in the daily average profit as compared with that month.

Johannesburg.—Shaft-sinking on the Springs' Mines is proceeding slowly, owing to the bad condition of the ground and the large amount of water which still percolates through the dolomite formation.

The Brakpan Mines, Limited, will start milling operations early in 1911. Good progress is being made with the equipment of the mine. Developments continue to show a good grade of ore, the reserves being now estimated at 1,503,135 tons, of an average value of 6.5 dwts.

A small test crushing has taken place at the Benoni mine, the machinery working well. It is expected that the mill will start crushing in April. The rumour of an intention to increase the capital of the company is denied. The cause of the recent fall in Benonis is unknown, but it is said to be due to a change of ownership in a large block of shares acquired under the recent reorganization scheme.

The oil shale deposits in the eastern districts of the Transvaal are causing considerable stir. In the Wakkerstroom district it is reported that the shale yields 90 gallons per ton, and in Ermelo 30 gallons per ton. The extent of the shale-bearing area is at present unproved.

RHODESIA.

The total output of gold from Rhodesia for the month of September is cabled as 42,499 ounces, valued at £178,950, as against 45,458 ounces, valued at £191,423, in the previous month. This is a decrease on the month of 2,959 ounces. In explanation of the further falling off in the output the British South Africa Company states: "The number of producing mines decreased by 37 in consequence of the fact that several mines hitherto worked on a small scale by individuals have developed so satisfactorily that they have been taken over by large companies and are now closed down pending the erection of larger milling plants." There were 152 gold producers during September. The output of other minerals was: Silver, 16,848 ounces; lead, 62 tons; coal,

16,362 tons; copper, 18 tons; chrome ore, 1,334 tons; asbestos, 25 tons.

WEST AFRICA.

The West African Chamber of Mines states that the gold yield of the colony for September was 11,497 ounces, valued at £47,746, a decrease of 2,424 ounces, or £9,967, compared with the preceding month.

UNITED STATES.

Los Angeles, Cal., Nov. 1.—The opening bids by the harbour commissioners of San Francisco last week for the supply of fuel oil for one year revealed the fact that the Associated and Union-Independents have sent the price up to 85 cents per barrel for crude oil at bay points. The offer is generally regarded as the serving of notice on all consumers that important contracts will not be filled below this point. There are rumours of an understanding between the Associated-Union-Independent interests and Standard, by which the price of oil will be kept at a point not lower than this price.

Cripple Creek, Col., Nov. 1.—A partial list of dividend-paying mines—that is, owning concerns—has been compiled, which shows that twelve properties, now actively working, have paid dividends to stockholders within the last few months. This list of twelve includes several close corporations.

Cripple Creek, Colo., Nov. 3.—To-day will mark the commencement of Cripple Creek's new era—an era that is expected to stretch out for at least another 20 years, during which time the district will mine and ship as much high-grade ore as it did when its ore bodies were new to the world and the miner had but to remove the surface rock to reach it. The deep, rich mineral zones of the camp are almost within reach of the miner—will be before the end of the day. The first water of the pent-up underground courses will be released through the Roosevelt drainage tunnel and in another 48 hours it is thought that the El Paso lower levels will have been drained and a large force of miners actually breaking rock on the 900-foot level. Less than six feet of rock remain between the bottom of the shaft and the drainage tunnel, which the churn drill will shortly penetrate and the water will be finding its way out at the rate of thousands of gallons a minute.

In another week, unless unexpected obstacles prevent, the tunnel will reach the main water course, when all the mines affected will enjoy the same good fortune as that upon which the El Paso will enter within a few hours. Between the tunnel breast and the main course there are estimated to be 72 feet, which, according to the progress the tunnel has been making of late, should be removed in six days, when a flow of water will take place such as has probably never occurred in a mining camp before, and it means that a new Cripple Creek will arise—as great, as profitable and as wonderful as when it rejoiced in the glory of its first discovery.

The tunnel, which was begun three years and a half ago, is into the mountains a distance of 15,503 feet, having gained 386 feet last month, which is the best record yet made.

Whether or not the tapping of the water course, to which the tunnel is drawing near, will drain the properties of the eastern end of the district, is a question, as it is believed that two separate and distinct underground lakes or channesl are separated by a hogback between Beacon and Bull hills. Should this condition exist, the tunnel will be extended on to the eastern section of the camp, but in the meantime the mines on the west side of the hogback, among them many of the larger producers, will be getting the benefit of the opening of one of the waterways and the output of the district, it is claimed, will be greatly increased before the other lake is tapped.

Trinidad, Col., Nov. 8.—Between 50 and 70 men are believed to be entombed in mine No. 3, of the Victor American Fuel Company, at Delagua, twenty-two miles northwest of Trinidad, as the result of an explosion to-day.

Fifty men came out unharmed through mine No. 2, which is connected with mine No. 3. According to reports to the mine officers, those men did not even know there had been an explosion in No. 3. If this report is true, the explosion, which caved the entrance to No. 3, did not extend far into the mine, and it is hoped that the men within the working are unharmed.

Boston, Mass., Nov. 5.—The shareholders of the Nevada Consolidated Copper Company, at their annual meeting held in Portland, Me., re-elected last year's board of directors with the exception of President James Phillips, jr., and C. Hartman Kuhn, who were succeeded by S. R. Guggenheim and J. M. Steele.

The annual report of the company, as presented to the meeting, gave the output of the company for the fiscal year ending September 30, 1910, as 62,772,342 pounds of refined copper, which was produced at a net cost of 6.42 cents per pound. The net profit for the year was $3,580,787, from which $2,982,644 in dividends were paid, leaving a surplus of $598,142. The ore reserves on the property at the close of the year were estimated to amount to 40,360,823 tons, averaging 1.70 per cent. copper. The undivided profits, together with the surplus and quick assets at the close of the fiscal year amounted to $2,633,617. The gross revenue from the copper produced—sold at an average price of 12.75 cents—was $8,008,146, while the gold and silver returned $472,982, making a total gross income of $8,481,129. Operating expenses aggregated $6,135,747, and the total net profit for the year, not including miscellaneous income—$1,263,925—was $2,-

MEXICO.

Guadalajara, Mex., Nov. 5.—Carrizo Copper Company, operating in the Ayutla district of this state, has completed the work of remodelling and enlarging its concentrating plant, and milling has been resumed. The enlarged plant has a capacity of 100 tons daily, but so far the amount handled has not exceeded 75 tons a day. During the time that construction was in progress a supply of several thousand tons of ore was accumulated at the mill, and these reserves will be sufficient for the mill for some time.

GENERAL MINING NEWS.

NOVA SCOTIA.

Halifax.—It is announced that Mr. J. R. Cowans is soon to leave the province and take up his residence in Montreal. This change is to take place at once. The Springhill Company will in future be carried on as most of the American collieries are, with a manager at the mine who has charge of underground and superintends bringing the coal to the bulkhead, and general officers who control the sales and administration at the head office.

Mr. Sharp, of West Virginia, will have control underground, and has been in Springhill for some weeks.

During Mr. Cowans' stay in Nova Scotia he has come into contact with business, professional and public men and is held in the highest esteem by them, and all will regret that he will no longer be a resident of Nova Scotia. Of necessity Mr. Cowans will be a frequent visitor to this province, and the company will still be administered by him. Mr. Cowans has hosts of personal friends all over Nova Scotia, who appreciate his worth, and they join in wishing him all good things in his new home.

Halifax.—Efforts are being made to create sentiment against reciprocity in coal. This appears to be unnecessary, as the great bulk of Nova Scotians are strongly opposed to reciprocity in principle.

ONTARIO.

Cobalt.—A keg of bullion from the Silver Leaf mine [illegible] week, consigned through the Dominion Express C[illegible]

Messrs. Handy & Harman, Bridgeport, Conn., the weight being 3728 ounces, and the value $1,172.72. The Silver Leaf mine being under lease to the Crown Reserve, who are working the property, the bullion naturally belongs to the latter company, but will be shown separately in the returns.

Sault Ste. Marie.—The recent discovery near Hobon on the main line of the C. P. R., has caused quite a stir among mining men throughout East Algoma, and up to date over fifty claims have been recorded. The site of the new gold field is township forty-nine, range twenty-seven, District of Algoma. It is easily accessible from the C. P. R. and the Algoma Central Railway and is almost due west from Porcupine, which fact causes mining men to think that the new field may be even richer than yet appears.

Cobalt, November 4.—Summonses have been served on the directors of the Standard Cobalt Company, charging them with misfeasance and the improvident disposition of 40,000 shares of the Standard Cobalt Mines, which, it is said, were made over to the Cobalt Central Company, the New York organization controlled by Thomas Nevins & Company.

The action is brought by the liquidator of the Standard Cobalt Mines and is signed by the official referee, J. A. McAndrew. It calls for the presence of the Standard Cobalt directors before the referee in Toronto on November 28. Meanwhile proceedings are being brought in New York whereby various important witnesses concerned in the case are being examined.

Kenora.—Satisfactory progress is being made on the Mikado mine by Manager McKuson. The buildings and equipment have been thoroughly overhauled and the mine is being cleaned up. Rich ore will soon be mined on the 180-foot level.

BRITISH COLUMBIA.

Victoria, November 5.—Mr. R. F. Tolmie, Deputy Minister of Mines, and Mr. F. H. Shepherd, Chief Mine Inspector of the province, have just completed the establishment at Hosmer of the first coal mine live-saving station to be installed by the Provincial Government under the act authorizing the adoption of the system. Others will follow at Middleboro and at Nanaimo. The system consists chiefly of a Draeger oxygen apparatus for the purpose of resuscitating miners and others who may have become temporarily overcome by deadly gases in mines after explosions or other unforeseen accidents.

The station established at Hosmer consists of one of the Draeger oxygen apparatus, which has a two-hour capacity, flanked by two pulmotor, resuscitating devices, with a thirty-minute capacity each. These apparatus have cylinders of 100 cubic feet of oxygen capacity and are of the 1910 model. Four electric safety lamps, one recharging device, and a water gauge for testing device valves go with each apparatus.

These Government stations are to be supplemented by stations placed at each mine, in accordance with Government requirements, by the mining companies.

The system has been installed in many places in Europe, the United States, Japan and even in Siberia, over 4,000 being now established and ready for emergency.

STATISTICS AND RETURNS

DOMINION STEEL OUTPUT.

The Dominion Steel Company had a record output in October, the figures being as follows:—

	Tons.
Pig iron	22,058
Steel ingots	27,034
Blooms	26,113
Rails	15,375
Wire rods	4,743

The Dominion Coal Company also had a big month, the output being 329,000 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending November 4, and those from January 1, 1910, to date:—

	Nov. 4 Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver		226,217
Buffalo	56,920	2,006,348
City of Cobalt		548,875
Chambers-Ferland		1,527,300
Cobalt Central		293,286
Cobalt Lake		300,900
Cobalt Townsite		601,120
Colonial		245,580
Coniagas	102,460	1,816,436
Crown Reserve		5,314,140
Drummond	400,000	1,064,200
Hargraves	60,000	564,070
Hudson Bay		481,215
Kerr Lake	180,501	9,059,468
King Edward		263,406
La Rose		9,255,841
McKinley-Darragh	210,090	10,604,557
O'Brien	128,034	1,115,250
Peterson Lake (Little Nip)		497,420
Provincial		65,000
Right of Way	74,850	1,545,187
Rochester		60,750
Silver Cliff		268,720
Standard Cobalt		258,951
Temiskaming		1,913,350
Trethewey		853,620
Waldman		63,992
Wyandoh		48,300

Ore shipments for the week ending November 4 were 1,366,795 pounds, or 683 tons.

Total shipments from January 1 to November 4 were 54,462,948 pounds, or 27,231 tons.

BRITISH COLUMBIA ORE SHIPMENTS.

The following are the figures of the ore production and movement for the week ended October 22nd and for the year to date:

Boundary Shipments.		
Granby	13,485	910,019
Mother Lode	7,887	284,050
Snowshoe	2,762	121,954
Jack Pot	791	11,261
Rawhide	3,000	9,700
Other mines		9,523
Total	27,925	1,346,507
Rossland Shipments.		
Centre Star	4,333	155,014
LeRoi No. 2	823	25,813
LeRoi No. 2, milled	300	12,600
Other mines		12,781
Total	5,456	206,208
Slocan-Kootenay Shipments.		
St. Eugene, milled	2,775	116,550
Van Roi, milled	800	33,600
Queen, milled	420	17,640
Granite-Poorman, milled	250	10,500
Nugget, milled	110	4,620

Highland, milled	250	7,850
Wilcox, milled	75	675
Richmond-Eureka	67	3,438
Emerald	35	1,616
Yankee Girl	87	4,339
Sullivan	908	16,820
Hewitt	21	43
Number Seven	137	241
Eureka	45	45
Other mines		35,123
Total	5,980	253,100

The total shipments for the week, including the estimated amount milled, were 39,361 tons, and for the year to date, 1,805,815 tons.

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous.—Nov. 9, 1910.

	Bid.	Ask.
Amalgamated Asbestos	..	12½
Black Lake Asbestos	..	17¼
Dominion Coal	63¾	..
Dominion Steel	62¾	..
Dominion Steel Corp.	61¼	61½
Granby	47	47¾
Consolidated Mining	58	61
Nova Scotia Steel	85½	86
Crow's Nest Pass	..	80

New York Curb.—November 9, 1910.

Brit. Col. Copper	6¾	7
Butte Coalition	20¾	21¼
Chino Copper	21	21¼
Davis-Daly Copper	1⅞	2
Ely Consolidated	25 cts	26 cts
Gila	30	33
Giroux Mining	7½	7⅝
Goldfield Consol.	8	8¼
Green-Can.	7⅝	7¾
Hareuvar Copper	11	11½
Inspiration Copper	9⅛	9⅜
Miami Copper	20	20¼
New Baltic Copper	7⅛	7¼
Nevada Con. Copper	20¾	20⅞
Ohio Copper	1⅞	2
Rawhide Coalition	4 cts	5 cts
Ray Central	2	2⅛
Ray Consolidated	20⅛	20¼
Union Mines	15/16	1
Yukon Gold	3⅞	4

Cobalt Stocks.—November 9, 1910.

Amalgamated	.01 bid	
Bailey	.07½	.07¾
Beaver Consolidated	.30	30¼
Bix Six		
Buffalo	2.00	2.20
Chambers-Ferland	.18½	.18⅝
City of Cobalt	.21	.23
Cobalt Central	.07½	.09
Cobalt Lake	.14¾	.15
Coniagas	4.40 bid	
Crown Reserve	2.81	2.84
Foster	.09	.12
Gifford	.05⅞	.06¾
Great Northern	.07¾	.08¼
Green-Meehan	.02½	.02¾
Hargraves	.30	.32
Hudson Bay	.93	.98
John Black	.02	.06
Kerr Lake	6.45	6.62½
La Rose	4.77	4.80
Little Nipissing	.21½	.21¾
McKinley	1.11	1.12
Nancy Helen	.02	.05
Nipissing	10.90	11.06¼
Nova Scotia	.24	.25½
Ophir	.26	.34
Otisse	.01⅜	.02⅛
Peterson Lake	.21	.21¼
Right of Way	.30	.30¾
Rochester	.11⅞	.12⅛
Silver Leaf	.06	.07
Silver Bar	.02½	.06
Silver Queen	.06	.08
Temiskaming	.86¼	.86⅝
Trethewey	1.24	1.24½
Watts	...½	.04
Wettlaufer	.91½	.92½

SILVER PRICES.

	New York cents.	London Pence.
Oct. 25	56⅛	25⅞
" 26	56¼	25 15/16
" 27	56⅛	25⅞
" 28	55¾	25 11/16
" 29	55¾	25 11/16
" 31	56	25 13/16
Nov 1	56	25 13/16
" 2	56	25 13/16
" 3	56⅛	25⅞
" 4	55¾	25¾
" 5	55¾	25¾
" 7	56⅜	26

TORONTO MARKETS.

Nov. 9.—(Quotations from Canada Metal Co., Toronto.)
Spelter, 6 cents per lb.
Lead, 3.65 cents per lb., strong.
Antimony, 8 to 8½ cents per lb.
Tin, 38½ cents per lb.
Copper, casting, 13.50 cents per lb.
Electrolytic, 13.50 cents per lb.
Ingot brass, 8½ to 12½ cents per lb.

Nov. 9.—Pig Iron.—(Quotations from Drummond, McCall Co., Toronto.)
Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.50 (f.o.b. Toronto).
Hamilton No. 1, $20.00 (f.o.b. Hamilton).
Hamilton No. 2, $19.50 (f.o.b. Hamilton).
Clarence, $20.00 (f.o.b. Toronto).
Cleveland, $20.00 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼ inch lump.

Coke.

Nov. 7.—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.50 to $1.60 per ton.
Foundry coke, prompt, $2.00 to $2.15 per ton.

Nov. 7.—Tin (Straits), 36.42½ cents.
Copper, Prime Lake, 13.00 to 13.10 cents.
Electrolytic copper, 12.87½ to 13.00 cents.
Copper wire, 14.25 cents.
Lead, 4.45 cents.
Spelter, 5.95 cents.
Sheet Zinc, (f.o.b. smelter), 7.75 cents.
Antimony, Cookson's, 8.12½ cents.
Aluminium, 22.50 to 23.00 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $38.50 per ounces.
Platinum, hard, $41.50 per ounce.
Bismuth, $1.95 per lb.
Quicksilver, $46.00 per 75 lb. flask.

United States Smelting

Refining & Mining Co.

Buyers of ORES and MATTE

Refiners of

BLISTER COPPER, LEAD BULLION

Copper and Lead Smelters, Copper and Lead Refineries, Chrome, N.Y., Grasselli, Ind., Midvale, Utah, Bingham Jct., Utah, Needles, Cal., Kennett, Cal., Pachuca, Mex.

Main Office, 55 Congress Street, Boston

District Offices: 42 Broadway, New York, Grasselli, Ind., Salt Lake City, Utah, Kennett, Cal., Needles, Cal., Los Angelos, Cal., Pachuca, Mex.

United States Smelting, Refining and Mining Co.

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

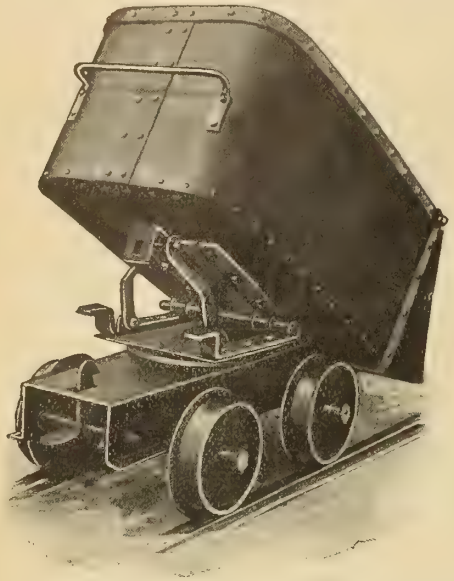
For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent
Board of Trade Bldg. Montreal

J. S. CARTER, Gen. Agent,
450 Main St. Winnipeg, Man.

I. E. SUCKLING, Gen. Agent,
S. E. Corner King & Yonge Sts., Toronto, Ont.

STEEL ORE CARS



Dumps on Sides and Rear End

The cars can be made of any capacity and gauge of track to suit requirements. Steel consturction. Very substantial and durable. All our various makes of dumping cars are fitted with special car locks automatic in action, allowing the car to dump to an angle of 30 degrees before the door is released.

A Car for Every Requirement

The Canadian Fairbanks Co. LIMITED

Fairbanks Scales - Fairbanks-Morse Gas Engines - Safes and Vaults

Montreal Toronto St. John, N. B. Winnipeg Saskatoon Calgary Vancouver

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Mine Management

Our organization offers many advantages to investors and mine owners seeking competent management. Under our scheme of management a continuity of policy is assured regardless of changes in the local staff. We are willing that our compensation depend upon results obtained. We know that our methods mean low working costs and maximum profits. Let us make you a proposition.

International High Speed Steel Co. of New York

CARRY IN STOCK AT COBALT, ONT., WAREHOUSE, all kinds of DRILL STEEL in Octagon and Cruciform.

For price and all information write to our Cobalt office, P. O. Box 370.

Our Steel is made in Sweden from best Swedish Ores and is even in grade.

Want Advt.

Mining Engineer, technical graduate wants Position with Coal Co. in Western Canada. Experienced Surveyor, Assayer and Draftsman. Unmarried, age 26. Low initial salary, no objection if chances are good.

Address, Box 653,
Oshawa, Ont.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining ngineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show ns of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a orough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

stley, J. W.
ateman & Brown
ampbell & Deyell
arter, W. E. H.
eMorest, Stull & Low
vans, J. W.
laherty, R. H.
willim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

rown, A. H.
ampbell & Deyell
vans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E.
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

Lamb, R. B.
Mining Engineer and Metallurgist
Traders Bank Bldg.
Toronto, Ontario

Loring, Frank C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

Leckie, J. Edwards
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

Longyear & Hodge
MINING ENGINEERS
Diamond Drilling. Reports.
Magnetic Survey of Iron Ore Properties.
Manufacturers of Diamond Drills and Drill Supplies.
Box K, - - SUDBURY, ONT.

Ralph A. Meyers, E.M., B. Sc.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

Magee, Boyd
Consulting Mining Engineer
HAILEYBURY and TORONTO

Miles, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: Obadul Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

Perkins, Frank Clinton
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

Alexander H. Smith
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

Scott, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

Smith, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

Spencer, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

Sutcliffe & Neelands,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

Walter E. Segsworth
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

Tyrrell, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

Willmott, A. B., M. A., B. Sc.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

Webb R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq., Buffalo, N. Y.

Woolsey, W. J.
Mining Engineer
THETFORD MINES, QUE.

Survey of Mining Claims Townsites, Town Lots, Etc.
Mine Surveying Municipal Engineering
CODE & CODE
Ontario Land Surveyors and Civil Engineers
Offices: COBALT and GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

John, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

Carey, Elmer Ellsworth,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

Brown, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - Cobalt, Ont.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B. Sc.
Manager

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office: McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto,

S. F. KAVANAGH
Assayer
Mining Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors.
Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Coristine Bldg., Montreal.
Phone M-7515

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
404 Lumsden Bldg, TORONTO.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

JOHNSON, ALBERT
Assessment Work—Drifting and Sinking contracted in Northern Ontario. Absolute Satisfaction Guaranteed.
Thirty Years experience in Gold, Copper and Iron Mining. Mining Claims for Sale.
Cobalt, Ont.

G. W. DIXON,
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building,
Montreal

ENGINEER with influential connection in British Isles will be visiting Montreal shortly to negotiate with firms wishing first-class representation. Address R. J., c/o Canadian Mining Journal.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Outario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO

The Davis Handbook of the Cobalt Silver District

Illustrated with Photographs

PRICE

Paper Cover = = $1.50

Stiff " = = = $2.00

by H. P. Davis

¶ The first section of this volume is an outline on the Goelogy, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general infromation necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = *Canadian Mining Journal* = *Toronto*

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada, Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

MACHINERY FOR SALE

Owing to change in power from steam to electric, we have a large quantity of machinery for sale, consisting of Steam Engines and Boilers, Air Compressor, a complete Lighting Plant (600 lights), Double Drum Hoisting Engine, Concentrating Tables and miscellaneous lot of other machinery.

Write for particulars and catalogue.

DELORO MINING & REDUCTION Co. Ltd.
DELORO - - ONTARIO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mir es. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING AND SCIENTIFIC PRESS

Established 1860

Controlled by T. A. RICKARD

Associate Editors Courtenay DeKalb, H. Foster Bain

For nearly half a century the

Mining and Scientific Press

published in the great western mining centre has recorded the developement of the metal mining regions. Beginning with the industry itself, it has told from week to week the fascinating story of the progress of mining practice. It is edited and controlled by mining engineers for mining engineers.

Published weekly at 667 Howard St., San Francisco, Cal.
Send for Sample Copy and Catalogue of Technical Books.

SUBSCRIPTION RATES—Canada $4.00, United States and Mexico $3.00
Foreign Countries in Postal Union $5.00

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

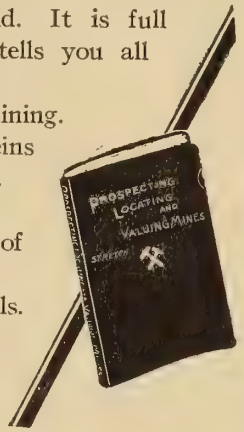


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co.....vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
B. C. Assay and Chemical Supply xxvii
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co., Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Casartelli, Joseph & Son xxiii
Canadian Fairbanks Co., Ltd..xviii
Crabtree, T. H.....xxi
Canadian Copper Co.....xxiv
Constant-Herzig Co. xviii
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Draeger Rescue Apparatus iv
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix
Davis Handbook xii

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Goldie & McCulloch Co., Ltd....v
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hitchcock, C. H.....xx
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
Jacobson, Rich. iv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco l

K

Keuffel & Esser Co.....xv

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd. xvi
Scott, C. N. xx
School of Mining xxiii
Simpson, Robert Co., Ltd,, Inside Back Cover
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Toronto University xxvii
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-ON-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN, & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Goldie & McCulloch Co.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Curtis & Harvey.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.,
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Goldie & McCulloch Co.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,
John McDougall Caledonian Iron Works Co., Ltd.

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
O. L. Berger & Sons.
Stanley, W. F.
Casartelli, Joseph & Son,
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd.
John McDougall Caledonian Iron Works Co., Ltd.

Condensers—
John McDougall Caledonian Iron Works Co., Ltd.
Goldie & McCulloch Co.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
John McDougall Caledonian Iron Works Co., Ltd.
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.
Robert Simpson Co.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Morris Machine Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Goldie & McCulloch Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rescue Apparatus—
Richard Jacobson.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
John McDougall Caledonian Iron Works Co., Ltd.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
John McDougall Caledonian Iron Works Co., Ltd.
Canadian Fairbanks Co., Ltd.
Goldie & McCulloch Co.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
O. L. Berger & Sons.
John Davis & Son.
Casartelli, Joseph & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

Vaults & Safes—
Goldie & McCulloch Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

BARROW HAEMATITE STEEL CO., BARROW-IN-FURNESS, ENGLAND

Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Baldwin-Westinghouse
Electric Mine Locomotives

Economical Mine Operation

and modern methods demand that you use electrical equipment. The same power used for cutting and drilling, is also used for hauling.

Service Records show that you should use **Baldwin-Westinghouse Mine Locomotives.**

Let us tell you more about them, and give you figures on their records in some large mines.

Write nearest office.



Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto



ON TIME

One of the most important business transactions which sensible minded men should perform on time is that of making proper provision for those who are dependent on them for the necessities of life.

The only way to do this is by means of life insurance. The only way to do it on time is to act now while in health. The most satisfactory way is to insure at once in the

North American Life
ASSURANCE COMPANY
"Solid as the Continent"

HEAD OFFICE, - - TORONTO

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz :

Nova Scotia : Wm. Stairs, Son & Morrow, Limited. **New Brunswick : W. H. Thorne & Co., Limited.**
Montreal and Toronto : Drummond, McCall & Co. **Vancouver, B.C. : John Burns.** **Winnipeg : David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.

Cables : "Ropery, Rutherglen." Codes : A. B. C. (4th and 5th Editions), A.I., Liebers and Private.

W. T. RODDEN, Managing Director — J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora



BELL ASBESTOS MINES

No. 3 Mill. This Mill is built in two units. Each unit has a milling capacity of from 25,000 to 30,000 tons of marketable Asbestos fibres per annum. The Bell Asbestos Mines are capable of supplying the world's demands for Asbestos

For Crude, Carded and Cleaned Fibres, address

BELL ASBESTOS MINES

Thetford Mines, P.Q., Canada

Ambler, Pennsylvania, U.S.A.

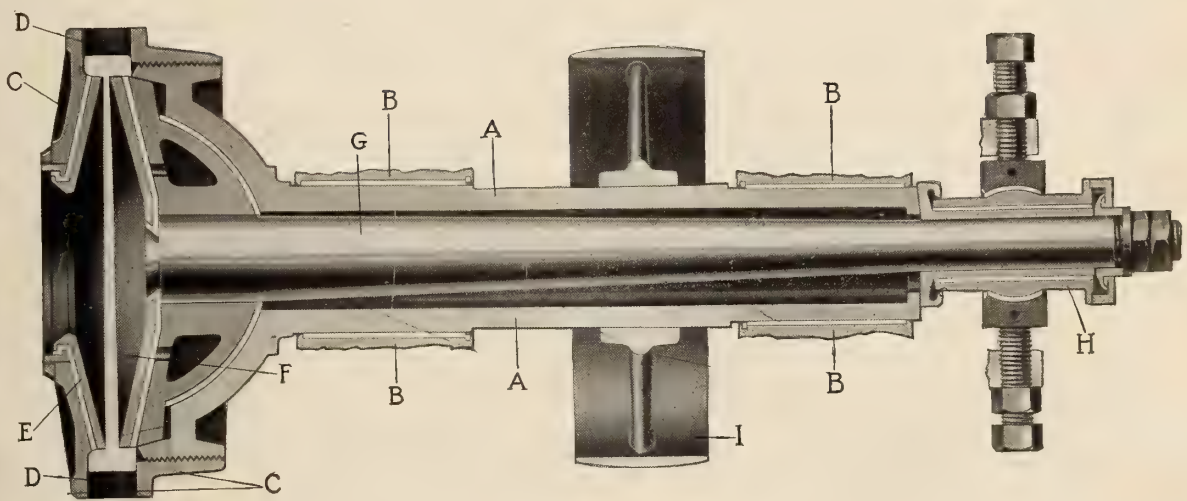
Victoria Square, Montreal, Canada

The Most Productive Mines of High-Grade Asbestos Crudes and Fibres in the World.

THE CANADIAN MINING JOURNAL

L. 31 TORONTO No. 23

A NEW PRINCIPLE IN CRUSHING



SECTIONAL VIEW OF THE SYMONS DISC CRUSHER

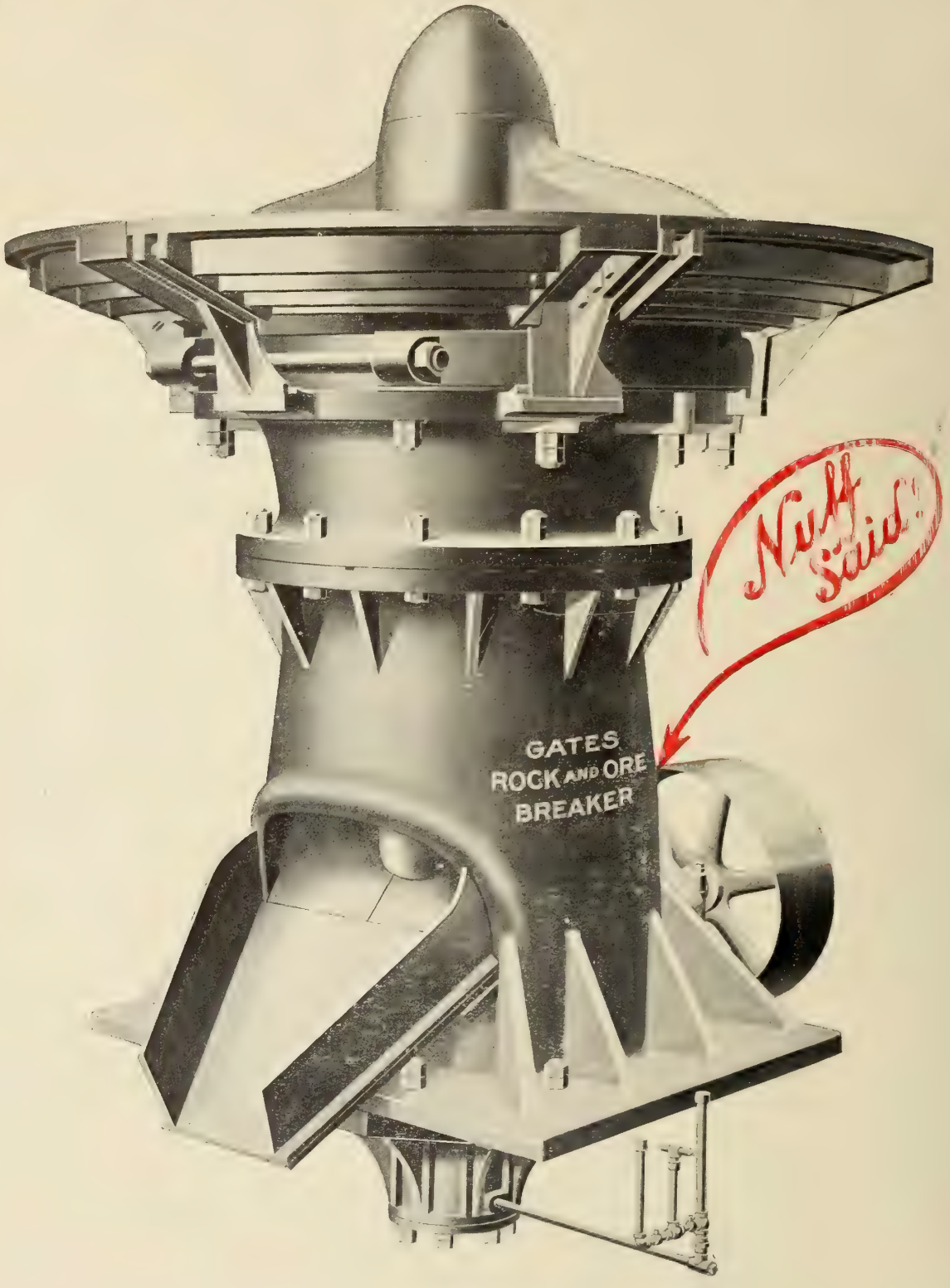
The Symons Disc Crusher is constructed according to an entirely new principle in Crushing. It has two Dish-shaped Manganese Steel Discs the hollow sides of which face each other. These discs rotate in the same direction at the same speed. The stone is fed between them through a central feed opening and is caught between them where they are widest apart, and carried around with them to where they are closest together, being crushed in going half way round. The smaller particles fly out during the next half round and the larger pieces caught again. The crushing movement may be regulated while the Crusher is running.

Let us send you full particulars. Every mining man should get posted on this Crusher which in one operation crushes large rejections or boulders down to a very small size.

MUSSENS LIMITED

MONTREAL, 318 St. James St. | **TORONTO,** 73 Victoria St. | **COBALT,** opp. Right of Way Mine | **WINNIPEG,** 259-261 Stanley St. | **CALGARY,** Crown Bldg. | **VANCOUVER** Mercantile Bldg

MINING MACHINERY



ALLIS-CHALMERS-BULLOCK

LIMITED

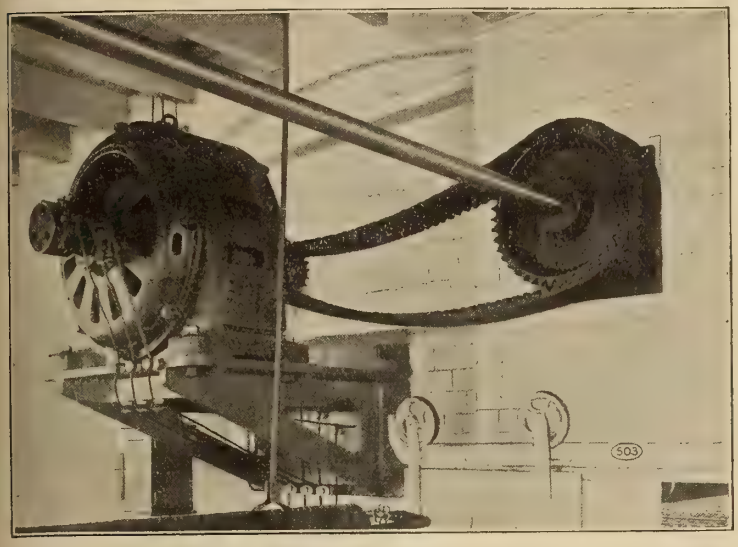
WORKS - - MONTREAL

SALES OFFICES

MONTREAL TORONTO WINNIPEG VANCOUVER

COBALT CALGARY

Renold Patent Silent Chains



(Renold Drive from Motor to lineshaft.)

Run slack,

No tension beyond the actual pull,

Journal friction is therefore at a minimum,

Quiet. Durable.
Flexible. Compact.

Write for particulars of drives we have running in your neighbourhood.

JONES & GLASSCO

Sole Canadian Agents **MONTREAL**

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we **know**, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs **per year** than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO.

COBALT, ONT.
P. O. Box 310

LIMITED

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

SPEED

A single motion is quicker to make than two.

Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of the

easy action
light running **Model 10**

Smith Premier

The Smiih Premier Typewriter Company, Inc.
Syracuse, N. Y.



Canadian Representatives:
National Typewriter Co., 87 Victoria St., Toronto
Wm. H. Hall & Co. 221 Notre Dame St. W., Montreal
E. R. McNeill, 166 Sparks St., Ottawa
A. Milne Fraser, 1157 Holis St., Halifax, N.S.

"Sullivan Value"
In Rock Drills

means that, under *your* working conditions, the drill that will cut fastest, and cost least for power, labor and repairs, is a "Sullivan."

Our Drill Book 660, tells why.

The last *Mine and Quarry* contains articles on:
Rapid Shaft Sinking — Coal Mining by Machinery — Iron Mining at Commonwealth, Wis.
An Arizona Copper Mine — A Southwestern Marble Quarry — Care of Stoping Drill Bits
Ask for a Copy.



Sullivan Rock Drill in a Menominee Range Iron Mine.

Air Compressors — Fans — Hammer Drills — Hoists — Diamond Drills — Coal Cutters

Sullivan Machinery Co.
150 Michigan Ave., Chicago, U.S.A.

BIRMINGHAM, BUTTE, Mont., CLAREMONT, N.H., DENVER, EL PASO, JOPLIN, Mo., KNOXVILLE, NELSON, B.C., COBALT, ONT., NEW YORK, PARIS, FRANCE, PITTSBURG, ST. LOUIS, SALT LAKE, SAN FRANCISCO, SEATTLE, SPOKANE, SYDNEY, AUS.

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE

CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg



BEST FOR MINE BUILDINGS

Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

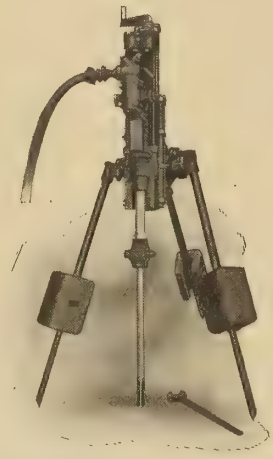
THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.

ROCK DRILL EFFICIENCY

Rock Drill Efficiency is measured by the length of time the drill stays on the job doing good work, standing up to its original capacity without breakage delays.

MATERIALS—The most carefully selected materials are used in the manufacture of **"Rand Drills."** Vital cast parts are made of high-grade open-hearth steel castings and steel parts are made of the finest steel, each selected to perform its particular function in the operation of the machine. Special treatment of steel parts insure the utmost service from each part.



WORKMANSHIP—Rand Drills are built by mechanics who are experts in their line, with years of experience and every facility and incentive for the best work, in a shop equipped with every modern convenience.

—

Can you afford to buy anything but the best—**RAND DRILLS.**

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



Price $350.00

We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

The Deister Concentrator Co., Ft. Wayne, Indiana, U.S.A.

The Canadian Bank of Commerce

PAID-UP CAPITAL, $10,000,000
RESERVE - - $6,000,000

DRAFTS ON FOREIGN COUNTRIES

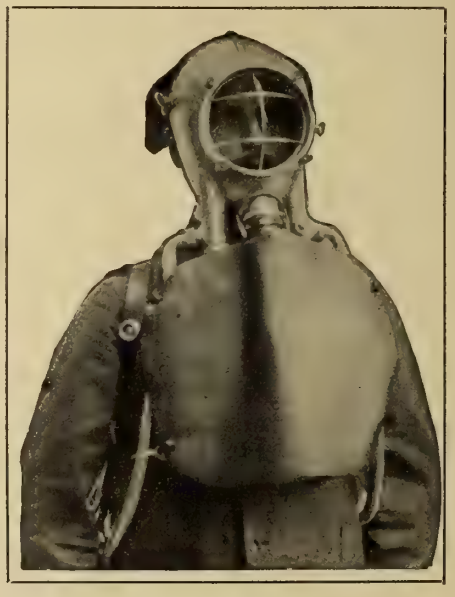
Arrangements have recently been completed under which the branches of this Bank are able to issue DRAFTS on the principal points in the following countries.

Austria-Hungary	French Cochin-China	Norway
Belgium	Germany	Persia
Brazil	Great Britain	Phillipine Islands
Bulgaria	Greece	Roumania
Ceylon	Holland	Russia
China	Iceland	Servia
Crete	India	Siam
Denmark	Ireland	South-Africa
Egypt	Italy	Straits-Settlements
Faroe Islands	Japan	Sweden
Finland	Java	Switzerland
Formosa	Manchuria	Turkey
France	Mexico	West Indies
	and elsewhere	

No delay in issuing. Full particulars on application.

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON
70 SHOE LANE, LONDON, E.C. ENGLAND

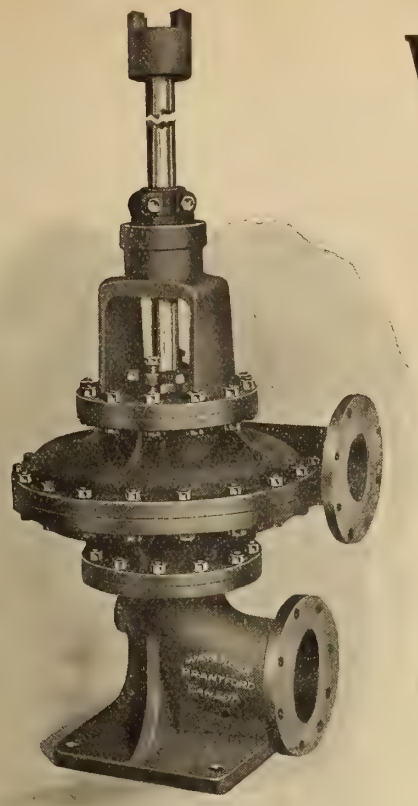
Successfully used at the following EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone.	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE



We Build a Pump for Every Service

¶ By this we mean that whether you are draining a mine, are pumping sewage, or cofferdam excavating, or using a pump in one of the many different ways it may be applied, **we have the right pump and the best pump for your work.**

¶ Built in sizes up to 14 in. discharge opening, the Waterous pumps are adaptable for motor, engine, or belt drive. Both Vertical and Horizontal types are manufactured. They contain special features of exceptional merit—split base, split packing gland, reversible barrel, and wear proof runners. They are simple, compact, durable, and run with little power.

¶ No matter what your special needs may be we are confident that we can supply the pump that will fill them most satisfactorily.

HAVE YOU WRITTEN FOR OUR CATALOGUE NO. 200?

THE WATEROUS ENGINE WORKS CO., LIMITED
BRANTFORD - CANADA

Specify Distinctly "STAG" BRAND Allen's Stag Brand



SOLID OR HOLLOW
Mining Drill Steels
All Sizes and Sections from Stock

SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**
330 ST. JAMES ST., MONTREAL

THOS. HAMPTON, Manager for Canada

A New, Complete and Authoritative Treatise.

CYANIDE HANDBOOK BY J. E. Clennell

Over 500 pages, 6x9, illustrated, $5.00 (21s) net, postpaid

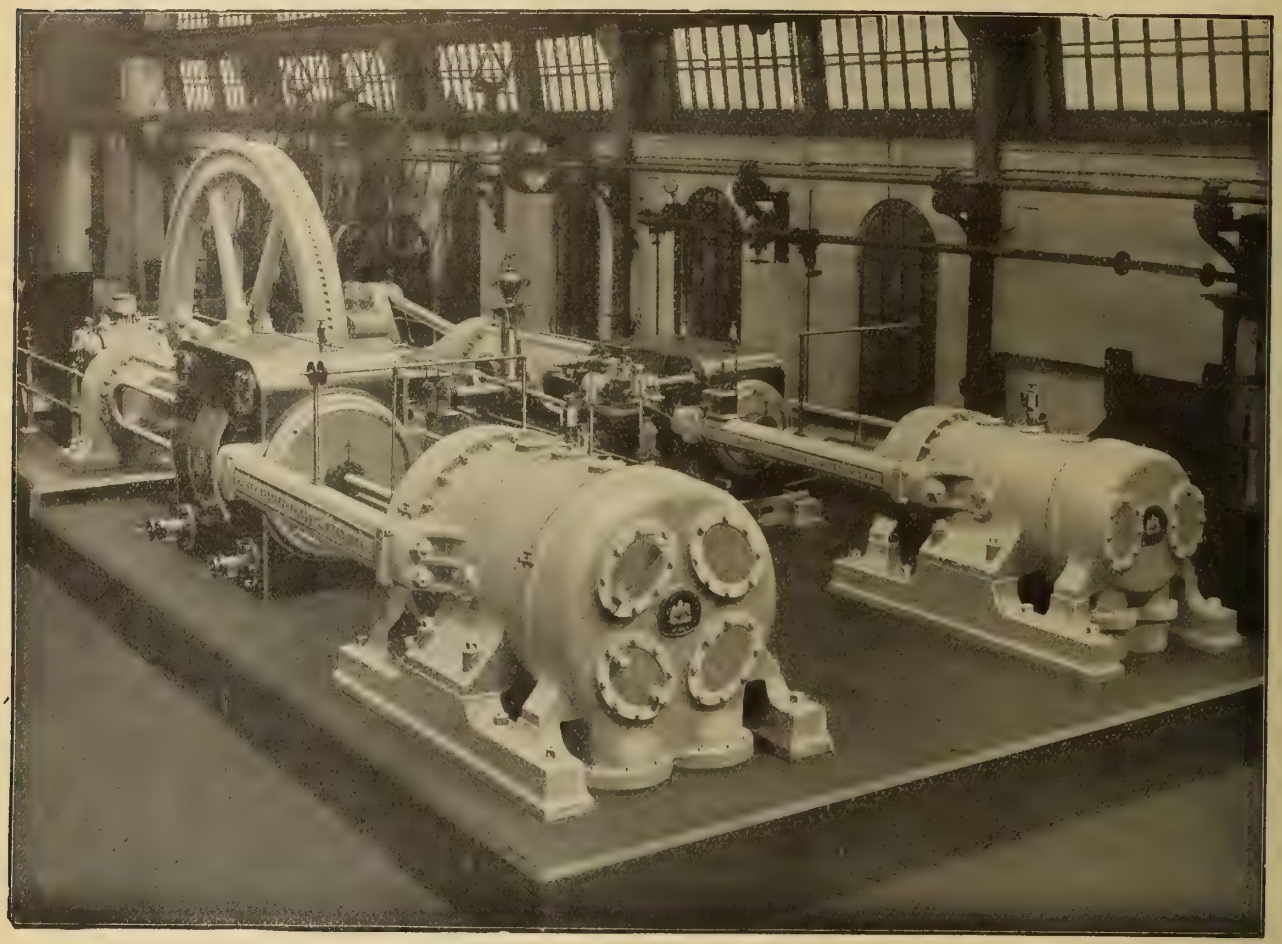
Mr. Clennell has been in close touch with the rapid developments of cyaniding. He has been instrumental, too, in many important discoveries, and his work in this field has taken him to the leading plants of the world. It deals generally with Cyanide and does not confine itself to the process alone. It is divided into nine main parts covering the subject more fully and exactly than it has heretofore been handled.

Especially noteworthy is the full treatment of recent developments and important phases heretofore *inadequately treated.*

Book Department CANADIAN MINING JOURNAL

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair 'Compound' Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

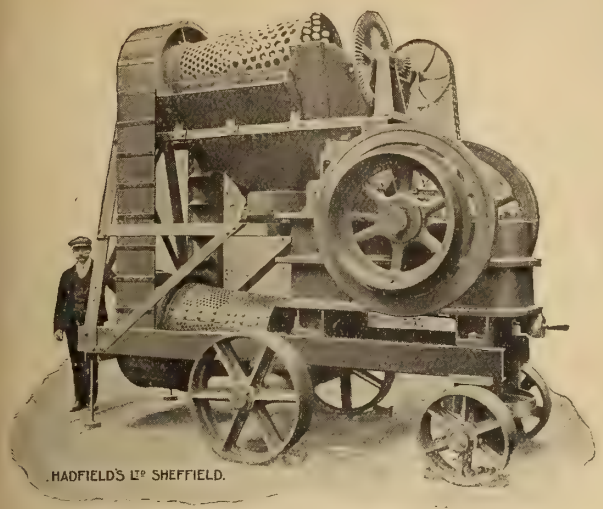
DRIVEN BY STEAM OR ELECTRICITY.

To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. (Applicable also to Existing Engines.)

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.



HADFIELD'S PORTABLE COMBINED CRUSHING, SCREENING, ELEVATING and LOADING APPARATUS

HADFIELD'S STEEL FOUNDRY CO., LTD., . . **SHEFFIELD**

Manufacturers of

COMPLETE CRUSHING PLANTS

of every description,

Embodying Hadfield's Latest Improvements

Hadfield's Patent 'Era' Manganese Steel

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings of every description

ETC., Including

WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS, ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield.

PEACOCK BROS.

68 Beaver Hall Hill, - - Montreal, P.Q.

FOR **DYNAMITE, ROCK-CHIEF**

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

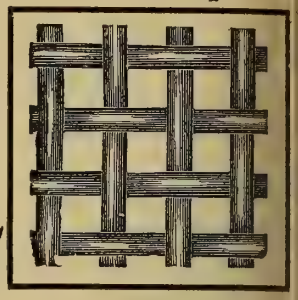
CORRESPONDENCE SOLICITED

THE BROWN MACHINE COMPANY, LIMITED

NEW GLASGOW — ENGINEERS — NOVA SCOTIA

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalogue 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

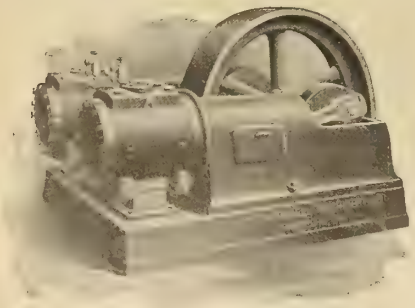
Steel Works & Head Office: NEW GLASGOW, NOVA SCOTIA

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



AIR COMPRESSORS

STEAM---ELECTRIC---POWER

FOR ALL CLASSES OF SERVICE WRITE US YOUR REQUIREMENTS

Canada Foundry Company,
LIMITED

Toronto Montreal Halifax Ottawa Cobalt Winnipeg
Calgary Vancouver Rossland

Mine Hoisting Engine

Cylinders 22 inches diameter, stroke 42 inches, about 900 horse power; double drums 8 feet diameter, 5 feet wide.

Corliss valves, steam actuated clutches and brakes. The reversing gear, throttle, brake and other levers are grouped at a central platform.

This engine was completed within the past few months and is thoroughly modern. Write for drawings, specifications and photographs.

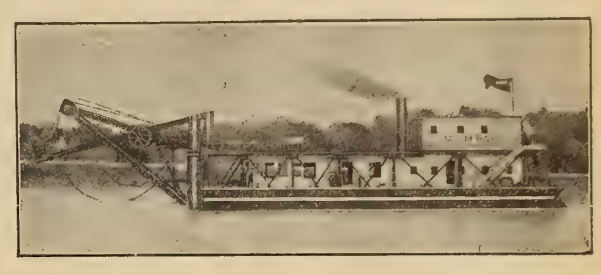
Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

607 Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
609 Grain Exchange Building, Calgary, Alta.	J. F. Porter	"

M. Beatty & Sons
Limited
Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,

Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

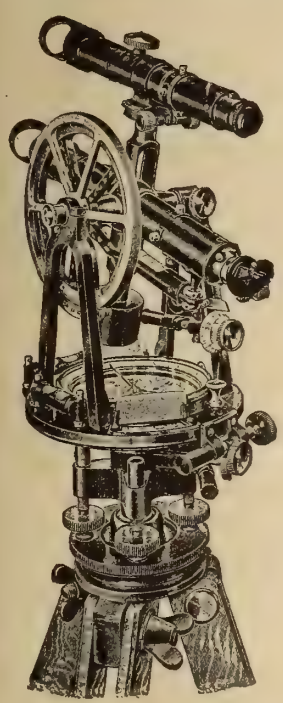
Submarine Rock Drilling Machinery,

Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S
Field Instruments
FOR
Civil, Mining Engineers & Surveyors

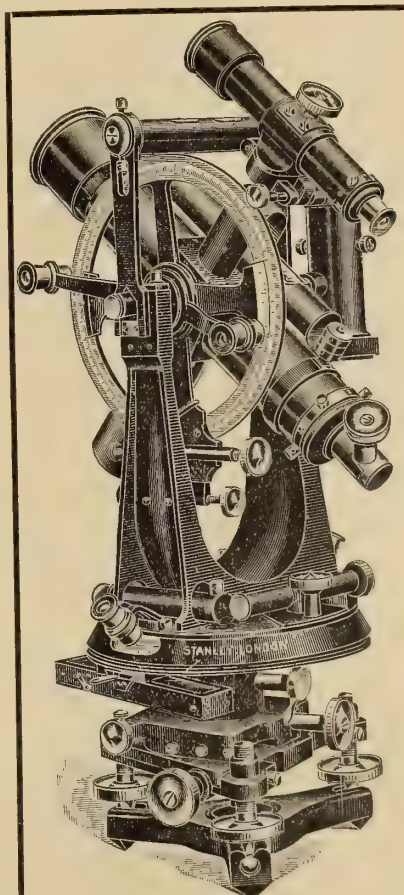


Maufacturers
Instruments of
Precision

also

Engineers and
Draftsmens
Supplies

Eugene Dietzgen
Co., Limited
TORONTO



DUNBAR-SCOTT AUXILIARY TOP AND SIDE TELESCOPE—REQUIRES NO CORRECTION FOR ECCENTRICITY

TRADE
STANLEY
MARK

W. F. STANLEY
& Co., Limited

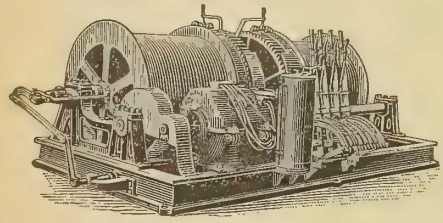
Great Turnstile,
London, ENGLAND

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.



S. Flory Mfg. Co.

ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY:
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

ARE YOU GOING HUNTING?



There are more hunting grounds reached by the Canadian Pacific Railway than by any other line in America

SINGLE FARE FOR HUNTERS

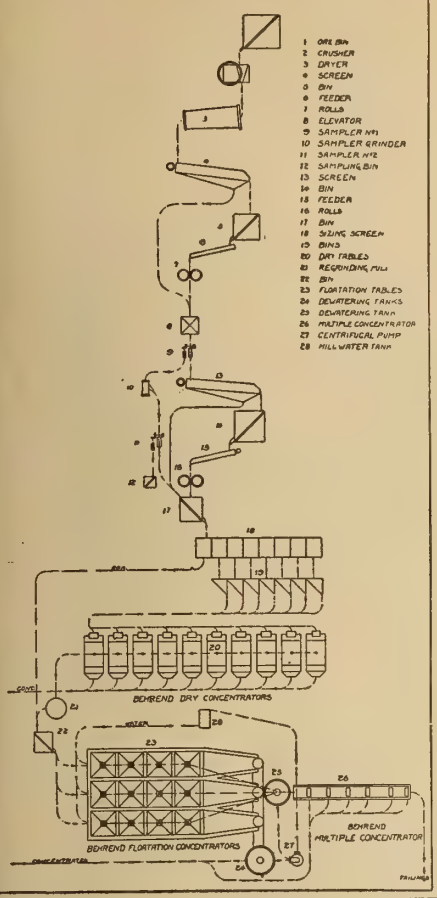
In effect October 20th to November 12th with a return limit of December 15th.

"Fishing and Shooting"
"Open Seasons—1910"
"Hints to Hunters"
"Sportsman's Map"

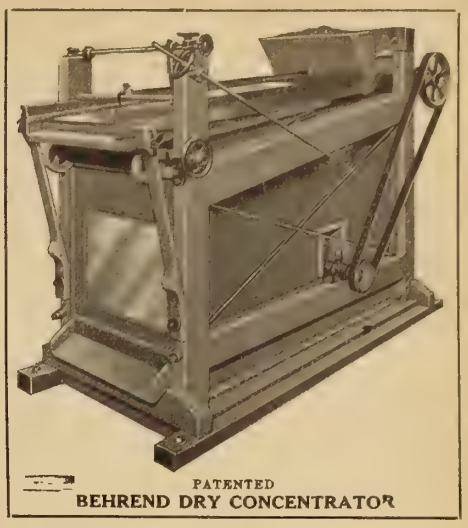
Handsomely illustrated publications of interest to Hunters. Ask any Agent of

Canadian Pacific Railway

R. L. THOMPSON, D.P.A. 67 Yonge St., Toronto



FLOW SHEET OF A MODEL PLANT FOR THE BEHREND SYSTEM OF DRY and WET CONCENTRATION



PATENTED
BEHREND DRY CONCENTRATOR

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED
32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,
108 Fulton St., New York City.

Importers of

Carbons

(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.

COAL WASHERIES

We have designed and installed the most successful plants in this country, particulars of which we will send on request.

Illustration shows "Link Belt" Coal Washing Plant recently completed for the Central Coal & Coke Co., Dunkirk, Kansas. Capacity 3,000 tons a day.



LINK-BELT COMPANY

PHILADELPHIA CHICAGO INDIANAPOLIS

NEW YORK 299 Broadway
PITTSBURGH 1501-2 Park Building
ST. LOUIS Central Natl. Bank Bldg.
SEATTLE 439-440 N.Y. Block
DENVER Lindrooth, Shubart & Co.
NEW ORLEANS Wilmot Machinery Co.
SAN FRANCISCO Eby Machinery Co.

Gas and Gasoline Power Machinery

FOR THE PROSPECT

3 to 8 H.P. Gasoline Hoists.
3 to 8 H.P. Gasoline Pumps.
3 to 8 H.P. Gasoline Engines for Driving Core Drills, etc.
6 H.P. Gasoline Air Compressors.

FOR THE MINE

Gasoline Hoists from 3 H.P. to 50 H.P.
Gasoline Pumping Outfits 3 H.P. to 50 H.P.
Gasoline or Gas Engines 3 H.P. to 500 H.P.

FOR THE MILL

The most modern up-to-date Producer Gas Outfits in any size units.
We give responsible guarantees with every plant we sell.
Our staff of highly trained engineers are at your disposal.
Write us for information regarding your power problem, and for prices.

The Canada Producer & Gas Engine Co., Ltd.

BARRIE - - ONT.

S. DYMENT, Pres.
WM. THOMPSON, Managing Director

A PROPER SAFETY LAMP

SHOULD BE SAFE, STRONG, SIMPLE AND EASY TO MANIPULATE IN THE LAMP CABIN —OURS FILLS THIS BILL.



"Hailwood's Improved Safety Lamp."

By means of Expensive Special Accurate Machinery we produce nothing but the very best possible lamp.

Don't continue risking your Mines with worn out unsafe old style lamps but possess an installation of our goods and follow the example of the majority of the best Colliery Concerns in existence by obtaining from us a complete installation of Oil Lamps, Electrically Ignited and Magnetically Unlocked together with Cabin Lamp Lighting and Unlocking Machines, Oil-filling Machines, Underground Fool Proof Lamp Re-lighting Machines.

ACKROYD & BEST, LTD.

MORLEY, NR. LEEDS, ENGLAND

For Prices and Particulars address:—

ACKROYD & BEST, LIMITED

No. 2 Arrott Power Buildings, Barker Place

PITTSBURGH, PA., U.S.A.

JENA

GLASSWARE

THE BEST IN THE WORLD

Sole Agents for Canada

LYMANS, Limited

(ESTABLISHED 1800)

Laboratory Apparatus and Chemicals

MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

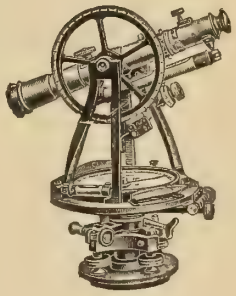
138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

REPAIRS To Surveying Instruments



WE have established in MONTREAL a **Repair Department,** fully equipped to repair surveying instruments, drawing instruments, measuring tapes, etc., in the most careful and workmanlike manner.

We employ in this department mechanics trained at our works, experienced in the repair of a wide variety of instruments of every make, and we can assure our customers that any repair work entrusted to our care will be promptly and satisfactorily executed.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

General Office and Factories, HOBOKEN, N.J.

New York Chicago St. Louis San Francisco

Mathematical and Surveying Instruments

Drawing Materials Measuring Tapes

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co., Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd- Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to
WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.
GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.
Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL, P.Q.

Beath's Steel Kegs

Beat any Shipping Package in the World. Unequalled for Shipping Concentrates, Oxides and in fact everything requiring protection in transit.

They're **Light, Cheap and Strong.**

Write for Samples and Prices

W. D. BEATH & SON, Ltd. **Toronto**

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

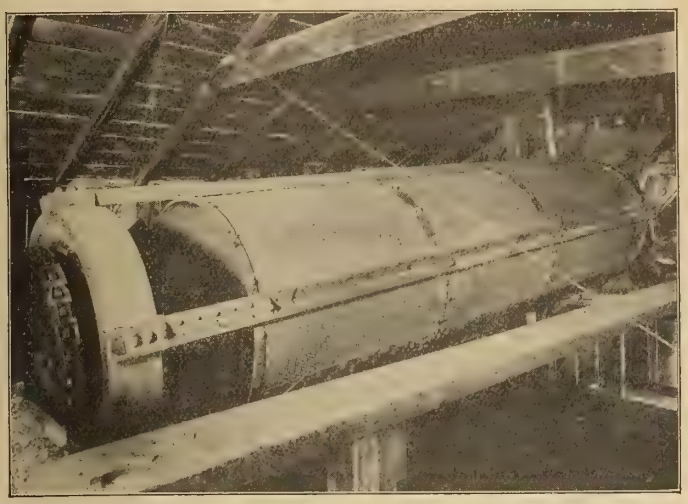
For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz:

Nova Scotia: Wm. Stairs, Son & Morrow, Limited. **New Brunswick: W. H. Thorne & Co., Limited.**
Montreal and Toronto: Drummond, McCall & Co. **Vancouver, B.C.: John Burns.** **Winnipeg: David Philip, Portage Ave.**

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.
Cables: "Ropery, Rutherglen." Codes: A. B. C. (4th and 5th Editions), A.I., Liebers and Private

Jeffrey Revolving Screens



For sizing Coal, Coke Ore, etc.

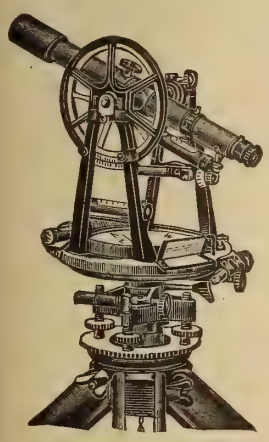
Built to meet necessary requirements, in capacities and size of product.

Send us a statement of the capacity and size product desired and we will specify the best screen for your purpose. Catalog "69" mailed upon request.

JEFFREY Electric Locomotives, Coal Cutters, and Drills. Complete Coal Mine Equipments.

The Jeffrey Manufacturing Co. Cote and Lagauchetiere ts. **Montreal**

TORONTO OFFICE, 173 King St. East,



C. L. Berger & Sons

37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES :

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.

Springhill Coal

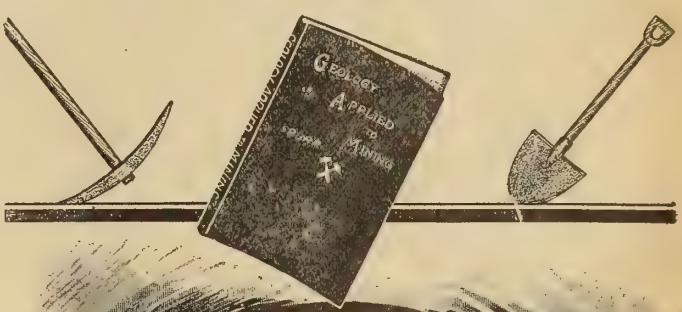
The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology* as *applied to practical mining*. It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

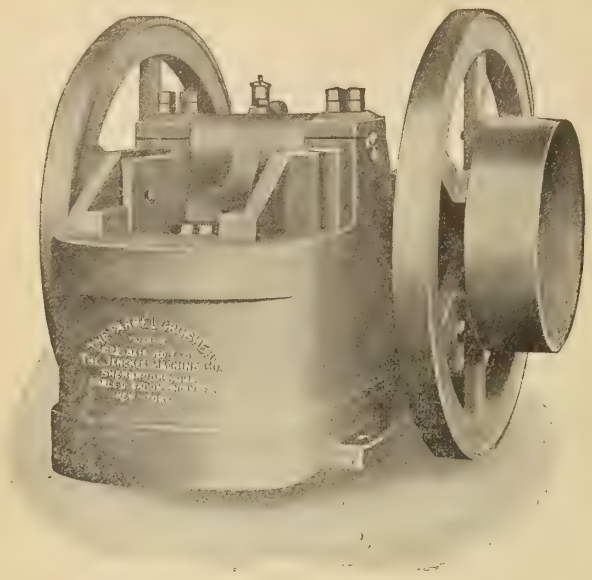
Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.

CANADIAN MINING JOURNAL

CONFEDERATION LIFE BUILDING,

TORONTO



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

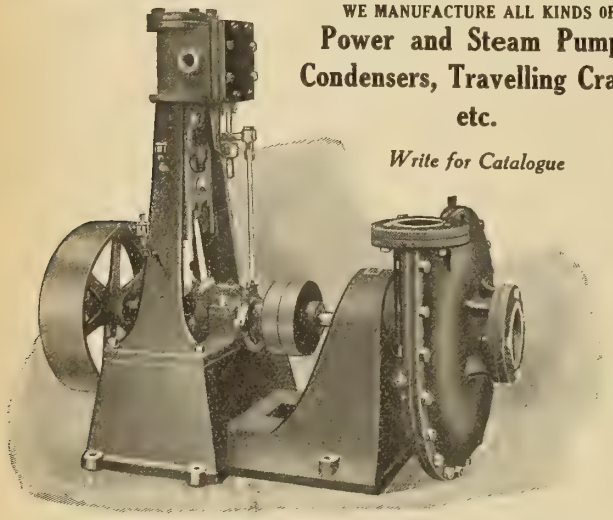
The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices :

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver

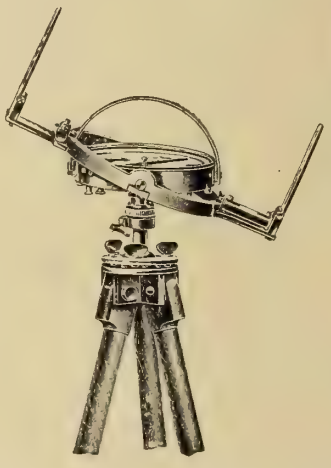


WE MANUFACTURE ALL KINDS OF

Power and Steam Pumps, Condensers, Travelling Cranes, etc.

Write for Catalogue

The Smart-Turner Machine Co., Ltd. - Hamilton, Ont.



DAVIS | DERBY.

Surveying Instruments
Transits
Hedley Dials
Levels, Clinometers
(Stock at Montreal)
Send for Catalogue

PEACOCK BROS.

68, BEAVER HALL HILL, MONTREAL.

Write for pamphlet No. 42 M.

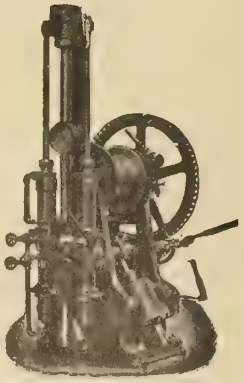
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, Dec. 1, 1910 No. 23

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc.

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3, 1879."

CONTENTS.

Editorials 709
(a) Good Books 709
(b) Asbestos 710
(c) The Hawthorne Silver and Iron Mines 710
(d) Mining Work for Students 711
(e) M. E. 711
(f) Briquetting Iron Ores 712
(g) British Columbia Coal Mine Inspection 712
(h) Photography Again 712
(i) Editorial Notes 712
Book Reviews 713
Correspondence 714
A Few Notes On Gold Production in Nova Scotia, by J. C. Murray 716
American Mining Congress 717
Contribution to the Philosophy of Shipment Sampling, by Joseph T. Mandy 718
The Premier Diamond Mine—The World's Largest Crucible, by James Cumming 723
Gold and Silver Mining and Ore Reduction—their Relation 726
Fire Protection at the Plants of the Amalgamated Asbestos Corporation 727
Mine Rescue Work in Britain 728
The Jersey Falls Gold Mining Property—Beauce County, Quebec 729
Ontario Bureau of Mines Report 731
Toronto Branch C. M. I. 731
Ore Receipts at British Columbia Smelteries 732
Personal and General 732
Special Correspondence, etc 733

GOOD BOOKS.

Bridge, auction bridge, poker, and other such devices of Satan, are as wasteful of time and energy in mining camps as elsewhere. Excessive card-playing is a misdirection of time, energy and money. It also softens the moral fibre.

Good books are the most satisfactory substitute for cards. And of good books the supply never fails.

The technical books that are turned out to-day are of high average merit. They are more carefully written, better printed, better illustrated, and are much cheaper than ever before.

A good book is stimulating. No thoughtful man can read Hoover's "Principles of Mining," or Finlay's "Cost of Mining," without profiting thereby. Surroundings and circumstances render most intensely interesting, treatises that in themselves may be arid. For instance, books dealing with metallurgical calculations may prove more exciting than an "Old Sleuth" yarn to the worker who is looking for assistance. The pleasures of recognition are of the keenest. A geological monograph may contain descriptions of rock associations that fit exactly a new district. The mine manager may find in an unpretentious volume a hint that will enable him to save the price of hundreds of books.

But it is not well to look upon books from a commercial point of view. That is best left to the publisher. The blessing of books is that they induce thought, they fertilize the mind, they soothe whilst they inspire.

Reading only books devoted to professional subjects invites mental dry-rot. Every mining man's library should be liberally sprinkled with sound, secular literature of his own choosing. The last two words are most vital. Books lose half their meaning if they are not of one's own selection. The pleasures of discovery should not be neglected.

Books gather more meaning as they mature on our shelves or in our boxes. Throughout life the reader contracts a few high literary friendships. We remember one prospector who carried a battered Keats, wrapped in silk, on all his trips. Never a night passed on which that pocket friend was not produced. Another of our bush acquaintances always puts in his pack a volume of mathematical tables and the latest text-book on certain abstruse problems. His chief delight was to test the clearness of his mental processes by tackling horribly involved mathematical questions. We doubt if the result was as beneficent as a course of Keats.

The better class of novels is not to be despised. Unfortunately few of them can be read more than once. But there are books of many kinds that are never-failing storehouses of pleasure and of profit. As pure liter-

ature alone, the Bible is supremely vivid, varied, and entrancing.

Of the poets there are Keats, Tennyson, Byron, Burns, Edgar Allan Poe, Kipling, Bret Harte, and Stephen Phillips; but few others are adaptable to the bush. Of novelists, most profitable are Smollett, Sterne, Defoe, Dickens, Charles Kingsley (and his brother, Henry Kingsley), Thackeray, George Eliot, H. G. Wells, Bernard Shaw, Maurice Hewlett, and some dozen French and American authors. But most fruitful of all is the realm of the essay. Montaigne, Sir Thomas Browne, Swift, Charles Lamb, Landor, Emerson, Macaulay, Robert Louis Stevenson, Oliver Wendell Holmes, and, in our own time, the whimsical G. K. Chesterton, can all successfully defy sleep.

Another even more entrancing field is that of biography and of autobiography. To our mind the immortal Pepy's Diary stands far above all others. And the Diary can be read at all times and seasons. It can be opened at any page with the assurance that the attention will be held. Notable among biographies are Boswell's "Johnson," Trevelyan's "Life of Macaulay," Lockhart's "Scott," and the life of Tennyson, written by his son. Besides these there are a hundred and one biographies of men who attained fame in other professions than letters. But we must not weary our readers. The world of books is infinite in variety and in scope. We have indicated our own ideas and predilections. Each of us will differ widely or otherwise from his neighbour. But to each, the wonderful temple of literature is open. And the prosaic fact that nearly every good book can be obtained in cheap and portable form, removes all obstacles. All of us will be the better off if we widen our horizon not only in technical literature, but in the general field of letters. A generous knowledge of the humanities does not tend to emasculation; it ennobles, it frees from prejudice and littleness, and it is altogether worth while.

ASBESTOS.

The principle of the "boycott," a device of Celtic origin, is not altogether bad. In its crudest form the boycott is a distressful combination of prejudice and violence. In its modern application the boycott may serve a useful purpose.

For years Canada was supreme in the production of unmanufactured asbestos. Through a combination of circumstances that supremacy is not so marked now. There is, however, one side of the present situation that should be known to every Canadian. Before touching this let us look briefly over the present status of asbestos production and asbestos manufacture.

In 1909, Canada produced 63,349 tons of asbestos, valued at $2,284,587. In the same year the Russian output was 14,654 tons, or about 23 per cent. of the Canadian production. South Africa in the same period produced more than 1,700 tons, and the United States is credited with 3,085 tons. The outputs of other countries are negligible.

As quality is a controlling element in the asbestos trade, it must be noted that the Russian asbestos is all of high grade, whilst that from South Africa, and the United States, is of lower grade. The Canadian output is reported officially at an average price of less than $40 per ton. How correct this figure is it is hard to tell. But it gives some idea of the amount of each grade sold when we learn that the prices quoted for Crude No. 1, Crude No. 2, Mill Stock No. 1, and Mill Stock No. 2, are respectively $270, $152, $53 and $25 per ton. A third grade of mill stock sells at $9.37 per ton.

It is apparent that Russia is our chief competitor and that this competition hits the most profitable end of the business. The outcome of this competition must be left to the future.

Meanwhile, it is timely to note that the manufacture of finished asbestos products is established in Canada. Heretofore, Europe and the United States have practically done all the manufacturing and Canada has been a fairly large consumer of finished products. Now Canadians have the opportunity of using Canadian-made commodities. And they should do so.

The prosperity of the asbestos industry concerns a large portion of the Province of Quebec directly. Whatever errors have been made in the financing of the chief asbestos corporation, have been sufficiently exploited. These errors, we hope, can be retrieved. The industry has a sound physical basis. The increased use of manufactured products will reflect at once upon the mining companies. And there is good reason why Canadians should call for wares made in Canada.

We can hardly expect even the most loyal Canadians to purchase asbestos goods for sentiment's sake. But we can expect them to be interested in the welfare of Canadian industries, and to give preference to Canadian manufactures.

This, we submit, is a rational and fair application of the boycott principle.

* * * * *

Before closing we wish to urge once more the desirability of encouraging in every possible channel the use of fireproof mineral products in the construction of private and public buildings. This is a matter that should be put strongly before our civic, Provincial and Federal authorities.

THE HAWTHORNE SILVER AND IRON MINES.

The career of Mr. Julian Hawthorne has been that of a literary acrobat. Some few years ago he deserted the legitimate field of letters and developed a talent for compiling lurid prospectuses. In these columns and in the columns of several of our contemporaries he has been slated with utmost severity. Yet he continues his amazing gyrations as a promoter. And, of all places in the world, he has chosen London as the scene of his latest endeavours.

Such is the extravagance of Mr. Hawthorne's methods and so complete is his disregard of fact that we must confess ourselves to be convinced that he is either a fool, a knave, or a rare combination of the two. So much for Mr. Hawthorne.

We would have commented upon the Hawthorne Silver and Iron Mines much sooner had we not had cause to believe that certain responsible persons were doing their utmost to ascertain the precise value of the Wilbur iron mine, which, by the way, is the physical backbone of the flotation. Our hand was held merely because we wished to give the project the fairest possible chance. We understood, moreover, that Mr. Hawthorne himself was to be removed from the organization. Instead of this we find Mr. Hawthorne in charge of publicity in Great Britain. We find also that his methods have drawn harsh comment from leading financial critics who, naturally, think the concern that he represents is Canadian.

What we most regret, however, is that the honoured name of Dr. Robert Bell, former acting Director of the Geological Survey of Canada, has been dragged into the matter. That Dr. Bell should consent to associate himself with Mr. Hawthorne is beyond understanding. Dr. Bell is not a mining engineer. The estimation of the extent and commercial value of ore deposits is not and never has been a part of his proper duties. His opinions on these things are of uncertain commercial value. He is an explorer—a very distinguished explorer—and a field geologist. In permitting Mr. Hawthorne to capitalize his reputation, Dr. Bell has lost sight of the duty he owes to the country and to himself. It is painful to be forced to write thus of an honoured Canadian.

. . . . . .

In fairness to those who have supplied the sinews of war to the Hawthorne Silver and Iron Mines, it may be stated that, to the best of our knowledge, they are reputable citizens of the United States. They believe that in the Wilbur iron mine they possess an asset of large value. They are at present pushing work systematically. But nothing can offset the stupidity of allowing Mr. Julian Hawthorne to spread himself in Great Britain.

By the latest prospectus we notice that the names of two prominent Canadians have been added to the directorate. These are Mr. A. Claude McDonell, M.P., and Mr. W. R. Smyth, K.C., both of Toronto. These gentlemen must realize that they are assuming large responsibilities. In the first place, their names are being used to lend colour to statements that are absurd and untrue. In the second place, they cannot escape the moral onus of all the acts of the promoters in Great Britain. Mr. Hawthorne's name smells to heaven. Both Canadian directors must do their best immediately to clear the atmosphere.

We are surprised that responsible journals in the old country, especially our contemporary, "The Mining Journal," of London, which decidedly should know better, accept without question the reading notices that Mr. Hawthorne has been circulating. It will now be their manifest duty to set their readers right.

Editor's Note.—As we are going to press we are informed that Mr. A. Claude Macdonell, M.P., has resigned from the board of directors.

MINING WORK FOR STUDENTS.

Mr. H. E. Haultain's letter in this issue of the Canadian Mining Journal should be read carefully by all who are interested in the training of the young mining engineer.

In a former editorial we suggested that the professors of mining in our various universities get together and pool the possibilities of summer employment for their students, with a view to the suitable allocation of each man.

Mr. Haultain's letter shows how things are managed at the University of Toronto. The certificate that each student must hold as a record of work performed, is well conceived. But in the letter of introduction that is given the student there is a clause to which objection can be raised. Whilst it is quite true that a student should be willing to take any job that he can get, yet we doubt the wisdom of proclaiming this fact from the housetops.

Time was when the student was considered a "pink-tea" artist, an essentially frivolous and privileged being. This idea no longer holds. Our students are men. They are able to hold their own in the bush and in the mine. There is no need of undue humility. The student needs a position in which he can learn something of professional use to him. He is to be a mining engineer and not an artisan. His chief need, apart from strictly technical requirements, is to know something about business routine, managerial administration, company organization, and promotion. In the last direction, promotion, there is opportunity for the clean professional man to establish new standards. But, as a warning, we must remark that promotion is at once the most trying, the most difficult, and the least honoured branch of honest work.

Also, it is imperative that the young mining engineer should realize that his first obligation is to become a real mining engineer. He must round out his experience, mature his judgment of men, mines, and affairs; and must seek diligently to make good in all points. And one of these points is that he become an active member of the Canadian Mining Institute.

M. E.

Our opinion has been asked as to whether a person holding the baccalaureate degrees in arts and science, and, in addition, a diploma of graduation from the leading coal mining college in Great Britain, is or is not justified in writing M.E. after his name. This is a question that is susceptible of several answers.

In the first place, the letters M.E. have specific significance. They imply that the person using them has actually had the degree conferred upon him by an educational corporation. Hence, a person not holding this

degree, no matter what his qualifications may be, is not justified in suffixing them to his name.

The degree of M.E. does not always imply that a man is a mining engineer. The raw college product has much to learn when he leaves college behind him. On the other hand, many men who have no degrees at all are sound mining engineers. The raw college product can honestly use the M.E. The experienced, but degreeless, engineer cannot use it.

We believe that the experienced mining man, provided he has actually operated mines, can fairly append the words "mining engineer" to his name. This implies that he is capable of directing mining operations. But, unless he wishes to follow the example of charlatans and imposters, he will not take liberties with the initials.

BRIQUETTING IRON ORES.

So many already opened Canadian iron ore deposits fall short of market requirements that mechanical concentration will sooner or later become an absolute necessity. The comminution and concentration of these ores implies in most cases the further step of briquetting. Finely-divided ore, fed into a modern furnace tends to cause scaffolding and to induce gas explosions; and where the furnace gases are utilized for driving gas-engines the objection to fines is more marked.

Iron ore briquettes, to withstand the vicissitudes of transportation, must be strong and compact. To suit the requirements of the blast-furnace they must be sufficiently porous and must not crumble when subjected to high temperatures. Moreover, the process should not be costly. These and other considerations are discussed in a paper read before the Iron and Steel Institute by Mr. C. De Schwarz, and reprinted on another page.

The conclusions reached by Mr. De Schwarz are interesting. He believes that a universally acceptable method of briquetting fine iron ore has not yet been invented, and probably never will be. Further, he states that present methods are commercially practicable only in special surroundings and conditions.

It would appear that the whole district of briquetting requires closer study. The applicability of any one process to a given ore does not imply that other ores can be similarly treated.

BRITISH COLUMBIA COAL MINE INSPECTION.

The British Columbia Department of Mines requires its mine inspectors to enforce its laws, particularly in regard to operation of coal mines. Lately, at Ladysmith, Vancouver Island, a special commissioner thoroughly investigated a charge brought against mine foreman David McKinnell for not having taken the steps required of him, in the discharge of his duty as foreman, to secure the removal of discovered gas in No. 3 mine, Extension colliery, owned by the Canadian Collieries, (Dunsmuir), Limited. The charge was brought by James S. Black, who made complaint that McKinnell had unfairly deprived him of his position of fire boss because he had reported the presence of inflammable gas in a working place. The commissioner, after hearing much evidence, decided that McKinnell had been guilty of gross negligence, in consequence of which he found him unfit to discharge his duties as overman, and required him to surrender his second-class certificate of competency, which was thereupon cancelled. The necessity for a strict observance of the coal mining regulations is persistently urged by the mine inspectors. An explosion took place in one of the Extension colliery mines on October 5th, 1909, and resulted in the death of 32 miners. This disaster emphasized the necessity for unremitting watchfulness in the mines there, as gas is found in them from time to time.

PHOTOGRAPHY AGAIN.

Generalizations are unsafe. In our last issue we congratulated McGill University upon establishing a course in photography. At the same time we remarked that we believed McGill to be the first Canadian educational institution to move in this direction.

We now learn that at the School of Practical Science, Toronto University, the chemistry and optics of photography have been a part of the engineering course for many years. Laboratory work and lectures on practical photography have been an integral part of all courses in engineering for at least five years and have been optional for a longer period.

Our apologies are due the School of Practical Science. May its shadow never grow less! May its negatives always be as welcome as that above, and may its proofs be as substantial! Also may it develop and fix itself even more firmly!

EDITORIAL NOTES.

The Nelson, B.C., Board of Trade is addressing itself to the question of the increasing freight rate on coal. It is claimed that the rate on coal should at least be as low as that on wheat. As a matter of fact it should be considerably lower. Wheat is hauled 1,200 miles for about $4.80 per ton. Consumers of coal at Nelson pay a rate for a 330-mile haul equivalent to the rate on wheat for about 500 miles. Moreover, flour, worth much more per ton than wheat, is hauled at the same rate as the latter. When it is remembered that coal supplies the most constant source of freight, and that wheat is only a seasonal freight, the disparity becomes more marked.

The British House of Lords is to be called upon to decide an important dispute between the De Beers diamond company and the Chartered Company of South Africa. The former company is the plaintiff. In 1892 it advanced $1,060,000 to the Chartered Company. This was paid back in 1896. It had been stipulated in 1892 that the De Beers company should be given exclusive diamond rights in Rhodesia. The Chartered Company claims that this agreement lapsed in 1896. The plaintiff

company contends that the Roman-Dutch law covers the case and that the agreement is still valid. The Rhodesian settlers bitterly oppose the De Beers people.

It is earnestly to be hoped that the Great Northern Railway will rebuild the destroyed parts of the Kaslo and Slocan Railway, which formerly connected Kaslo with Sandon, a distance of 31 miles. The mines between Kaslo and the summit of the divide at Bear Lake are urgently in need of rail connections to Kaslo. New development work on the Rambler-Cariboo has made large bodies of ore accessible. At the Washington mine work also is being done. At present ore is being hauled by sleigh to Three Forks, a station on the C.P.R. line from Sandon to Nakusp.

When low grade mining propositions (and "low grade" is a word that changes in meaning with each mineral) are discussed, it is well to remember that working a low-grade ore for a small margin of profit implies the existence of perfect office and technical staffs and the existence of sound and elastic financial reserves. These requisites cannot be created in a day—particularly the staffs.

The present vigorous condition of the zinc smelting industry in the United States is threatened by the depletion of the natural gas supply in Kansas. In that state are about 20 smelteries, embracing a total of 50,000 retorts. For at least 30,000 of these retorts, gas is employed as fuel. Not more than one-half of them can now be kept in commission, owing to the scarcity of gas. A reversion to coal-fired retorts will take at least two years.

The power problem at Porcupine is to be solved. The Porcupine Power Company, an organization backed by the Timmins-Dunlop-McMartin syndicate, along with Mr. A. M. Bilsky, has placed contracts for equipment for generating 3,000 horse-power on the Mattagami. Mr. H. D. Symmes is constructing the plant.

The amount for a four-fifths interest in the Hidden Creek mines, bonded by the Granby Consolidated, is reported to be $400,000. The mines are situated on Goose Bay in the Portland Canal district. The ore is said to average 3½ per cent. copper, and to correspond in silver and gold content to the Granby ores.

The London mining market has been disturbed by leakage of information. It appears that in certain quarters notice of new developments has been received a week or more before it reached the majority of shareholders. This has occurred in both Rand and Rhodesian companies.

A scurrilous correspondent has suggested that Sir Henry Pellatt's new title might appropriately assume the form of Baron Cobalt-Lake. We have not reproduced our correspondent's frivolous misspelling of "Baron," and we adjure our readers to refrain from guessing.

A most creditable special number is the Cobalt Daily Nugget Mining Industry Edition, issued by the Cobalt Daily Nugget. It is profusely and well illustrated, and the text has been carefully edited. It should be in the hands of all persons interested in our great silver district.

The prices obtaining for zinc blende in Joplin are better than they have been for some time. During the former half of November, carloads of 63 per cent. ore brought as high as $50.75 net per ton. Lead ores ran as high as $54.

Nowhere are the good offices of the Geological Survey appreciated more than in British Columbia. Reports on this year's work are looked for with great interest.

BOOK REVIEWS.

ROCK DRILLS—DESIGN, CONSTRUCTION, AND USE, BY EUSTACE M. WESTON, REEF LECTURER ON MINING, TRANSVAAL UNIVERSITY COLLEGE. 367 PAGES. PROFUSELY ILLUSTRATED. PRICE, $4 NET. McGRAW-HILL BOOK COMPANY, 239 WEST 39th STREET, NEW YORK, 1910.

The gaps in professional handbooks are being gradually and well filled. This latest addition to the list of practical books will be welcomed by many.

Until now, there has been no attempt to cover the whole subject of rock drills. We have needed, particularly, a comparison of English, Australian and American drills. Such a comparison is necessary to aid the engineer in his choice of machine for his special needs.

The successive subjects treated are: standard piston drills; hammer drills; electric drills; operating on surface and underground; piston drills using air exclusively; philosophy of drilling rock; repair and maintenance of rock drills; drill steel and drill bits; explosives and their use; theory of blasting with high explosives; examples of drill practice in Africa, Australia, and America; drill tests and contests; dust and its prevention; notes on the use of compressed air. It will be seen that the scope of the book is large and that the sequence is logical.

Among the most interesting incidentals in the book is the Chronological Table, transcribed from Messrs. Holman Brothers' catalogue. From this we are reminded that Friar Albert Magnus described an explosive powder in the year 1280 A.D. In 1412 gunpowder was manufactured in England. In 1613, most significant event, Martin Weigel, mining superintendent, of Frei-

berg, proposed drilling and blasting in mines. The next chronological ite mis also to the credit of Germany. In that year German miners introduced blasting to their backward English brothers. Tamping with clay is recorded in 1685. Two years later, German miners are known to have used straws filled with powder for blasting. Within two years, hardwood tubes and pasteboard cartridges supplanted the primeval straw. But the most important event in the evolution of the drill was the introduction of chisel-bit drills in 1749. This also was a Teutonic innovation.

The first recorded British improvement was the invention, in 1813, by a Cornishman named Trevithick, of a rotating boring machine which was used for quarrying limestone. In 1823, the electric spark came first into use, for firing a blast. In 1831, Beckford, of Camborne, invented the safety fuse. Cave, a Frenchman, invented a reciprocating percussion drill in 1851; and, in the same year, an American named Fowle, patented a direct action percussion drill. Shortly after this, compressed air came into general use. After the application of nitroglycerine to rock blasting in 1863, the development of explosives, detonators and drills was rapid.

As probably the evolution of the hammer drill is the most important of modern developments, it is worth while digressing here to notice Mr. Weston's estimate of the comparative merits of the piston and the hammer types. Mr. Weston points out that, unless one keeps in mind the fact that the rock drill is a commercial machine, one might be tempted to believe the modern hammer drill to be by far the superior machine. The weight of the hammer of the largest type of hammer drill is 15 pounds. The weight of piston, steel, etc., of a piston drill ranges from 60 pounds to 125 pounds. Thus, whilst the velocity of the hammer drill should be 16 times that of the piston drill to get equivalent effect, in practice it is only four times as great. In other words, a very high air pressure must be used to permit the hammer drill to compete at all with the piston drill. Mr. Weston expands the subject capably and well.

Most instructive are two chapters entitled "Examples of Rock Drill Practice," and one entitled "Rock Drill Tests and Contests." The former takes up 90 pages. They cover practice in South Africa and in America respectively. Many cost items are given. The chapter on "Rock Drill Tests and Contests" takes up South African tests largely.

Whilst Mr. Weston's book will call for additions and revisions perhaps more rapidly than books on other subjects, yet it is distinctly a book that will help the mining engineer. In its field it is unique.

MODERN ASSAYING—A CONCISE TREATISE DESCRIBING LATEST METHODS AND APPLIANCES—BY J. REGINALD SMITH EDITED BY F. W. BRAUN—80 ILLUSTRATIONS—145 PAGES—PRICE—J. B. LIPPINCOTT COMPANY, PHILADELPHIA AND LONDON. 1910.

"The art of assaying," so goes the introductory definition, "is a branch of analytical chemistry in connection with mining and metallurgy. Its object is to obtain the value of a stated quantity (usually an avoirdupois ton) by determining the value of a small representative sample." The second last word is the keynote of the whole subject.

"Modern Assaying" is what it should be, a compact, simple, well-illustrated book. The instructions are concise and exhaustive. We are glad to notice that the gas furnace is given prominence. This is usually omitted. The free-hand drawings, illustrating the operations: crushing, sampling, grinding, weighing, etc., are a decided improvement on anything we have seen. Gold, silver, gold bullion, lead, antimony, and copper methods lytic method is the only "wot" method given for coplytic method is the only "wat" method given for copper and lead (together), for the reason that it is both rapid and simple. Useful tables are appended. "Modern Assaying," whilst by no means dealing with the whole field of assaying, is sufficiently inclusive to prove a valuable addition to every mining man's library.

PRACTICAL DATA FOR THE CYANIDE PLANT—BY HERBERT A. MEGRAW — 93 PAGES — ILLUSTRATED—SOFT COVER. PRICE $2 NET. MEGRAW-HILL BOOK COMPANY, 239 WEST 39TH STREET, NEW YORK. 1910.

To help the "Man on Shift" this volume was written. Although it is confessedly a compilation, it is not without original matter. The author, Mr. Herbert A. Megraw, while claiming little originality, hopes that the book will accomplish its object in solving the everyday difficulties of the worker in cyanide. We are sure that, in many cases, it will.

The ground surveyed is as follows: crushing and grinding, the cyanide plant, slimes, precipitation, formulæ in mensuration, tables of general weights and measures, general reference tables. The section "Precipitation" is thus divided: solutions, stoichiometry, preliminary experiments on ores, trouble, data. Under these heads, the sequence of steps is well presented. Necessary chemical equations are included and explained. Under the heading "Trouble," a lot of very helpful and practical hints are given.

CORRESPONDENCE.

EMPLOYMENT FOR STUDENTS.

November 17th, 1910.

The Editor, Canadian Mining Journal, Toronto.

Sir,—In connection with your excellent suggestions in a recent editorial on the matter of work for students and young graduates in Mining Engineering, permit me to put before you the following:

A recent regulation in regard to students in the department of Mining Engineering of the University of Toronto reads as follows: "Candidates for the degree in the Department of Mining Engineering will be required to present satisfactory evidence of having had at least six months' practical experience in work connected with mining, metallurgy or geology for which they must have received regular wages. The time may be spent on geological survey, in ore dressing, smelter or lixiviation works, in an assay office in the vicinity of mining or metallurgical works, on any work in or about a mine other than as an office man or clerk, or in prospecting. Not more than three months on geological surveys will be accepted and prospecting will only be counted as two months) and must not be submitted for more than three of the six months."

The students are supplied with blank forms calling for the following:

Date.....
Name of Candidate.....
Name of Company.....
Name of Manager of Company.....
Location of Operations of Company.....
Exact nature of work engaged in by the Candidate
.....
(Only one kind of work should be mentioned here. Use a separate sheet for each kind of work.)
Name of Boss.....
Date of starting work.....
Date of quitting work.....
Number of days actually employed on this particular kind of work.....
We certify that the above is, to the best of our knowledge and belief, a true and correct statement.

.....
Boss or Time-Keeper.

.....
Candidate.

Countersigned.....
Manager.

To students making inquiries about summer work the following letter is given:

"The bearer of this is a student in Mining Engineering in this Faculty and is desirous of obtaining work during the summer. He understands that he is to get his job from the foreman and is willing to take any job that he can get. He expects no favours nor privileges as a student except this one—that if he shows a willingness in his work he may be moved about from job to job, so as to gain experience.

This letter is to be presented to the manager or the manager's representative. Will the manager kindly advise the bearer to whom to apply for the job and if no job is vacant will he kindly return this letter to the bearer."

When I graduated there was extremely little mining work going on in this country and most of the mining students sought work in the United States or elsewhere, but now the conditions are completely changed and our students apparently have no difficulty in obtaining work in Ontario, and from all the reports that I receive I find that the majority of managers and superintendents are very good to the young men in the way of giving them opportunities for experience.

My personal ideas in regard to this work are expressed in an article entitled "The Undergraduate and the Profession of Mining Engineering" read before the Engineering Society of the School of Practical Science in 1902, part of which I quote.

"In your early years there are several very unorthodox things that I would advise. In all mining work the biggest item is for labour, and there is no other item of expenditure in which money may be lost or saved to the same extent. The human machine is not only the most used, but it is the most complex, and to be a successful mining man you must understand your workman. The best place to study your workman is alongside of him. I strongly advise every young mining graduate to work as a mucker or trammer underground in some fairly large mine. To do this properly you must do it thoroughly and drop all your engineering business, and your diploma and all that, and get into dirty overalls and get your job from the foreman and sleep in the bunk-house and keep away from the office. This I know is often advised, and in Cornwall and Freiberg there are regular practical courses underground where the students play more or less seriously at work, and learn after a fashion to swing a hammer and frame a set. Candidly I don't think much of that—I do not see that such work is of very much use, and in those practical courses you don't learn anything of the men—you don't get round to their point of view. This, to my mind, is the essential point, and my advice is to get a mucker's job and hold it at least over one pay day and over several if you can. It will hurt and it will be hard, but it will be worth it.

"Again, if you have any inclination towards carpenter's work or machine fitting or any opportunity to follow up such work, I say by all means do so. I know of no better qualification for a young man seeking mining experience than a knowledge of machine fitting. There is no part of a mine free from machinery, and the fitter is wanted everywhere and gets a job more easily than any other class of skilled or semi-skilled workman, while a carpenter can often get a job on mill construction or the like that will give him an insight into construction that he could get in no other way. These are not short cuts to success or by-paths—they are stepping stones and most valuable ones at that. I would strongly advise the mining student to spend at least one of his summers in a machine shop or in a carpenter's shop. I would consider this better than a summer spent in an assay office, on survey, or in a mine."

Yours faithfully,
H. E. T. HAULTAIN,
Department of Mining Engineering,
University of Toronto,
Toronto, Ont.

PHOTOGRAPHY AT UNIVERSITY OF TORONTO.

Editor Canadian Mining Journal:
Sir,—

An editorial note in a recent issue of your Journal leads me to believe that you are not aware of the extent to which work in Photography is carried on in the Faculty of Applied Science, University of Toronto. In order to set matters right, I would be obliged if you would give publicity to the following synopsis of our work along this line.

In the first place, the department of photography makes annually a large number of lantern slides, blue prints and silver prints for the regular lectures in all courses as well as for any special lectures and papers delivered before the Engineering Society, either by students, members of the staff, or outsiders.

For the past five years instruction in photography has formed a part of the work in all branches of engineering, being given as a part of the course in light to students of the second year. The curriculum included blue printing and allied processes applied to the reproduction of tracings made by the students from their construction notes, to architectural plans, to designs, etc.; also photography in plates and films of tests and testing machinery as well as outside construction work both during and after completion. From their negatives the students have been required to make contact prints by various processes as well as enlargements and lantern slides. Lectures have also been regularly delivered on the application of photography to surveying and recording, and some good results have been obtained by students along these lines. The various processes of colour photography and some account of photo-lithography have also been taken up in the lectures.

With the development of the four years' course, the work has been separated from that in light and transferred to the third year in order that more time may be devoted to it. The curriculum has been considerably extended, mainly in the direction of increased practical work in the processes already enumerated and by the addition of colour photography and photo surveying.

Yours, etc.,
G. R. Anderson,
University of Toronto.

CONSERVATIVE.

Editor Canadian Mining Journal:

Sir,—In a very interesting, but unsigned article, "Mining—A Business," on page 686 of your last issue, reference is made to the investor's need of engaging competent advisers. As an investor in mines (some of them holding that title only to defferentiate them from other things), I agree with the writer. But I am sorry to inform you that on the two occasions on which I had to rely upon technical advice, my faith was misplaced. These dislocations of my confidence took place in Canada—one near Cobalt, and one at Larder Lake. The two technical gentlemen (holding that title to differentiate them from other things) befooled me in two distinct ways, but two very complete ways. Later I found out that both advisers were not held in very high honour in the profession. But I had no ready way of finding this out at first.

I think, Mr. Editor, that it is a Christian duty for someone to tell the investor by what birth-marks he may be able to tell the competent engineer, or even the honest one.

I may add here, for the benefit of the writer of the article, that both of my friends were described as conservative. Knowing Canada as I do, I cannot believe that this was merely a political label.

Anyway I am now a conservative investor; and I shall not become liberal until I am able to fall in with a good engineer, or follow the one that I employ to the ends of the earth. But I don't wish to encounter another "conservative" adviser.

Yours, etc.,
P. W. Hunt.

New York, Nov. 21st, 1910.

A FEW NOTES ON GOLD PRODUCTION IN NOVA SCOTIA

(Written by J. C. Murray.)

The seventeen regularly constituted gold-mining districts of Nova Scotia, along with outlying prospects, produced 908,722 ounces during the period 1862-1909, inclusive. This output resulted from the crushing of 2,031,048 tons of ore. The average yield per ton is, therefore, 0.447 ounce, or $9.24.

That both total and average yields have been higher than this is altogether probable. But this is susceptible of proof only in a general way. It is known, for instance, that gold returns were very carelessly collected and recorded until comparatively recent years. It is also known that much gold stealing has always gone on. How extensive the stealing has been is a matter of opinion and of conjecture. In any case the loss both in specimen ore and in amalgam has been considerable throughout the history of gold-mining in Nova Scotia. Also it has been practically impossible to keep track of the numerous individual tributers who have made livings from working over old dumps and deserted prospects. It is safe, in the writer's opinion, to add at least 10 per cent. to the amount of gold won.

Official returns show that in 1909, the average recovered value per ton was only $4.05 per ton of ore crushed. This average has remained about the same for some years. At first sight it would seem that the general character of the ore was deteriorating. This is not quite the truth. The average yields by districts, for the year 1909, show figures running all the way from 2 ounces 4 dwt., to 3 dwt. But the Stormont district accounts for over 72 per cent. of the ore crushed, and contributed less than 50 per cent. of the gold won. In that district 42,617 tons of ore averaged only $3 per ton. The remaining 16,441 tons of ore averaged about $8 per ton. Moreover, the mill practice in the former district was probably much closer than in the many small mills scattered round the province. As a matter of fact it is as unsound to jump to the conclusion that the general tenor of the ore is lower, as it is to conclude that it is improving. There are not enough facts.

A co-ordinate diagram of the gold-outputs of Nova Scotia is about the best guide. This shows a high peak for the year 1867, when 27,314 ounces were extracted, an average of about $16.75 per ton. Seven years later, 1874, a depression is observed, the yield being but 9,140 ounces, the average also dropping to about $13.50 per ton. A slight peak in 1877 (16,882 ounces), is followed by a depression to 10,756 ounces in 1881. There is then an almost constant ascent, until in 1889, the production reached 26,155 ounces, won from 39,160 tons of ore. A uniform decline then followed until in 1893 the output was only 14,030 ounces from 28,040 tons of ore. Again there follows a continuous rise up to the year 1898, in which 31,104 ounces were won from 86,331 tons of ore. This, by the way, is the largest annual yield on record. After fluctuating between 27,000 and 30,000 ounces for four years, the output gradually fell to its present level.

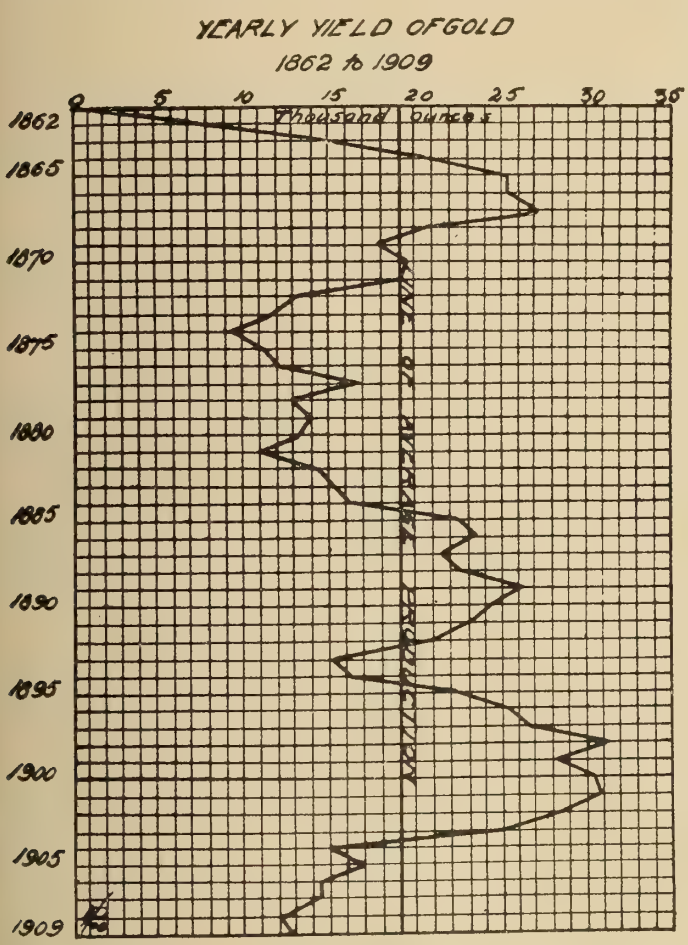
From all that can be learned the tide has just turned and Nova Scotia is about to ascend the scale again. In fact, the turn came last year. It may be noted that the first period of depression, 1867-1874, covered just the same length of time as does this last period, 1901-1908, exactly seven years. There is no need of placing mystic significance in this number "seven." But it is a recognized fact that depressions and ascensions are recurrent. It is a fact, too, that the mining investor cannot overlook in studying the question of investment.

Referring again to the average yield of the ores, up to the year 1893 the average extraction per ton was well over $10 per ton. In some years it exceeded $25 per ton. From that time on, especially in the years of largest tonnages, the yield per ton fell. It is now rising, along with the tonnage.

There are, of course, many reasons, too many to enumerate, that are advanced to account for the falling off. The best argument is careful and productive work. This is going on gradually.

Looking over the life records of the different districts, I find that Sherbrooke leads with $2,907,039 to its credit. Next comes Stormont with $2,148,008. The former district's ores averaged about $10 per ton, the latter's about $5. Waverley ranks next, $1,329,630, with average per ton of $9; then Oldham, $1,216,012, with average per ton of $23; Caribou and Moose River, $1,088,310, with average per ton of $5.50; Renfrew, $858,313, with average per ton of $16; Uniacke, $834,976, with average per ton of $14; Montagu, $797,767, with average per ton of $29; and so on through the list.

The records outlined above lead one to ask several questions: Is the mining engineer of to-day better fitted to tackle Nova Scotian gold mines than was the old operator? I believe decidedly he is. He has better training, better machinery, better financial backing, better transportation, and all the experience that has



been won before to guide him. Are the gold mines of Nova Scotia exhausted or nearly exhausted, or are the richer deposits worked out? My answer is decidedly in the negative. Why have they not been a success? The answer to this is too complicated to give here, and I would not give it in any case. There has been enough controversy already. Is there yet a good chance for investment? Yes, for investment controlled carefully and well proportioned to the operation in view. Are the possible winnings worth the attention of important investors? The answer to this is part of the formulæ of draw-poker—you must pay to find out.

Let me repeat finally that the signs point to increased production of gold in Nova Scotia. The size of this increase will depend upon the amount of money carefully invested in promising property. The increase will of course mean profit to some one. I believe that the competent mining engineer can guide the careful investor into those profits for a period longer than seven years.

American Mining Congress

The thirteenth annual session of the American Mining Congress was held in the City of Los Angeles, California, September 26th to October 1st, 1910.

Unusual interest centres in the Mining Congress this year, arising principally from its effective and successful fight for the creation of a Bureau of Mines, which was formally established on July 1st. This demonstration of ability to cope with problems affecting the mining industry has brought to the organization increased strength and influence, and the more liberal support of mining men. The Los Angeles session of the Mining Congress will probably be, in many respects, better than any so far held.

The work of the Mining Congress involves much more than the discussions at its annual sessions. An important part of its working machinery is its dozen or more committees, each of which is appointed for the investigation of some particular problem. This work is done during the time intervening between sessions.

During the past twelve months committees of the Mining Congress have been giving their attention to some questions of vital importance to the mining industry. These committees will report to the Los Angeles meeting and their reports will be submitted to the convention for its discussion and ratification.

These committees, with the name of the chairman of each, are:

General Revision of Mineral Land Laws, E. B. Kirby, St. Louis, Mo., Chairman.

Smelter Rates, Harry L. Day, Wallace, Idaho, Chairman.

Federal Legislation, John Hays Hammond, New York, N.Y., Chairman.

Mining Fraud Legislation, Thomas E. Kepner, Reno, Nev., Chairman.

Alaskan Mining Laws, Henry R. Harriman, Seattle, Wash., Chairman.

Coal Tax Insurance and Workmen's Compensation, John H. Jones, Pittsburgh, Penn., Chairman.

Standardization of Electrical Equipment—In Coal Mines, Samuel A. Taylor, Pittsburgh, Pa., Chairman; In Metal Mines, General Irving Hale, Denver, Colo., Chairman.

Trade Relations between United States and Silver Using Countries, J. Frank Watson, Portland, Ore., Chairman.

National Forest Reserves, Col. A. G. Brownlee, Denver, Colo., Chairman.

The mooted conservation question was one of the most interesting subjects to come before the convention, and one which resulted in hot debate. Mining men, particularly in the western states, are becoming aroused over the possibility of the adoption by the national congress of the legislation proposed in the Nelson conservation measures (Senate Bills Nos. 5484 and 5486 to 5492 inclusive), all of which have an important bearing upon western mining conditions.

These bills are meeting with little approval and it is expected that at the Los Angeles session the Mining Congress will determine upon a plan of actively opposing the passage of the legislation during the next session of Congress, or of working for amendments which will be more favourable to mining development.

CONTRIBUTION TO THE PHILOSOPHY OF SHIPMENT SAMPLING

By Joseph T. Mandy, E.M., Ph.D.

Modern sampling consists of two kinds

(1) Mechanical sampling

(2) Hand sampling.

In general practice, where large amounts of material are constantly handled such as at smelters, mechanical sampling, on account of the dispatch of the work, and the resulting economy therefrom is, with few exceptions, carried on. It is a well-known fact nevertheless, that two distinct and diametrically opposed schools exist to-day. The mechanical sampling squad, led by the pioneers of this method, Messrs. Brunton, have, generally speaking, their stronghold in the Western States; the hand samplers in the East. Both schools are continually at loggerheads, and at times the fight has been waged with great energy. This opposition of views has always proved a mischief-maker between eastern ore shippers and western purchasers, the shippers being the aggressors, and some very hard words have been spoken.

Although most smelters, both eastern and western, carry on the bulk of their sampling mechanically, there always comes a stage in the process when hand sampling is resorted to, perhaps for the sake of convenience, perhaps for other reasons; nevertheless the method is generally a combination of mechanical and hand. Perhaps the mechanical people claim that after a certain point has been reached (for a certain bulk) hand sampling can give better and more accurate results than machine sampling. It is, perhaps, questionable whether machine sampling is practicable after a certain point.

Boiling down the whole practice of sampling, it resolves itself simply into a matter of averages. Nobody claims that commercial sampling (by any method) is mathematically accurate; errors are bound to occur in individual samples where the greatest of care is taken. These errors can be either in favour of the purchaser or of the seller, and here the law of chance enters into play; namely, the chance is taken that these errors will average up in the long run; so that at the end of, say, a year's shipments, the likelihood is that the sum of errors in favour of the shipper will equal the sum of errors in favour of the purchaser. However, it is advisable for the interests of both parties that some method be carried out that will cut the chance of errors down to a minimum. Considering these points, it is apparent that, so far as is consistent with economical operation, the greatest pains to bring about accuracy is necessary to obtain the best results.

Too frequently in discussing errors of sampling one hears the remark, that "they will average up in the long run." This is relying too much on chance. The real significance of the science of sampling is absolutely lost, as sampling is devised to reduce the number of chances taken. To sum up the situation, the fundamental law of accuracy in sampling may be laid down thus:

"The amount of accuracy obtainable in sampling varies inversely as the chances taken." Eliminate the chance of an error, and the sampling has that chance more of being accurate.

The ideal form of sampling a shipment is taking the whole amount, smelting it, obtaining its products in commercial form and paying the shipper for same. Here, chance for error in the valuation of the lot is practically entirely eradicated. This is, of course, not practicable. Some method has therefore to be devised which will enable the purchaser and seller to place an accurate valuation on the shipment in question, before the shipment goes to the furnaces to be mixed with other materials.

A small part of each shipment is therefore usually taken out of the total as a sample. This part should therefore be representative of the value of the total. There are ways and ways of taking this small part; from the rough grab sample to the intricate methods of proportional division.

To discuss different methods would need a volume of many pages, and is not within the scope of this article.

In ore shipped in 25-30 ton carload lots, the procedure generally is to obtain about 1-25th (1 ton) of material representative of each lot, and subsequently to reduce this down to a package of 125 grams of material representing the value in the entire 25 or 30 tons. As the bulk of the sample is gradually cut down, greater care is necessary, as the effect of error increases with the decrease of bulk.

Sometimes in shipping material in lots of several carloads of fairly uniform ore, the initial reduction in bulk is brought about by taking every 2nd, 3rd, or 4th, etc., car, as a sample car, and reducing this down in the usual way, and taking the average of the results as being representative of the value of the total number.

As was stated earlier in this article, the ideal method of valuation is the delivery of the total commercial product. It naturally follows that, as this is impracticable, and as valuation has to be carried out by the valuation of a fraction of the total, the greater the number of fractions of the total that can be obtained and valued and averaged, the greater will be the accuracy of the final average. It is thus evident that each additional fraction of the whole taken for a sample is a "chance" on the side of accuracy and vice versa.

Of course it is absolutely impossible in general practice to continue sampling the lot over and over again either by hand or mechanically in order to obtain numerous fractions. It is usually not economical to go over the entire carload more than once. More than this is rarely done. The 1-25th obtained should be reasonably representative. As this smaller bulk is more easily handled, the representative amount taken out of it can be readily duplicated two or more times. This duplication, although assuring greater accuracy of the sample taken out of the 1-25th, does not increase the accuracy of the final sample on the whole lot by the same amount. It is therefore very necessary to exercise extreme care and pains in obtaining an accurate and representative 1-25th.

I.—MECHANICAL SAMPLING.

Modern mechanical mill samplers all operate by taking the whole of the ore stream for a part of the time. The old machines acted vice versa.

We will first consider the general method employed in a mechanical sampling mill, and pay particular attention to the possibilities of error.

Mill Feed.—Sampling mills can have different feeds. The material can be fed either from (1) a hopper, or (2) directly by hand (shovelling from a feed plate).

(1) Hopper Feed.—This is without doubt the best feed. The total material to be sampled, or as much of it as is deemed necessary, can be dumped into the hopper before the machinery is started up. This insures a constant flow of material to the initial machine (jaw or gyratory crusher, etc.). The flow can then be regulated to suit the capacity of the machine by means of a bar gate. This insures a more or less constant stream of ore to the first cutter (Brunton oscillating, Vezin, etc.).

(2) Hand Feed. Using this method, the material is shovelled from the feed plate into the first machine. The feed plate is fed either by shovelling directly out of the car, or as is sometimes the case with box cars, fed from wheelbarrows. It can be readily seen that such a feed is bound to be exceedingly intermittent, and unless some satisfactory device is installed between the first machine and the first cutter the feed to the latter will be very erratic and intermittent. The feed regulator or flow retarder most generally used, is the shaking table. The beneficial effect of this particular machine is open to criticism. It undoubtedly causes a separation of particles of ore, according to size and specific gravity, and is therefore liable to do more harm than good. A hand feed to a sampling mill is, however on first principles to be avoided. Few modern sampling plants are fed in this way; nevertheless, instances of it do exist.

The advantage of uniformity of sizes of particles.—A big step towards obtaining an accurate sample from the mill is the reduction of the material to as uniform a size as is possible. It is evident that the finer the material is crushed the greater will be the uniformity of size of the particles. It is, however, inconsistent with economical practice to bring about too great a reduction in size. In this the smelting end has to be considered. Furnace losses, or extra expense for briquetting, would result from too fine a material. A happy medium has therefore to be found. Whereas a smelter would object to crushing the total material to say 1-4 inch in size before taking a first cut, they will agree to two or more cutouts each preceded by a reduction in size, the final being about under. say 1-4 inch.

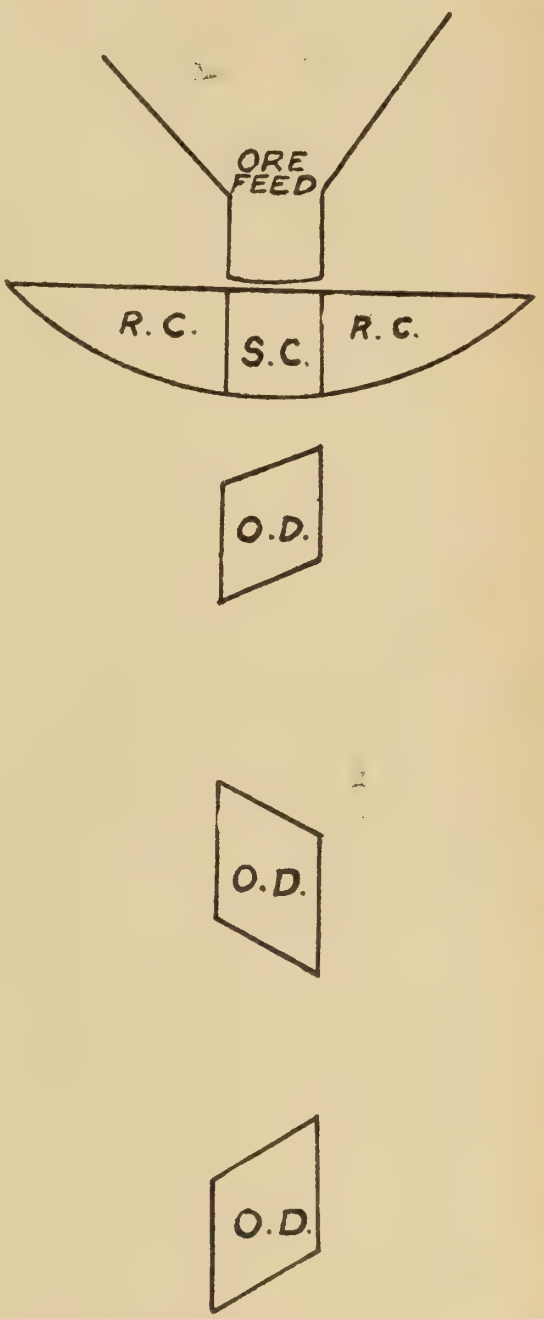
No hard and fast rule can be laid down regarding what size the material should be before the first sample cut of it is taken. This depends entirely on the character and nature of the ore. For most ores, however, a reduction to 1-inch size at least, before an initial sample cut is taken would be necessary. Very frequently 1-2 inch is essential for good work. This latter would be the case for a "spotty" class of ore like Cobalt low grade silicious material. For Cobalt high grade a much greater reduction, with removal of metallics, would be necessary.

In machine sampling the initial sample cut is generally of 1-5, taken by a Brunton oscillating or revolving Vezin sampler.

The feed spout to these machines should be either smaller than, or the same size as the sample compartment, never larger.

The accuracy of mechanical samplers is open to criticism. It is this very point that has caused so much hot feeling between the adherents of mechanical sampling and the supporters of hand sampling. Hand samplers claim that in any cutter the cutting edges have to advance far beyond the sides of the feed spout before the larger particles will enter the sample or reject compartments, during which time the larger particles are going into the wrong compartment and an undue proportion of fines into the proper compartment. The mechanical

SHOWING INTERMITTENT DELIVERY FROM AN AUTOMATIC CUTTER



R.C. Reject Compartment
S.C. Sample Compartment
O.D. Ore Delivery

FIG. 1.

people acknowledge this, but argue that as sampling is a matter of averages any way, the chances are that for the total number of swings or revolutions the sampler makes, the extra amount of fines due to this going into the reject compartments will equal the extra quantity

of fines going into the sample compartment by the right proportion and vice versa, the result being that the errors will average up, and cancel out. This may or may not be true. Again hand samplers claim that the values in a stream of ore are never the same for every section of that stream, which fact is liable to accentuate the above error. The mechanical people reply with the same theory of the chance of averages, which may be true too, but still there is a chance that it may not be so. However, the hand samplers' contention that there is a chance for selection of sizes and values to take place in the mechanical samplers generally used is undoubtedly right. Consequently they wish to remove that chance, and as they cannot devise a machine which is not liable to the same error, their only remedy is not to use any machine.

Intermittent Feed.—After the first sample cut is taken by a mechanical sampler, the most constant feed before the cut was taken is turned into an intermittent one (fig. 1). On account of the irregularity of distribution of values that is liable to occur in a stream of ore, enemies of mechanical sampling put forth the argument that a reject cutout may coincide with a high value section and so the mechanical sampler is liable to cause a selection of values. There is no doubt that this chance does exist, but there is just as much chance that the reverse will occur with the chances that for the total number of swings or revolutions the selection of high and low in reject or sample compartments, will average up and cancel out. With a very intermittent feed such as would result from a shovel fed mill, an extra chance for inaccuracy due both to selection of values and quantity is added.

These chances for inaccuracy due to intermittent feed should certainly be eradicated and no very great difficulty to overcome them is apparent. Remove the intermittent feed and a chance for inaccuracy is removed.

It is claimed that the intermittent stream of ore from the sample compartment of an automatic sampler, becomes constant after passing the set of rolls usually placed between two samplers, in order to bring about the necessary reduction in size before a second cut is taken. This is, however, not entirely the case; the rolls do tend to retard the stream, but the delivery from them to the next sampler is not much improved. The intervals between the different patches of the stream are somewhat bridged over, but the stream, although not quite so irregular, still retains the unevenness induced by the previous sampler, so that it is fed to the subsequent sampler intermittently. It is, therefore, apparent that even with a sampling mill with the best of hopper feeds, a feed regulator is very necessary after the first sampler, and before every subsequent sampler.

Another case of inaccuracy claimed by hand samplers against machine samplers is, that during the swing or revolution of the machine coarse particles of ore coming into contact with the sides of the cutting planes are liable to get knocked into the wrong compartment.

In the ordinary revolving Vezin when this does occur the coarser pieces will always get knocked out of the sample scoop into the reject. With the Brunton flip-flap (stream diverter) it is less liable to occur, whereas with the Brunton oscillating cutter the coarse particles can be thrown either into the reject or sample compartments, the error consequently having a chance to average up. Considering this point, however, it is undoubtedly bad practice to use a Vezin revolving scoop for, at any rate, material coarser than ¼ inch. Some samplers may even consider it bad practice to use this machine for any class or size of ore.

With the Brunton oscillating cutter, the elements of chance and averages again enter into play. However, although the fault outlined above does exist in the Brunton, it is certainly a point for debate whether it is possible for it to make any difference in the final sample, on account of the large quantity of the same as compared with the very small amount of material erroneously deflected. It is certain, in the majority of cases at least, that the error due to this cause will not affect the final result of the sample to the same extent as say furnace or other errors in the final commercial assay of the sample pulp.

The great point, however, in favour of machine sampling over hand sampling is the eradication of the personal element.

There is little doubt that as the above errors in mechanical sampling do exist, debate upon them may affect some improvement, which, even if it eliminates one chance for error is a step further in the direction of accuracy.

Let us consider hand sampling from the same point of view as that from which we have considered mechanical sampling.

II.—HAND SAMPLING.

In considering hand sampling one feature stands foremost as its drawback. This is the personal equation, which is ever present. This is a feature that for accurate and satisfactory sampling it is essential to eliminate absolutely, and it is chiefly responsible for the evolution of mechanical sampling. It is never advisable in sampling ore shipments to allow either a directly or indirectly interested person to handle the material in any way. Manipulation by interested parties is liable to occur even unconsciously, and apart from the actual conscious or unconscious liability for manipulation there is ever present suspicion, which is likely to cause bad feeling between shipper and purchaser. As was stated earlier in this paper, even where the bulk of the sampling is carried out by mechanical devices, there invariably comes a stage where hand sampling is resorted to.

In all commercial valuations, however, when the sampling is carried out by one of the parties interested (generally the smelter which is the purchaser) the other party invariably has his representative on the ground, and it is part of his duties to guard against this manipulation. But this precaution is not sufficient. It is clear then that when hand sampling is carried out entirely on a particular shipment of ore, the chance for manipulation is present during every operation; whereas in mechanical work it is at any rate eradicated for a part of the time. Hand samplers claim that with the class of labour employed to carry out the work, the operations practically resolve themselves into mechanical operations. This may be true during the period of breaking in a gang of men, but is offset by the imperfect way the work is carried out during this time. The men then learn the work, and in a very short time, no matter how ignorant they may be, know what they are doing and why they are doing it. Occasionally a case may occur such as was brought to the writer's notice where a man being broken in by the foreman was put to mixing a small pile of ore previous to quartering, by coning the material up six times. He had completed the third cone and was told to cone the ore up again, whereupon he threw down his shovel and looked at the foreman, saying, "Do it yourself, what do you think I am—a fool?" Thereupon he quit and complained that the foreman was imposing upon him. This incident goes to

show that a workman wants to know what he is doing. The personal equation is the Nemesis of hand sampling.

Non-Uniformity of Sizes of Particles.—The drawbacks attendant upon non-uniformity of size of particles apply in the same way to hand as to mechanical sampling. The influence of gravity, etc., on inaccurate work is perhaps more accentuated in hand sampling as will be shown later. It is an absolute impossibility to bring about even an approximate uniformity of size by any known method.

Frequently in hand sampling a reduction in bulk is brought about by fractional shovelling before any reduction in size of material is introduced; this cannot be too forcibly condemned. Again, an imperfect mixture is ever present in the ore, and the whole bulk of the shipment represented by patches of different values. Where a mixture is attempted it is carried on either by ridging or coning, both of which, instead of mixing the material bring about a concentration of certain particles and consequently of values, due to the segregation of sizes which invariably occurs in these operations; all this despite the much higher cost of the work.

Fractional Shovelling.—This is generally used to bring about a reduction in bulk, either from the ore as located for shipment, or from a pseudo-mixture in a large cone. or from ridges. Every fourth or fifth, etc., shovelful is laid to one side for a sample, the remainder being rejected. The sample is then supposed to represent 25 per cent. or 20 per cent., etc., of the total. It will be acknowledged that this is an extremely raw and unscientific method. In the first place the size of the shovelful is liable to vary very considerably. In fact it is the experience of the writer that the tendency is for the last shovelful of material taken (the sample shovel to be the smallest. In four shovel sampling, for instance, a workman may reject three large shovelfulls and take one smaller for a sample. Even if these all came from a patch of material of uniform value, the percentage represented in the sample is wrong. Although the reverse may even occur, the error is still present. At its best, if large and small sample shovelfuls alternate, the chance for error is ever present. Again, as the portion of the pile from which a sample shovelful is taken is entirely at the discretion of the workman, considerable room for unscrupulous and prejudiced manipulation is present.

Coning and Quartering.—This is the old Cornish method of reducing bulk, and where carried out accurately in absolute fairness and without prejudice can be productive of good results.

Even considering this, however, the chances for errors, both physical and personal, are very great. The operations consist in piling up the ore into a cone, then drawing this out into a cake and dividing it into four equal quarters. Two opposite quarters are then taken and treated in the same way, until the desired reduction in bulk is obtained. A series of this reduction in bulk generally precedes a reduction in size by rolls or other machine which is followed by another reduction in bulk, etc.

The coning is supposed to bring about a thorough mixture of the ore which, as will be shown later, is not the case. To produce a fairly true cone, the following two rules have to be strictly adhered to:

(1) Drop the material on the cone, do not throw it.

(2) Drop the material exactly on the apex.

If these are not strictly observed ,the axis of the cone will invariably be thrown, resulting in a very inaccurate quartering.

For really good work in coning the breadth of each charge dropped should not be any greater than the diameter of the apex. This tends to distribute the material evenly around the periphery. When it is larger it falls on the sides, and is not distributed around the periphery.

Segregation of Sizes of Particles on a Cone.—The most common operation in hand sampling ore is the coning and quartering of the material. It is also usually carried out to reduce the bulk of the sample from the mechanical mill. This method is generally looked upon as fairly safe. The possibilities and chances for errors are, however, great, and as these operations are generally carried out on a reduced bulk of the total shipment, the possible errors are such that their effect can be far reaching, and cause an absolutely inaccurate final result. The common contention that the coning of a pile of ore causes a mixture of the material is a fallacy. In reality the effect of coning is to cause a concentration due to the segregation of particles.

Some samplers think that because the fines collect around the axis of the cone, and that when the cone is drawn into a cake and quartered, if the axis of the cone has been thrown, the cone will fall into one quarter which will consequently contain an undue amount of fines. That this contention is wrong is shown by the following data of experiments carried out by the writer. The experiments also show what the real action taking place in coning is, and its effect on the accuracy of the final result of the sample.

DATA SHOWING

SEGREGATION OF DIFFERENT SIZED ORE PARTICLES IN A CONE

WEIGHTS AND PERCENTAGES OF SIZES IN EXPERIMENTAL SAMPLE

12 MESH OVERSIZE	11,926 GMS	35 594 %
16 MESH OVERSIZE	7219 GMS	20 335 %
16 MESH UNDERSIZE	6355 GMS	40 070 %
TOTAL	35,500 GMS	99 999 %

TABLE SHOWING SEGREGATION IN FOUR SECTIONS OF A CONE

	SECTION	SIZE	WEIGHT GMS	PERCENT	PERCENTAGE OF TOTAL AMOUNT OF EACH SIZE IN EACH SECTION	PERCENTAGE OF SIZE DISTRIBUTION IN "CLOAK"	VARIATION OF SIZES IN "CLOAK" FROM TRUE DISTRIBUTION	VARIATION OF SIZES IN "CORE" FROM TRUE DISTRIBUTION
CLOAK	APEX	12 M O	263	19 395	2 205			
	A	16 M O	193	14 380	2 701			
		16 M U	898	66 224	5 491			
	B	12 M O	917	23 185	7 690	22 690	-10 904	
		16 M O	647	16 359	8 962	16 924	- 3 411	
		16 M U	2391	60 455	14 619	60 385	+14 315	
	C	12 M O	2271	22 944	19 042			
		16 M O	1732	17 498	23 992			
		16 M U	5895	59 557	36 044			
CORE	D	12 M O	8475	41 757	71 063			+ 8 173
		16 M O	4645	22 891	64 344			+ 2 556
	BASE	16 M U	7171	35 341	43 846			-10 729

A sample of ore was taken containing known weights of 12 mesh oversize, 16 mesh oversize, and 16 mesh undersize. This material had all passed a ¼-inch screen. The material was very carefully coned up. The cone was then divided into four sections, as shown in Fig. 2, and screen tests run on each section. The results are shown in the accompanying table, and a very evident segregation of size varying in each section is apparent.

It will be noted that the concentration of coarse particles (12 mesh) of ore increases from the apex of the cone to its base. The ratio of this increase also grows in the same direction. The concentration of this size is more accentuated in the bottom section (base section D), which will be the "core" of the resulting "cake."

The concentration of medium size (16 mesh oversize) also increases in the same direction as that of the 12 mesh oversize. The ratio of concentration also grows in the same direction. In this case, however, the concentration is not so accentuated. With the finer particles (16 mesh undersize down to dust) the concentration is the reverse of the coarser ore; the same going from the base to the apex. The ratio of the increase between the base section (D) and the three higher up being very marked. In the sections A, B, and C there is 14.315 per cent. too much of this material, and in section D 10.724 per cent. too little.

From the above it can evidently be deduced that the ratio of concentration of coarse ore from apex to base increases as the size of the ore particles.

In the base 1-4, D, of the cone there is too much coarse and too little fines; in the upper 3-4 there is too much fines and too little coarse.

Now, in drawing out the cone into a cake the base section, D, of the same, practically remains intact, and becomes what has been termed the "core" of the "cake"; the three upper sections, A, B, and C, being distributed fairly evenly around and above it, forming what we will term the "cloak"; the percentage of each size in the "cloak" must therefore be reckoned to the total weight of the same (Fig. 3).

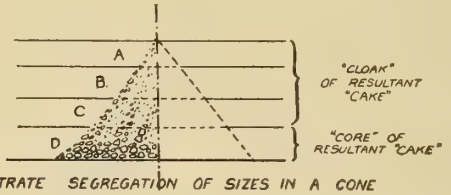


FIG 2. TO ILLUSTRATE SEGREGATION OF SIZES IN A CONE

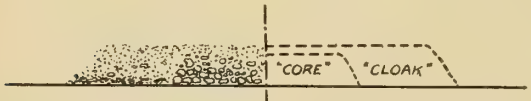


FIG 3. SHOWING PERSISTANCE OF SEGREGATION IN RESULTANT CAKE

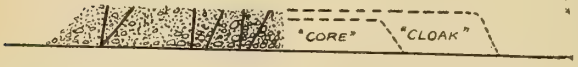


FIG 4. SHOWING DIP SAMPLE SECTIONS AND CONSEQUENT ERROR DUE TO "CORE" AND "CLOAK"

It is thus evident that the "cloak" contains an excess of 14.315 per cent. 16 mesh undersize, a deficiency of 3.411 per cent. 16-mesh oversize, and a deficiency of 10.904 12 mesh oversize.

The danger of the possible effect of error due to this cause on ores in which the highest values are restricted either to the coarse or fine particles cannot be too greatly appreciated.

In quartering the resulting cake, if the quarters are not marked off absolutely accurately, it can be seen that the correct proportionate distribution of coarse and fines will not be represented in the individual quarters.

In building a cone by shovelling, it can be clearly noticed how this segregation does not take place for the first two or three shovelfuls—that is, until the cone has assumed its definite shape, and the angle of slope remains constant. The point at which this takes place is generally higher than the final thickness of the cake, so that the segregated fines around the axis are then distributed fairly evenly on a plane parallel to the base of the cone when same is flattened into a cake.

In drawing out a cone into a cake. a slight segregation of particles also takes place, when the material is drawn to the periphery of the cake and the larger particles roll down the sides to the base.

Sometimes dip samples are taken from the surface of a cake, after marking the same off into squares, when a sample is taken out of each square. That this cannot be too vehemently condemned is evident.

Also frequently in taking moisture samples, the material is coned up and then flattened out into a cake, and the sample taken from the surface of the same. Such a sample will always show an increase over the actual moisture, on account of too great a proportion of fines (coming from the "cloak") being taken (Fig 4).

CONCLUSION.

From the above comparative analysis of hand and mechanical sampling, it is the writer's opinion that in all fairness it should be readily acknowledged that the odds in favour of accurate work are overwhelmingly on the side of the mechanical mill—this, even regardless of the personal equation in hand work. The chances for error are very much less, as also are the effects of the possible errors.

With the conversion of the intermittent feed in a modern mechanical mill to a constant one, by the installation of a suitable machine, the results of the process will be greatly improved. There is also no reason why the bulk reduction of the final mill sample, say 1-25 or 1-125, should not, in every case, be carried out mechanically by using, say, the Jones Riffle, which is entirely superior to the Cornish coning and quartering. In this way the personal element will be reduced to a minimum, and the greatest chances for error will be eradicated. The Jones Riffle can be installed in combination with automatic feeders and the whole process thus remain a continuous one.

With these two improvements, the two main imperfections of the modern mechanical sampling mill using the Brunton machines will be removed, and the results will leave little to be desired.

On August 1st, the Journal published some information relative to the intention of the government of British Columbia to bring into operation legislation requiring the establishment of mine-rescue stations at coal mines in the province, and the decision to equip three government stations as well. Mention was also made of the fact that the government had ordered three complete sets of Draeger apparatus for its own stations. It is pleasing to now learn that about the middle of October the chief inspector of mines for British Columbia, accompanied by the deputy minister of mines, proceeded to Crow's Nest Pass district to establish there the first of the government stations. The two others, to be established on Vancouver Island, will have attention as soon after the work at Hosmer, Crow's Nest Pass, shall be completed, as shall be practicable. It has been stated that the coalfield in the Nicola Valley district will be similarly provided with mine-rescue apparatus and facilities for its use in case of need. It is plainly evident, therefore, that the government of British Columbia is in earnest in its determination to leave nothing undone that is within its power to require shall be done towards protecting the lives of the miners employed in the coal mines of the province.

During the last fiscal year the Dominion Government paid $340,542 in bounties on lead.

THE PREMIER DIAMOND MINE—THE WORLD'S LARGEST CRUCIBLE

Written for the Canadian Mining Journal by
James Cumming.

The Premier Diamond Mine may be styled the Ninth Wonder of the World. It has to be seen to be appreciated. Its actual discovery is disputed by a Mr. Williams, who avers he made the then owner of the Prinsloo Farm aware of his discovering diamonds as far back as 1898, and is at present engaged in a gigantic law suit against the Transvaal Government and the Premier Diamond Company to recover a quarter of a million sterling for so doing. But the historical discoverer is put down as Sir Tom. M. (then Mr.) Cullinan.



View of Village showing Nos. 2, 3 and 4 Gears in the distance

The date of the discovery is mentioned as November, 1902.

The area of the mine is equal to 3,482 claims each of 900 Cape square feet. The English measurement reads 3,344,500 square feet or about 78 acres. Each claim measures 30 by 31 feet.

Possessed of a permit obtained from the secretary at the Johannesburg office, I proceeded by rail, via Pretoria, and alighted, after an interesting journey, at the up-to-date station called Cullinan, named after the discoverer, and situated 25 miles east of Pretoria.

The mine is adjacent to the town, and is surrounded by a double row of barbed wire fencing with several closely guarded entrances and exits. The fences are about ten feet high, separated one from the other by fifty feet, along which armed guards patrol.

When one enters by the main gate where he presents his permit, and signs his name and address, he is within easy distance of the mine. A very few steps bring you to the edge of the crater, and as you look at the busy hive beneath, one gets dizzy at the moving scene viewed from the giddy height.

The mine is being worked in levels or terraces, each 50 feet in depth. Before one level of this area is stripped another level is half done, and so the work of digging out the big hole will go on until a depth of 1,200 feet will have been reached, at which depth some other method of extraction will have to be devised as it may not be possible to continue the system of open working below that depth with safety to those employed. It will take forty to fifty years to reach the 1,200 foot level at the present rate of output of 22,000 to 24,000 tons of rock per day of 24 hours.

Bore holes have penetrated the magma to a depth of nearly 1,100 feet with satisfactory results, so much so that Mr. F. G. S. Wells, the works manager, who guided me through the mine and plant, and who is, by the way, the finder of the famous Cullinan diamond, declared that the mine would be alive and working when every person living to-day in Africa would be dead.



View of Mine from Kopje at back of Native Hospital (looking west). Showing Mine Workings, Nos. 2, 3 and 4 Gears and No 2 Compound and Fences.

The physical features of the pipe area vary greatly in character. The soil is red owing to the presence of iron dissolved out of the neighbouring diorites. Beneath the sub-soil, and for a distance of 50 feet, the colour is yellow because of decomposition, and below the water level the true "blue" ground is reached and so continues downward.

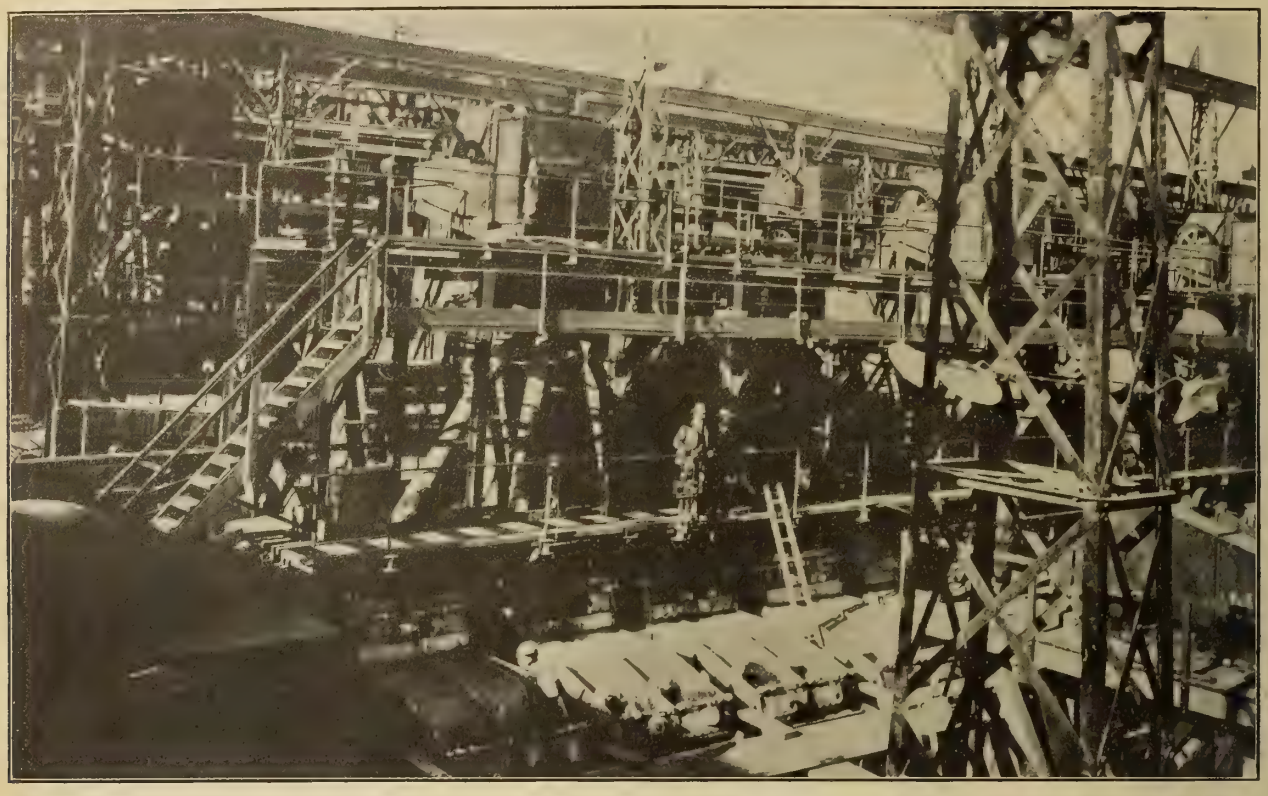
The "blue" ground also varies in colour, showing more carbon where it is blackish, sulphur where yellowish, and predominating in iron where reddish.

In the centre of the area are two great dikes which look like miniature Bass rocks in a firth of diamondiferous magma. These divide the two mines which are nearly round in shape. They are composed of indurated sandstones and quartzites and are gradually being removed.

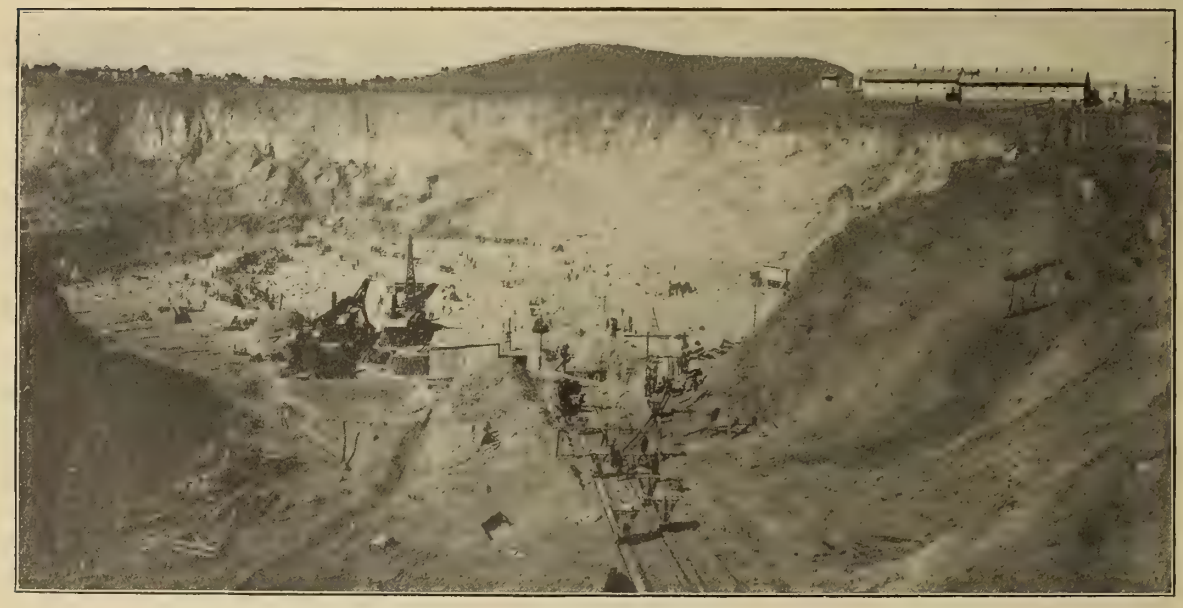
Three sets of endless haulage gear with a continuous stream of trucks—each of one ton capacity—are in constant operation between the mine and the crushing, washing, and sorting machinery. These gears never cease working unless through accidents.

Workmen are always in the mine, one shift relieving the other, and so the work goes on. Six thousand natives are attacking the faces in the different levels of the two areas at one time, while others attend to the ever-moving long double lines of trucks, one line full, one empty, as they travel to and from the machinery. The loading up is done as the trucks pass along the faces of the open cuttings, which expedites the work.

The system of quarrying the rock is unique. The usual process of a jumper and a striking hammer is not in evidence. Two boys handle a long length of 7-8-inch octagonal steel. They lift and let it fall alternately much in the same manner as a steam jumper drilling machine does. By this means two boys bore several



No. 4 Gear Pulsator-Plant, 2nd T eatment. Back view.



View of No. 1 Mine, showing Native Hospital in the distance and endless haulage gear.

three feet holes each shift of 10 1-2 hours. At the end of every shift the blasting is done. One ton of dynamite is used every shift, at a cost of £100.

When blasting is about to be commenced every soul is warned to clear out of the danger zone. To see the boys scurrying to a place of safety is a sight never to be forgotten. Others are less cautious. They become callous and indifferent to danger by daily experience and get underneath piles of old sacks raised high enough for them to crawl under, and there they remain during the disintegration of the diamond bearing rock and in this way escape the showers of falling debris. Strange to say very few accidents occur.

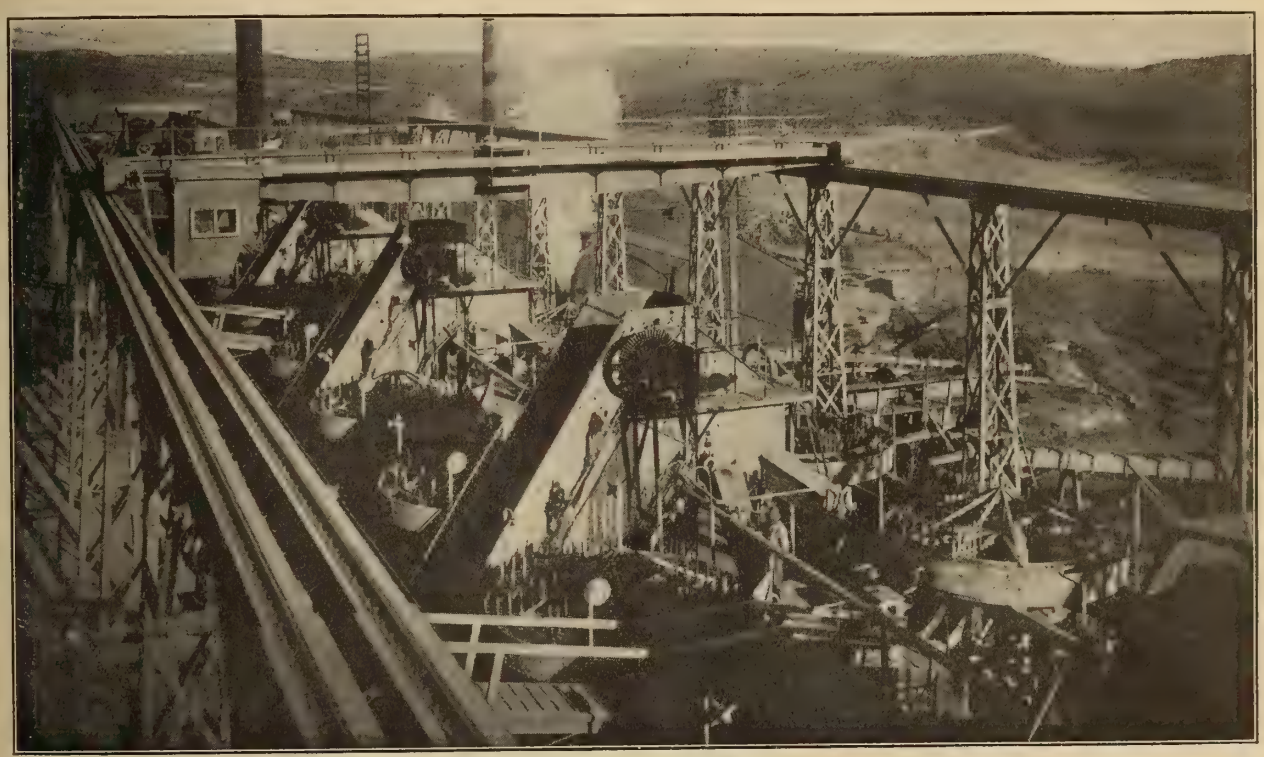
The only thing that suffers is the electric lighting plant which is installed round every working face. To obviate this, and save the expense of constant repairs, four strong search lights are under construction. They are being built on the edge of the rim of the pipe. By this light at night the workmen will see as well as in daylight.

then scraped off, placed in a cauldron, boiled, and run off. Then the diamondiferous matter is again washed and is now ready for the sorting tables.

The Premier mine became famous because of its enormous pipe. It can put all the other mines of Kimberley easily into its area and have space to spare. It added to its reputation when the Cullinan diamond, of world-wide fame, was unearthed. This stone was presented to His Majesty, King Edward VII. The stone originally weighed 3,032 carats, and, after it was cut into three magnificent diamonds, now takes a foremost place among the Crown jewels of the British Empire. Recently another beautiful stone was discovered weighing 191 carats and valued at £16,000.

The mine is owned by the Transvaal Government and the Premier Diamond Company, the first named having six-tenths and the second named four-tenths of the whole concern.

The asset to the Government is a large and profitable one. Its share of profit for the year 1909 reached £438,-



No 3 Washing Plant (portion) taken from No. 3 Bridge. Boiler House and Engine Rooms in background.

Needless to say the sorting and washing machinery is colossal. It would need to be, for up to the 31st October, 1909, 27,508,044 loads of ground had been treated, from which diamonds weighing 8,435,208 carats had been recovered to the value of £7,790,000.

The ore is automatically tipped—the trucks never stopping—into Comet crushers which pulverize to pieces of three inches. These pieces pass on to rotating washers and sets of corrugated rollers and then to pans where the washing process still further reduces the stuff into pulp and separates the diamondiferous rock from the waste. The first named goes on to pulsating gear of a complex character running down and brought up again by an endless system of pipes and small dredging buckets respectively until it passes over a series of jigging tables on which the diamonds are held fast by an eccentric motion as they pass over a fatty substance smeared thickly on the pulsating plates. The grease is

811 out of diamonds realizing altogether £1,454,917.

No less than 13,000 natives, and 800 Europeans are employed on the mine. The town of Cullinan is maintained by them. They run their own stores on the co-operative system, also hotel, chemist shop, and other auxiliary stores incidental to any town.

Sir Tom M. Cullinan is the chairman of the co-operative stores. To his efforts the mine, stores and town owe their existence.

Sir Thomas is also the chairman of the company and enjoys the fullest confidence of the Union Government.

Late reports from Broken Hill South Blocks are to the effect that during October the ore milled assayed 16.1 per cent. lead, 2.48 ounces silver, and 9.51 per cent. zinc. The cost of mine development was 3s. 1.96d. per ton; of ore extraction, 7s. 5.03d. per ton; of ore treatment, 5s. 1.75d. per ton; and general expenses, 1s. 1d. per ton. Total working costs, 16s. 9.74d. per ton.

GOLD AND SILVER MINING AND ORE REDUCTION—THEIR RELATION

(Written for The Canadian Mining Journal.)

Gold and silver are known as the noble metals, and since time immemorial have attracted the miner on account of their beauty and their power to resist oxidation. But it is only in recent times that such advances have been made in the treatment of rebellious and low grade ores of these two metals that they are attracting the attention of mining investors throughout the world.

Gold and silver have many features in common in connection with their treatment. The modern hydrometallurgical processes are closely similar. We shall consider these two metals from the standpoint of the miner, and also from that of the metallurgist, and try to show the relation existing between the two principal departments involved in their production. For this purpose it is well to consider the advances made in gold and silver metallurgy, and their relation to investment.

Mining and metallurgy, like all other fields of human endeavour, are constantly and rapidly undergoing change. Perhaps the industrial evolution that we observe on all sides of us is nowhere so well illustrated as in the metallurgy of these two metals.

We have seen in the brief space of a few years hand-feeders discarded for the machine, and we observe the tendency to make not only modern reduction plants automatic in a mechanical sense, but we are now experiencing what may be termed an automatic chemical advance.

In the United States and Mexico, operators are still to some extent unappreciative of the relation existing between milling, concentrating, and subsequent chemical treatment. We have not yet fully developed and moulded into one these three separate manipulations. Australia and Africa have demonstrated this to be necessary to good practice. Before we reach the efficiency of African, Australian and New Zealand methods, we must recognize that metallurgy depends upon all steps and operations from the time the ore leaves the shaft or tunnel, until the tailings are on the dump, and metal marketed. The requirements for this are a sound and wide knowledge of chemicals, mechanics, and physics.

The mill man, the concentrator man, and the cyanide man, as individual units of a mine staff, will gradually disappear. They will be replaced by the real metallurgist. It is by moulding all individual manipulations into a series of operations so well balanced that they become a simple scheme, that we must look for the true advance in the metallurgy of gold and silver from now on.

Great strides have recently taken place in mechanical separation instead of hydraulic classification, and we have reason to congratulate ourselves on the perfection of ore dressing plants, preliminary to, and after rock breaking, and on the sure and steady progress that is made in all departments of crushing and grinding machinery, and their arrangement. We can look, with a good deal of satisfaction, to modern methods of mechanical sampling and automatic weighing. Great perfection has been attained in all kinds of concentrating machines and appliances, and we are now beginning to know something really valuable about slime concentration. We have now the continuous agitator, and the many forms of filter press. Probably we most miss a cheap, simple, and effective slime dewaterer.

While generally there is a splendid effort being made to make new plants continuous of operation in their mechanical and chemical parts, we are still confronted with the problem of imitation. This, however, is gradually disappearing with intelligent investigation. America is unquestionably developing a practice in part distinctly its own, and there is no question that when fully evolved, it will be both efficient and inexpensive. The backward state of wet metallurgy in recent times, in both the United States and Canada, has, no doubt, been due to high efficiency of the many and convenient smelteries throughout the country. Had it not been for this fact, mine owners would have been compelled long ago to have kept fully up with the best wet metallurgical practice of other mining countries. Mines have been operated, and are still being operated to some extent in divisions, and it is only by full acquaintance with all branches of the business that these will gradually be eliminated, and uniformity, a merging of one department with the other, established. This requires that the metallurgist should be familiar with mining operations, and that the mining engineer should have a metallurgical training, as the mining and treatment of ores are interdependent upon incidental mine equipment. But as the metallurgist is forced to have a knowledge of this equipment, so also is the mining engineer compelled to have a similar knowledge, and thus we find no line of real separation.

A well-established relation between mining and metallurgy is as essential for a proper ore mixture in the dressing process, as it is in smelting operations. Subsequent treatment in its later details is affected by the character of this mixture. There is clearly a close relation between the ore reserves in a mine, and the capacity of the reduction plant. It is essential that the knowledge of the constructing metallurgist should be such that he may be in a position to check and verify these reserves. A far more important relation between mining and metallurgy is that of the life of the plant to the mine. This is clearly of vital importance, and demands that a plant should be erected with a full consideration and sense of the prospective possibilities of the unblocked ore possibilities of the mine. A determining factor is found in the interfering minerals encountered in the different parts of the mine workings. A good miner will watch this matter carefully in order that their influence on the treatment does not embarrass those who are responsible for ore reduction.

Metallurgy may be defined as the art of extracting metals from their ores, and preparing them for the use of the manufacturer. It will therefore be seen that there is no plant or part of the equipment upon the surface, that is not directly or indirectly concerned with the reduction of the ore. It should also be understood that this surface equipment is undoubtedly connected in many respects with the mine equipment. Therefore the cost relationship between mining and metallurgy is the most important relationship of all, because it is upon the proper method of cost keeping and distribution of charges that we are enabled to effect improvements and guide the whole operation of a mining proposition. It will thus be seen that it is impossible at any stage to separate entirely the question of costs in one depart-

ment from its bearing on the cost of some other department.

Again, there is a close relationship between mining and metallurgy on the operating sheets that are used to direct and control the dynamics of the hydro-metallurgical department. While we can benefit by the experience and experiments of other countries, we can only use them as a basis of our own work. Both mining and metallurgy are exact operations, and within the limits of our knowledge few mistakes are made by competent men. But we must realize that a sound knowledge and a thorough training are necessary to the solution of any problem. If an individual undertook to make shoes, it is hardly likely that he would begin the process of manufacture until he had obtained men competent to make shoes. Why, therefore, should those incompetent to mine and treat ores undertake the extraction and reduction of these metals? This matter is clearly one for experts. Imitation has never wholly solved any problem, and never will. We must eliminate imitation from our practice and our business methods, and only take what, in the judgment of men trained thoroughly the business of mining, is thought to be suitable for the problem in hand. It must be realized that every mine, no matter where situated, has its local conditions, and its local requirements, and therefore it is only by skill that these requirements can successfully be met. Every metallurgical problem is distinct and depends on the individual ore, and its particular chemical and physical constituents. While the general design and mode of operation of any one reduction works may be to all appearances similar to the mill adjoining, the operating metallurgist will have to use his brains to solve the little local requirements inside the mill in his daily manipulation.

We have arrived at a stage in the history of gold and silver mining where no failures should be recorded on a given payable ore body through operation. We have machinery together with our knowledge and control of the forces of mechanics and physics to assist the miner. We have arrived at a state of mine equipment that would astound the forty-niner, and we are triumphantly marching to a metallurgical goal that even five years ago was not contemplated. We are at present evolving the continuous treatment process, and few at the present time realize what this means for the future. An ideal process would be that which could treat ore without men, and without supplies. We have not eliminated all the men yet, but they have been reduced over 50 per cent. in this last seven years, and supplies have been correspondingly diminished. There is no doubt that the metallurgical chemist will succeed in wonderfully reducing the present consumption of material.

In a brief review of this kind it is impossible to allude specifically to the splendid work that has been done in the various modifications of the cyanide process, and to enumerate and describe the different machines and appliances that have been brought together to effect this evolution. But the time is not far distant when we shall begin to realize that this evolution of the mining and metallurgical industry of our time as applied to gold and silver will in itself become revolutionary.

It is estimated that 40,000,000 tons of iron were carried through the Soo Canal during the past season.

The Newfoundland Oilfields, Limited, has contracted for the sale of its total output. Two new complete drilling outfits have recently been delivered on the ground.

Fire Protection at the Plants of the Amalgamated Asbestos Corporation

One would naturally expect the plants of the largest asbestos concern in the world to be well guarded against fire risks. This is certainly true of the Amalgamated plants at Black Lake and Thetford Mines. From Fire Inspectors' reports the following notes are compiled. It will be seen that the buildings at all the mines are in excellent condition. Every reasonable precaution has been taken to provide against their destruction by fire.

Dominion Mines, Black Lake.—This plant consists of one main mill building with adjacent warehouse and dryers, the latter buildings separated from the mill by about 100 feet of space. The dryers are well installed in a separate building, are of modern design, and have good overhead clearance, with flues thimbled through roof. The electric heaters are installed in the main building with safe surroundings. There are individual motors on all machines, supplied with current derived from high-tension circuit and step-down to 2,200 volts. Wiring and appurtenances are all of standard design and carefully arranged and installed. Premises are clean. The dust collectors all vent into monitor on roof.

For active fire-fighting, there is one double hydrant on the town main. It is of 6-inch size and is situated near office. Nine hundred feet of good cotton jacketted hose is kept on hand. Numerous 3-gallon chemical extinguishers, water casks, and pails are distributed throughout all buildings. The plant depends on the fire brigade of the Standard Mines for fighting fires.

The one-storey dryer building is provided with a metal roof. The walls are asbestos sheathed. The floor is of cement.

Standard Mines, Black Lake.—The plant consists of one main building, which includes the mill, machine shop, dryers, and crushers; and one detached building containing the boilers. No serious defects exist in the installation of electrical plant. The crushers, dryers, heaters, and lights are well arranged as regards hazards. Premises are clean and well cared for

For fire protection there is one hydrant near the Dominion Mill. A fire department of ten men is always ready for duty. There are numerous 3-gallon chemical extinguishers, water barrels, and pails.

The protection here has lately been improved by the installation of two new hydrants that command both mills. The few changes recommended by the Inspector have been carried out.

British Canadian Plant, Black Lake.—The large mill here consists of nine connected main buildings, one of which is four storeys high. All have metal roofs and are of open finished frame joisted construction. Fire protection is described as being ample.

Electric power is used. The equipment is of the highest grade and is well installed. The main power rooms are enclosed in asbestos-sheathed partitions and are practically dust-proof. The switches and starting boxes have excellent surroundings. Risks are carefully guarded. One stove in Shed No. 21 was complained of, as also was a pile of cordwood near the dryers. Both these items were attended to promptly.

The fire protection consists of a new pump driven by electricity. It has a capacity of 500 gallons per minute, supplying a 3½-inch line. The line is supported on the dump trestle. There are take-offs at the machine

shop and dryer buildings. The latter connection is provided with 200 feet of 2½-inch hose. There also are two yard hydrants on the town main, one near the office and one adjoining the machine shop, each provided with 500 feet of good 2½-inch cotton-jacketted hose. All buildings are equipped with numerous water casks, pails, and Badger Chemical Extinguishers of 3-gallon size. The latter are all new and recently charged.

The plant is patrolled hourly by a watchman who punches a ten-station portable watch clock. There are no external exposures except railroad running west of the plant.

King's Plant, Thetford Mines.—There are here two separate mills. They are both open finished frame of very heavy construction where necessary. The sub-station is of brick. Buildings vary from one to five storeys in height, have composition roofs, and are fairly clean and in good condition, though No. 1 Mill is crowded.

Hazards are few. The electrical installation is excellent. The only boilers in use are for the hoisting engines. Heating is effected by means of steam coils. Premises on the whole are well cared for.

For fire protection a large electrical pump having a capacity of 3,000,000 gallons per 24 hours, is situated in a pump house near the river. This supplies all yard hydrants and vertical pipes in the mills. There are two vertical pipes in No. 1 Mill and one in No. 2 Mill. To each is attached 50 feet of 2½-inch cotton-jacketted hose at every floor. There are also two completely fitted hose wagons, each provided with 500 feet of 2 1-2 inch jacketted hose with full equipment of lanterns, spanners, nozzles, etc. There is also one truck with five ladders.

All the apparatus is manned by volunteers who are paid for time consumed in drilling. The department is under a chief and one assistant. It numbers 35 men. Weekly drills are held.

The full quota of water casks, pails, and chemical extinguishers is kept on hand.

Two watchmen make hourly rounds, controlled by two Eco 6-station clocks.

The town depends upon the equipments of the mills for its own protection from fire.

Beaver Plant, Thetford Mines.—This fair-sized mill occupies one large main building and several small adjacent and outlying buildings. Except the dryer house, the buildings are all one to four storeys high. They are of heavy mill construction with factory floors. All have open-finished frame walls and composition and shingle roofs.

The plant is roomy, clean, and in good condition. The new dryer building is fireproof. Hazards are few. Steam heat is used when necessary. Electrical equipment is thoroughly well installed. Sweepings, shavings, refuse, etc., are well taken care of throughout the plant.

A Snow fire pump, size 10 by 16 by 12, draws from a 15,000-gallon cistern, which is fed by two electrical pit pumps and by city mains. The pump is housed in a separate building. There are two stand pipes in the mill and one in the boiler house. Each has connection on every floor, provided with 50 feet of 2½-inch hose. There are three yard hydrants supplied with town water. These hydrants are 3-way, having 2½-inch and 4-inch outlets. The plant is supplied with hose reel carrying 300 feet of hose. Many chemical extinguishers, water pails, and sand pails are distributed throughout the buildings. The town fire department responds to fire signal.

One watchman makes hourly rounds, controlled by a 12-Station Eco portable clock.

The Inspector found no defects in this plant from a fire protection point of view.

The annual saving in insurance rates effected by this careful control of risks must be considerable. Apart, however, from this positive saving, the care exercised points to the fact that the spirit of efficiency marks the plants of the Amalgamated.

Mine Rescue Work in Britain

(Written for the Canadian Mining Journal.)

Rescue work in mines in England and Scotland is now long past the experimental stage, and properly equipped rescue stations have become a part of the normal equipment of the British coal-fields. There are now nine such stations either in operation or nearing completion. In Yorkshire, which was the pioneer county in rescue work, there are three stations; namely, Altofts Colliery near Normanton, Tankersley and Wath. The Altofts station was the first erected in Europe; the Tankersley station was the first erected in Great Britain. In Lancashire the Howe Bridge station has been in operation since October, 1908. In the Midlands a rescue station has been erected near Mansfield, but is not yet in full working order. In Wales there are two stations, namely that at Aberaman, which serves the Cardiff district, and one at Crumlin in Monmouthshire. A large and modern station is almost completed at Elswick, Newcastle-on-Tyne. This station is supported by the coal owners of Northumberland and Durham in conjunction with the firm of Armstrong, Whitworth & Company. There is only one station in Scotland, namely, that at Cowdenbeath, which serves the counties of Fife and Clackmannan. Although, as will be seen from the foregoing, great progress has been made in the provision of rescue stations, there yet remain a number of counties unprovided for. There are no stations in the coal fields of Staffordshire and Warwickshire, in the Swansea coal field in South Wales, nor in the West of Scotland or North Wales. Meetings of the coal owners have been held in most of these unprovided districts and committees appointed to take up the question of rescue stations, but so far no definite progress has been made.

All the British stations are provided with smoke galleries for the training of men in the use of the apparatus. A typical gallery is that at the new station at Wath in Yorkshire. This gallery forms three sides of a square surrounding the paved yard of the station; the walls are of brick provided with doors having spring catches easily opened from the inside, and with observation windows through which the men under training can be watched. The floor of the gallery is filled up with shale and stone from the mine and supplied with all the necessary material for building stoppings and the ordinary mine timbering, together with pit tubs and rails. Contracted and tortuous passageways are provided to imitate the conditions of travelling which might be expected to exist in a mine after an explosion. The gallery can be filled with a dense smoke, which can be made as malodorous as the superintendent of the station wishes. The temperature of the air and its humidity can both be varied, an important feature, as it has been found in actual rescue work that the humidity of the mine air tells very quickly upon the endurance of men wearing breathing apparatus. It will be remembered that one of the rescue corps at the Hamstead fire

succumbed to heat apoplexy. The men under training work in this smoke, wearing the apparatus and doing, as far as possible, the same arduous work that would be expected of them if they were actually occupied at rescue work in the mine.

The instructor at the British stations is generally a retired non-commissioned officer from the army, not necessarily acquainted with coal mines. His work is to keep the register of attendance and proficiency, and see that everything is in readiness and in good order as far as the pit mouth,—beyond that his duties do not extend, as the trained corps naturally place themselves under the direction of the mine manager wherever and whenever their services are required. These ex-non-commissioned officers have proved themselves very suitable and efficient, as it is necessary for the proper working of these stations that a certain amount of military discipline be observed.

The stations are usually situated near a railway station—that at Wath, for instance, being within five minutes' walk of three stations all serving colliery districts. At the Elswick station, a motor is to be provided for the brigade and the apparatus, but at most stations it is not necessary to keep a motor specially for the use of the station as this mode of conveyance is now so common that no difficulty is experienced in getting a car quickly.

Following upon the Mines Accident (Rescue and Aid) Act, 1910, the Home Secretary has appointed a committee to consider the organization of rescue and aid in cases of accidents in mines. The personnel of this committee has been well received by the mining profession in Britain, and it may be expected that satisfactory regulations will shortly be framed by them.

The combination of rescue work with instruction in first aid and ambulance classes is gradually becoming more and more pronounced. In reference to this the "Colliery Guardian" remarks: "There has been too great a disposition to give prominence to the breathing appliances at the expense of other factors which enter into this question. What is necessary is so to organize the staff at every colliery that they may be able to render the most effective aid in the event of an accident occurring, whether it be an explosion or a fall of roof. It is probable that the appliances will be of service only on special occasions—the fewer the better—but hardly a week passes in which there is no work for what may be called the 'Medical Service Corps' of the Colliery." This is a point of view which cannot be too strongly urged. The usefulness of even the slightest knowledge of first-aid work in the case of accident underground can only be estimated by those whose daily work brings them in contact with such things. A great deal of unnecessary suffering, and many lives also, could be saved if more interest were taken by underground workers in ambulance instruction. It seems more than probable that the rescue station as it is known to-day will eventually evolve into an institution that will be a combination of a fire station, having provision both for underground and overground fires, an emergency hospital, and a place for the training of men, who, to use the happy phrase of the "Colliery Guardian", may be called the "Medical Service Corps" of the colliery.

Comparing Canadian conditions with those in Britain, it may also be said that, while considerable progress has been made in mine rescue work in Canada, a great deal still remains to be done. It is pleasing to note that the British Columbia Government has taken up the matter and that several stations are being fitted up in that province. In Nova Scotia there are the stations of the Nova Scotia Steel & Coal Company and the Dominion Coal Company. At least one of the mainland coal companies of Nova Scotia, it is understood, has in contemplation the provision of a station. A joint station for the counties of Cumberland and Pictou was mooted some two or three years ago, but, so far, nothing has been done.

Up to the present time there has been no great enthusiasm shown in Canada in connection with first-aid or ambulance instruction. A branch of the Order of St. John of Jerusalem has been in existence in Montreal for several years, but nothing like the interest that is shown in this work in the coal fields of Durham and Yorkshire, and which is, also, at the present time, being taken up enthusiastically in Pennsylvania—has as yet been manifested in Canadian mines. During the last two winters, ambulance instruction has been given in the Cape Breton coal fields by the colliery doctors. The success of this enterprise was hindered by the disturbed labour conditions that existed for some time, but it is hoped that the ensuing winter will see a revival of such an extremely necessary and laudable work.

The Jersey Falls Gold Mining Property—Beauce County Quebec

Abstract of an Old Report.

Had the facilities for creating a mining boom been as complete half a century ago as they are now, I have reasonable belief that the roar of stamp-mills would be heard in eastern Quebec. There are many old inhabitants, indeed, who can remember the time stamps did drop in the Chaudiere Valley. Within the last thirty years, two or three small mills were in commission. But it is only during the past twelve months that active interest has been aroused. It is a curious fact that capital created and put in circulation by the new fields of Northern Ontario, is now being directed eastward towards the almost forgotten goldfields of old Quebec.

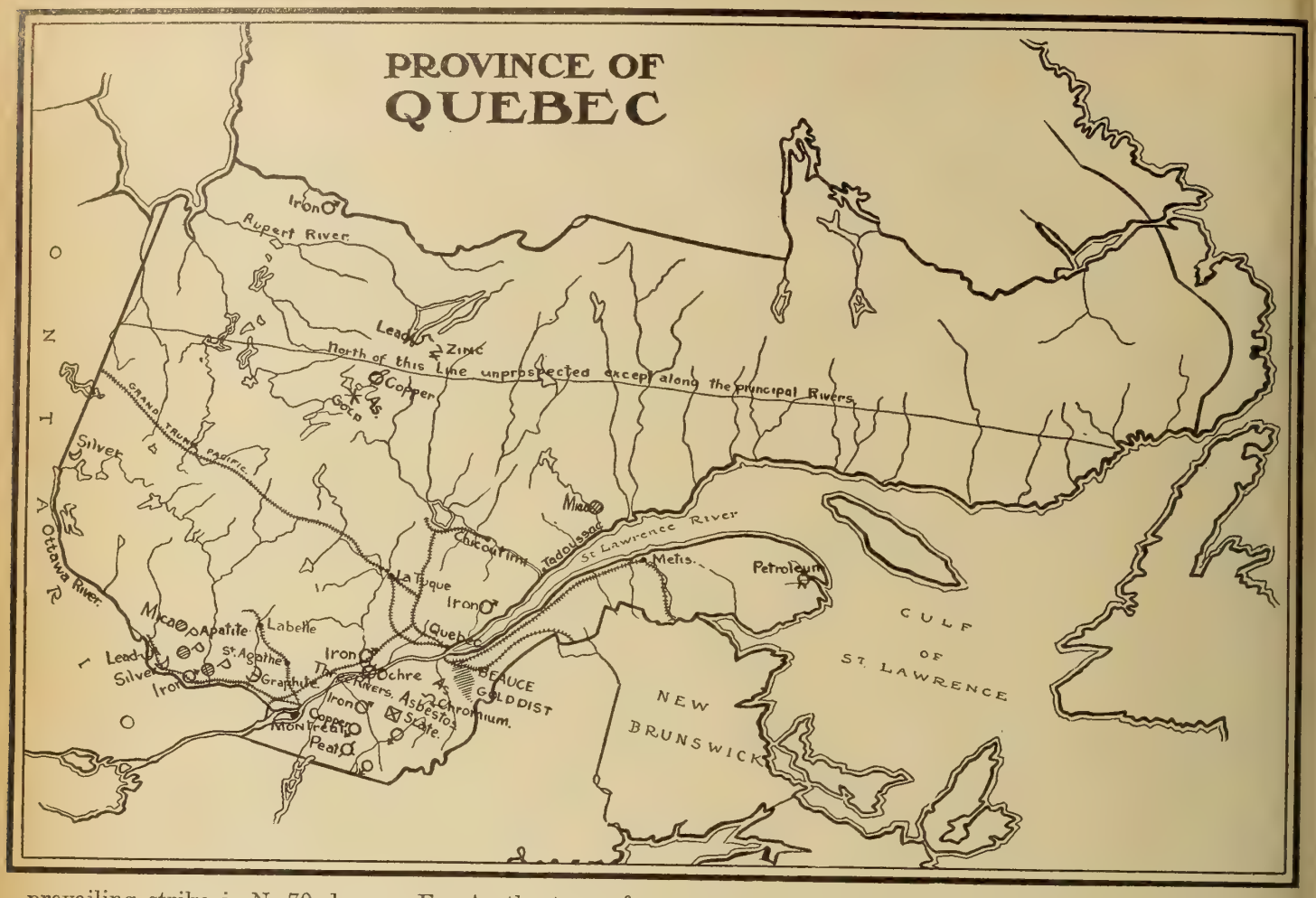
In view of this latter fact, I have put together a few notes from a report written in 1867 by Professor Henry Y. Hind. This report, printed in Boston, comprises Professor Hind's opinion of the Jersey Falls Gold Mining Property, several maps, and a list of assays made by Dr. A. A. Hayes, state assayer for Massachusetts.

The report is addressed to Mr. J. N. Maynard, and covers a tract of 2,300 acres on the Chaudiere River, in the Townships of Jersey and Shenley, County of Beauce. Within the boundaries of this tract are the Grand and Lower Falls and a series of rapids above the Grand Falls. Thus there was, in Professor Hind's opinion, ample power for all future purposes.

The Stafford stream, only about fifteen feet wide, with a total fall of 215 feet, within a mile from its mouth, joins the Chaudiere on the Jersey side, after intersecting several hundred acres of the property. The Chaudiere, at summer level, is 120 feet wide, and has an average depth of 18 inches.

The rocks, belonging to the upper members of the Upper Silurian series, are clay slates interstratified with sandstones. The prevailing dip is S. 20 degrees E. at angles varying from 65 to 85 degrees.

The interbedded strata are folded in a series of great curves, with a general northwesterly inclination. The



prevailing strike is N. 70 degrees E. As the tops of these folds have been denuded, the dips are almost always to the southeast. A belt of disturbed strata, about 780 feet wide, runs with the stratification. This belt was thrown into a series of folds before the general folding referred to above.

A series of faults or dislocations, having a general course, nearly at right angles to the stratification, show sometimes considerable downfall, and contain quartz veins.

The Veins.

The veins are of two kinds. Dr. Hind describes them as the Strike Veins (interbedded), and the True Veins (fissure) in the faults.

The Strike Veins run with the stratification, are of varying thickness, and are continuous. They range from a few inches to several feet in thickness. Their depth does not exceed 1,200 feet. In cases they are shallower. They occur in groups, and there are more than ninety on the property. They resemble in structure the gold-bearing veins of Nova Scotia. Essentially segregated, they have derived their minerals from the surrounding rocks by aqueous action. Among the minerals are galena, pyrrhotite, pyrite, zinc blende, and occasional traces of copper. With the quartz are small quantities of calcite, gypsum, and chlorite. Visible gold was not detected, but the existence of angular particles of the metal in nearby alluvions points to the veins as having been the original source.

Outside of the disturbed belt, the strike veins are perfectly regular between the dislocations.

The Faults.

Six faults, in each of which is a quartz vein, have been discovered. These may be of great depth. Where considerable downfall has occurred, the vein sometimes expands to many feet in thickness. The fault veins contain much more calcite than do the strike veins, and at intersection points of the two systems important metalliferous deposits may be looked for.

The Alluvions.

The order in which the alluvions occur is as follows:

1. Surface drift, with boulders of northern origin.

2. Stratified marine estuary deposits upwards of 100 feet thick, containing 25 to 35 feet of gold-bearing gravels below a belt of stratified blue clay 40 feet thick, and overlying,

3. Glacial drifts, consisting of very compact unstratified blue clay, holding boulders of northern origin, reposing on the country rock.

4. Modern river alluvions derived from Nos. 1, 2 and 3, and from the country rock.

Nos. 1 and 4 are gold-bearing, and require special notice.

The Modern River Alluvions.

These occupy the beds and banks of the River Chaudiere. Dr. Hind asserts that they are important and will amply repay working. He instances a case where, in 1851, a property within 3 miles of the Jersey Falls estate, yielded $4,323 from one acre. The "Long Tom" washing process was used. The working profit was $1,-366. Thus the gold won was $1.33 per cubic yard, at a cost of 90 cents.

In the light of modern conditions the figures next quoted by Dr. Hind are interesting. Taking Californian practice, he estimates a miner's wages at $4.00 per day. Then the comparative cost of handling a cubic yard of gravel is as follows:

I.—With the Pan	$20.00
II.—With the Rocker	5.00
III.—With the Long Tom	1.00
IV.—With the Hydraulic Process	0.20

Adapting these figures to Quebec (then, of course, Canada East), he notes that current wages are $1.00 a day, whilst, parenthetically, he informs us that 80 cents was the current wage in August, 1867. Thus the Californian figures become:

I.—With the Pan	$5.00
II.—With the Rocker	1.25
III.—With the Long Tom	.25
IV.—With the Hydraulic Process	.05

From these figures, Dr. Hind feels encouraged to conclude that modern methods would recover $400,000 from the river alluvions on the Jersey Falls estate, at a cost of $62,200. His estimate is based upon the assumption that the Jersey alluvions are as rich as those in the Du Loup.

The Marine Estuary Alluvions.

These alluvions assume the form of cliffs on the Shenley side about 100 feet in height. They consist of eleven feet of barren gravels, underlaid by forty feet of sterile stratified blue clay, which rests on about thirty feet of gold-bearing gravels. These in turn overlie a rich auriferous bed of blue clay, or a rich surface of glacial drift.

The greater part of the gold, so Dr. Hind believed, has accumulated on the surface of the blue clay. Where the blue clay is absent the gold has accumulated on the glacial drift.

An average gold content of ten to twelve cents per cubic yard would pay, according to Dr. Hind's contemporary estimate. Ample water was available. He, therefore recommended strongly the exploitation of the gravels.

Samples of quartz assayed by Dr. A. A. Hayes and by S. Dana Hayes gave results ranging from $11.79 of gold per ton up to $19.79. In one case a sample showed 16 ounces of silver per ton, along with $13.47 in gold. These samples were taken from five veins.

ONTARIO BUREAU OF MINES REPORT.

Returns to the Bureau of Mines show that the output of the metalliferous mines and works of Ontario for the nine months ending September 30th, 1910, was as follows:—

	Quantity.	Value.
Gold, ounces	1,390	$ 28,729
Silver, ounces	19,791,033	9,792,669
Cobalt (paid for) tons of 2,000 pounds	275	44,884
Copper, tons of 2,000 pounds	7,168	1,022,436
Nickel, "	13,905	2,989,651
Iron Ore "	120,358	273,906
Iron Pyrites "	16,454	44,690
Pig Iron "	319,698	5,039,626
Steel "	245,566	5,830,896
Zinc Ore "	700	5,760

Shipments from silver mines aggregated 23,824 tons, of which 19,191 tons were of ore and 4,633 tons of concentrates. The former averaged 768 ounces of silver to the ton and the latter 990 ounces. Gowganda, with six shippers, contributed 402 tons of ore, containing 334,210 ounces of silver. Elk Lake contributed 17 tons of ore, South Lorrain 9, and the Lake Superior district a small production, the remainder being from Cobalt proper. The output of metallic silver from the mines of the Cobalt camp is increasing, being 468,887 ounces for the nine months. During the period 7,069 tons of ore (containing nearly 50 per cent. of the total silver yield) were treated by the silver reduction works at Thorold, Trout Mills, Copper Cliff and Deloro.

The production for the corresponding period of 1909 was 18,751,549 ounces of silver, valued at $9,385,600.

The gold production shows a considerable increase, the greater portion being from the new Porcupine camp. For the corresponding period in 1909 the production was 1,125 ounces valued at $18,926, while this year the return shows 1,390 ounces, valued at $28,729.

The nickel-copper mines of Sudbury turned out 13,905 tons of nickel, and 7,168 tons of copper, as compared with 8,912 tons of the former and 5,587 tons of the latter for the same period in 1909, showing an increase of 56 per cent. and 28 per cent., respectively.

The production of pig iron as compared with the first nine months of 1909, shows a considerable increase, the figures being 319,698 tons, having a value of $5.039,626, as against 294,698 tons valued at $4,095,735 last year.

TORONTO BRANCH, C.M.I.

The second meeting of the Toronto Branch of the Canadian Mining Institute was held at McConkey's Restaurant, at 1 p.m., Saturday, Nov. 19th. Twenty-five members were present. Mr. H. E. T. Haultain occupied the chair. Professor W. Nicol, of Kingston School of Mining, was the guest of the day. After luncheon had been attended to, Professor Nicol spoke briefly and appropriately. He glanced over the progress of mining in Ontario, referring particularly to Cobalt, Porcupine, and Hastings County; and alluded to the present healthy condition of the mining industry.

The meeting then became informal. A discussion on the bearing of reciprocity on mining was led by Mr. J. J. Harpell. It was decided to make this a subject of debate at the regular meeting on December 17th, when Mr. Harpell will read a short paper.

Mr. Eugene Coste and Col. A. M. Hay emphasized the importance of a Dominion Mineral Act. Col. Hay urged strongly the need of a Royal Commission to study the mining legislation of all important countries with a view to consolidating the Dominion Acts and all the provincial Acts on the best possible basis.

Mr. Coste urged immediate action to be followed later by the appointment of a Royal Commission. A definite Act is needed now.

Dr. W. G. Miller advised action on the part of the Canadian Mining Institute. The subject is to be taken up more fully at the next meeting, December 3rd.

PEBBLES FOR TUBE MILLS.

Flint pebbles for tube mills, cement grinding and granite polishing come from the Orkneys, Greenland, Denmark, and largely from France. In the granite polishing trade the use of pebbles has been superseded by toughened shot and saws, and on the Rand by the use of the pebbles in the banket. The French deposits cover a distance of over a hundred miles on the beaches between Havre and St. Valery-sur-Somme. These pebbles are extremely hard, and occur in the cretaceous chalk formations. They are shipped in large quantities to Australia, New Zealand and America.

Gold pannings can be collected with a small globule of clean mercury, which can be transferred to a small bottle. Foreign matter can be removed by passing the globule from one cup to another. It can then be dissolved in nitric acid and the gold residue left as powder. The residue is then ignited and weighed.

Ore Receipts at British Columbia Smelteries

The total quantity of ore received at the several smelteries operating in the Kootenay and Boundary districts of British Columbia during nine months to October 1st, 1910, compares favourably with that for the corresponding periods of 1909 and 1908, respectively. The tonnage figures for the different smelteries and periods are as under:

Smeltery.	For nine months ending Sept. 30, 1908.	1909.	1910.
Consolidated, Trail	227,997	302,353	351,413
Granby, Grand Forks ...	786,852	728,447	871,255
B. C. Copper, Greenwood	224,203	203,065	279,785
Le Roi, Northport	59,631	9,301	.....
Total	1,298,683	1,243,166	1,502,451

These figures, which have been taken from the statements of ore receipts printed in the Nelson Daily News, show that the total for the nine months lately expired is approximately 260,000 tons higher than that for the corresponding period of 1909, and 204,000 tons higher than for 1908. Whether or not a proportionate rate of increase will be maintained to the end of the current year, is uncertain, but it is probable it will be, notwithstanding that the output of two or three mines that in other years were important producers is likely to be less for the closing three months of this year than in the two other years under notice. The suggestion that proportionate tonnage figures will be maintained is based on the fact that several mines not shippers in other years are among this year's producers.

It should be kept in mind that the foregoing figures do not exhibit the total production of ore for the whole province, but only the tonnage of ore sent to the smelteries mentioned. In addition, there is the ore that has been put through stamp mills or concentrators in East and West Kootenay—roughly 170,000 to 180,000 tons—and that from mines in the Similkameen and Coast districts. It would, therefore, appear to be quite reasonable to place the total tonnage of ore produced by the metalliferous mines of the province during the nine expired months of 1910 at between 1,700,000 and 1,750,000 tons.

It is on official record that the gross tonnage of ore mined in British Columbia in 1908 was 2,083,000 tons, and in 1909, 2,057,000 tons. Should nothing happen to interfere with production at present rate, the total for 1910 should be about 2,300,000 tons.

Personal and General

Mr. R. B. Lamb visited Cobalt recently.

Mr. A. H. Smith has returned from Porcupine.

Mr. O. E. LeRoy was in Toronto on Saturday, November 19th.

Mr. H. Kilburn Scott has left for Brazil on professional business.

Mr. John Shaw has been appointed superintendent of the Casey Cobalt.

Mr. J. H. Plummer has been elected a director of the Bank of Nova Scotia.

Mr. W. Stanley Lecky has moved from Montreal to Toronto. Mr. Lecky has been engaged by a Toronto syndicate to inspect mining properties.

Mr. Charles Watson, formerly manager of the Cobalt Townsite, has been appointed manager of the Armstrong-McGibbon property in North Tisdale, Porcupine. He is succeeded in the Townsite by Mr. A. C. Bailey.

Mr. Osmond E. LeRoy, of the Geological Survey, having completed his field-work in British Columbia for 1910, left the West about the middle of November on his return to Ottawa.

Mr. G. A. Guess, late of the Tennessee Copper Company, was entertained at luncheon at the National Club, Toronto, by Mr. H. E. T. Haultain on Thursday, Nov. 24th. Dr. W. G. Miller, Mr. R. W. Leonard, and Mr. J. C. Murray were also present.

Mr. J. A. Reid, who spent the summer in Portland Canal, was in Toronto on November 15th completing arrangements to take up mining property in Mexico. Mr. Reid is a graduate of Kingston School of Mining, 1902, and has spent some years in Mexico and in Western Canada.

Mr. Wm. Yolen Williams, of Spokane, Washington, formerly superintendent of the Granby Company's mines at Phoenix, B.C., recently went to Observatory Inlet, near Portland Canal, B.C., to determine what development work shall be done by the Granby Company on the Hidden Creek Copper Company's mine, now under option to the Granby Company. Mr. O. B. Smith, jun., present mine superintendent for the Granby Company, afterwards joined Mr. Williams at the mine.

Mr. James Gray, formerly manager of the Nicola Valley Coal and Coke Company's Middlesboro colliery, in Nicola Valley, B.C., is now manager of one of the Canadian Collieries (Dunsmuir) Limited's coal mines at Cumberland, Vancouver Island.

Mr. Howard W. Du Bois, of Philadelphia, Pa., U.S.A., who is general manager and engineer for the Quesnelle Hydraulic Gold Mining Company, was in Victoria, B.C., recently.

Mr. H. K. Rodgers, of Seattle, Washington, who owns a one-fifth interest in the Hidden Creek Copper Company, lately proceeded to the company's mine on Observatory Inlet, to give charge of the property to the Granby Company's officials, who will further develop it.

Mr. F. N. Sylvester, hydraulic and electrical engineer, has been appointed assistant to Mr. Jay P. Graves, general manager of the Granby Consolidated Mining, Smelting and Power Company, Limited. Mr. Sylvester will have charge of the commercial business of the company, leaving the superintendence of the company's mines and smeltery as at present.

Among recent visitors to Sheep Creek mining camp, in Nelson division, B.C., were Messrs. W. M. Brewer, of Victoria; Robert R. Hedley, of Vancouver, and S. S. Raymond, of Los Angeles, California. For several years Mr. Raymond was manager of the Britannia Smelting Company, with works at Crofton, Vancouver Island.

Mr. A. J. McMillan, liquidator of the Le Roi Mining Company, left British Columbia early in November on a business visit to Chicago, Illinois.

Mr. Norman McKenzie, superintendent of No. 2 district for the Dominion Coal Company, has been granted an extended leave of absence. He will visit the principal coal mines of the United States, with a view to studying provisions for safety of life in mines.

In our "Personal and General" column in our last issue reference was made to the suit of Smith vs. Hersey et al. In this paragraph the case was summed up inaccurately. A friendly settlement was effected at the suggestion of Chancellor Sir John Boyd. After the settlement had been arranged the charges preferred by Mr. Smith were withdrawn.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Dominion Coal Company Employees' Benefit Society.—The regular quarterly meeting of this society was held at Glace Bay on the 14th November. The treasurer reported that all the collieries and departments were organized into branches of the society, with the exception of a few scattered departments which will be gathered into a general branch. It is now four months since the old societies were amalgamated, and the result of the quarter's work is very satisfactory. The net excess of income over expenditure, after allowing for liabilities contingent or contracted on claims during the quarter, amounted to $7,448. The total funds to the credit of the society at the end of October amounted to $83,204. It was decided to create a reserve fund, and $50,000 was set aside for this purpose. For the purpose of forming the nucleus of a fund to provide for old age pensions and disability, the sum of $25,000 was further set aside. The number of members of the Benefit Society is now 6,700, and by the beginning of 1911 it is expected that this number will be increased to 7,500 members.

The Dominion Coal Company is adding to the equipment of its rescue station a motor-driven oxygen refill-pump. The station is at present equipped with a hand pump, with which the one-hour flasks which form part of the apparatus are charged from the main storage bottles. The work of pressing up the oxygen charge is necessarily slow and somewhat laborious, and it is not considered wise to have the station dependent on one pump. The new pump will be of a greater capacity, and will form part of the permanent equipment of the main station, thus allowing the smaller hand-pump to be available for transportation to any place required.

A new set of Draeger apparatus, "1910 Model," has also been ordered. This model is fitted with one large oxygen flask instead of the two which form part of the older type of apparatus. The potash cylinders in the older type were also two in number, but in the latest model their place is taken by one large cylinder. Both the potash cartridge and the oxygen flask can be changed in half a minute in smoke without the necessity of removing the apparatus from the shoulders. The helmet is also improved. Part of the metal in the old type of helmet is replaced by soft leather, and the whole pneumatic lining which is the distinctive feature of the Draeger apparatus is made so that it can easily be removed and replaced again.

Reciprocity in Coal.—The people of Cape Breton who are vitally interested in the prosperity of the coal trade and the allied steel industry, upon which the continued welfare of Cape Breton almost entirely depends, have taken decided measures to present their case before the Government at Ottawa. A meeting was held in Sydney on the 10th of November, at which were present the mayors of Sydney, Glace Bay, North Sydney, Sydney Mines and Louisburg, the warden of the county, Mr. M. J. Butler, the general manager of the Dominion Iron & Steel Company and the Dominion Coal Company, and representative deputations from the lodges of the Provincial Workmen's Association. The following resolution was unanimously adopted:

"Whereas, the question of reciprocity between Canada and the United States is now under consideration, and

"Whereas, the prosperity of Cape Breton is dependent on the coal industry, and the revenue of the province of Nova Scotia is in a large measure derived from the industry; and

"Whereas, the capacity of this section of the Dominion to purchase provisions and manufactures, the products of the western provinces, thereby developing interprovincial trade, is dependent on the coal industry; and

"Whereas, reciprocity in coal between the United States and Canada, or reduction of Canadian duties on coal, would be disastrous to the Nova Scotia coal trade;

"Resolved, that this meeting is opposed to any change in the existing coal tariff, and to any reciprocal arrangement which would include coal;

"Resolved, that copies of this resolution be forwarded to the Honourable the Minister of Finance, Ottawa, and to the Provincial Secretary of Nova Scotia."

Mr. Butler stated that the Dominion Coal Company had made most determined efforts to place its coal in New England, urged thereto by the necessity of providing work for the men during the winter and, to some extent, equalizing the winter and summer shipments. The result had been most absolute failure, and the only thing the company had accomplished was to enable the Boston & Maine Railway Company to use its quotation as a club to beat down American coal companies to cheaper prices. Mr. Butler expressed the opinion that the agitation for reciprocity in coal emanated from the two great railway systems of Canada. He did not believe that there was any real wish in the Province of Ontario for reciprocity in coal, and he felt that the business men of Ontario realized that anything which acted to the detriment of the prosperity of the Maritime Provinces would, at the same time, react most adversely upon the business done by Ontario manufacturers in the Maritime Provinces.

Mr. Butler made the striking point that reciprocity in coal with the United States would mean a readjustment of the east to west transportation between the Canadian provinces. A north to south exchange of commodities would completely destroy the great systems of railway transportation which have been built up by the efforts of the people of Canada.

The meeting was entirely unpolitical—every shade of party being represented—and there was complete unanimity of opinion that any interference with the coal duties would be no less than calamitous in its result upon the Maritime Provinces.

QUEBEC.

Sherbrooke.—The East Canada Smelting Company is pushing the development of the McDonald mine, at Weedon. It is stated that there are some hundreds of thousands of tons of ore in sight, in addition to ore indicated by diamond drilling.

A contract has been let for digging a canal seven miles in length, so reports go, for working gold-bearing gravels in the Chaudiere district. Several transactions are pending in this region. The favourable report of a Montreal engineer has again come to the fore, and will probably be acted upon.

ONTARIO.

Cobalt.—The Casey Cobalt, the only property mining silver in the clay belt, has already shipped this year nearly 50 tons. It has gone out in O'Brien and Cobalt Townsite cars so that until investigation was made nothing was known of the little mine's productiveness. As all of the ore was of high grade it should net the company a comfortable sum. Mining operations are being conducted at the 200-foot level and the ore appears to go down. Shipments were made in January, April, July and October.

At a meeting of the Wyandoh Mining Company the following directorate was elected: Messrs. Alex. Pringle, John P. Black, Dr. Milton Hersey, O. H. Ward, B. Neilly and Shirley Ogilvie. The report showed ore on hand $820, in treasury $11,000 and 500,000 shares of stock, and the company owed between $18,000 and $20,000. The shipment made netted the company $11,800.

In the thirty miles of trenching upon the Nipissing last year eleven veins all showing high grade were uncovered. One of these, in the keewatin, in the southwest corner of the territory had an ore body 25 feet long by three inches wide of very rich ore. It has been sunk on, and at the 100-foot level a cross-cut has been started to catch the vein which dipped out of the shaft. Four parallel veins near Peterson Lake are being mined from tunnel 28. The ground covered included some hitherto unexplored keewatin territory, some partly explored conglomerate, and 3,500 feet in the diabase only. The average depth of the trenching was 2.8 feet. Next year all the surface prospecting will be done by means of hydraulicking.

In drifting on the Lavalle vein on the 150 foot level of the T. & H. B., near the Trethewey line and heading for it a five-inch vein of 3,000 ounce ore has been cut. It has been opened up now for 430 feet right to the Trethewey line. The mill building at this mine has been completed and half the machinery is on the ground, while the remainder is ordered. For the concentrator there is 12,000 tons on the dump and a large tonnage of low grade has been stoped in the mine itself. This is the fourteenth concentrator to be erected in camp and there are plans being made for two more, one at the Crown Reserve and the other at the Nipissing.

Quite a number of changes have been made in the management of Cobalt properties. Mr. Charles Watson, formerly of the Cobalt Townsite, goes to take charge of the Armstrong McGibbon at Porcupine at the beginning of the month; Mr. A. C. Bailey leaves the Casey Cobalt to take his place at the Townsite, and Mr. John Shaw will be manager of the Casey.

As the Cobalt Provincial now has a continuous ore body of over 200 feet at the 175-foot level, Mr. Reddington has thought developments warrant the erection of a good camp and a small sorting house to look after 40 tons a day. The vein is of high grade ore from three to six inches wide and outside its values extend for sixteen feet in several spots in the drift. Twenty tons of high grade have been taken out of a stope on the upper level and two cars of seconds are on the dump. The camp is being built to accommodate sixty men.

The Little Nipissing has cut its vein again at the 285-foot level and report it to be as rich as ever and six inches wide. The company has on hand three cars of ore of which one-third of a car is high grade.

The Cobalt Provincial Mining Company has secured an option from Messrs. Fraser and Ogilvie on lot A53. There is opened up on it 25 feet of a one-inch vein. The showing was supposed to be the best of any of the lots offered for sale at the last sale of property by the Government and brought $35,100.

On the fifth or lowest level of the Kerr Lake, No. 3 shaft near the Hargrave boundary, a new vein of high grade ore has been cut. Under Kerr Lake, where previously nothing had been done, a cross-cut has revealed the existence of several very rich veins, in all probability, the extension of some of the Crown Reserve's veins.

The largest shipment of bullion made from any one mine at one consignment was that from the Crown Reserve when they shipped 65 bars, containing 45,000 ounces, to England. It came from their coarse metallics from their small sorting plant.

Buffalo interests have leased the Green-Meehan on terms that appear to be favourable to the discovery of more ore if there is any left at all. In the five years of their lease the syndicate has to do 120 feet development in the first year and gradually increase the extent of the exploration each year until the fifth year when 275 feet at least must be done. Unless there is again a hitch, active work will be commenced at once.

The Beaver Consolidated has issued a statement showing that there was on hand at the end of October $30,000 in cash, $30,000 due from the smelter and another $30,000 car ready to ship.

During the month of September the Nipissing produced 351,849 ounces, having a value of $185,219. Development during the month has mainly been on the Meyer, which now shows a 212-foot ore body.

Surface conditions on the Nipissing are:—

	Partially Prospected.	Unprospected.
Conglomerate	306	123
Keewatin	176	10
Diabase	16	225

The Ophir Cobalt Company has been fined $100 for not providing a guard rail at its 200-foot level. A man named T. J. Kinsey fell down into a winze and was killed. The Beaver Consolidated was also reprimanded by a jury for not seeing that the guard rail at the shaft was kept down and in place. A man was killed there.

The McKinley-Darragh-Savage has already mined this year two million ounces of silver in the first ten months of the year. From the Savage mine a regular output of between 50,000 and 60,000 ounces is being maintained per month.

Two gold prospects outside the Porcupine area report continued good showings. These are the Swastika mine near Dane, on the T. & N. O., and the Thelma mine, in Bryce Township. At the Swastiki the manager has gone to Nova Scotia to buy a second-hand mill of five stamps in order that they may extend operations. At the Thelma Gold Mining Company, midway betweent Cobalt and Elk Lake, assays continue good as test pits are put down on a two-foot vein.

A contract has been let to sink a shaft on the Valentine Mines at the southwest end of Cross Lake. The shaft will be put down a hundred feet to crosscut several good sized veins found on the surface.

Pennsylvania detectives are looking into the affairs of the Delaware Cobalt Mining Company with properties somewhere near Gillies depot. The properties were bought for a few hundred dollars by the promoters and resold to the company, capitalized at $2,000,000, for $21,000. Much stock in the company, on extravagant representations, was sold to Easton, Pa., people, who are now beginning to make enquiries.

The O'Brien mill is now treating 120 tons a day and getting an extraction of 93.4 per cent. from 30 ounce ore.

Fourteen shipments of bullion have been made from the mill, consisting of 288,405.78 ounces, worth $153,028.49.

Porcupine.—Until the trail is better and supplies are cheaper and more easily obtainable, the Dome has got rid of most of the men employed. Probably this winter work will be confined to the erecting of a mill and big plant. A twelve-drill compressor has been ordered from the Canadian Rand Company.

By the time this appears in print the trail to Porcupine for sleighs and passenger traffic should be excellent. A new winter trail is being cut from Crawfords on the Frederickhouse to Hills on the Porcupine, and should be completed by the end of the month.

Two men were drowned in the Frederickhouse River, one in trying to break through ice with a canoe, the other in endeavouring to cross the river on thin ice.

Work on the Miller Middleton properties of the Timmins shows that the gold showings go down for at least thirty feet on those properties. Below the 100-foot level of the main shaft a winze is being sunk. It has been put down 30 feet and is still in excellent ore.

An English company represented here by the firm of Rose Van Cutsen & Company, has staked Pearl Lake near the Timmins holdings and Simpson Lake near the Foster. The intention is to prospect under them in a few days.

The demand for claims in the Porcupine area in Tisdale, Whitney, Shaw, the Reserve, and even in Carman and other townships, has never been so keen. Many important sales have been

made and many more are reported. Before the snow flew it was remarkable the number of gold showings discovered. But now the snow hides all the reports have increased tenfold.

There is still much discussion as to the route the electric road being built into Porcupine by the British Canadian Power Company will take. But the cutting of the right of way from Iroquois Falls to the Frederickhouse Lake has commenced and sixty teams have been purchased to commence grading.

The T. & H. B. Mining Company has purchased the six Foster-Ellis claims in Porcupine in Shaw Township, it is reported, for $30,000. The T. & H. B., in addition to the main mine at Cobalt, have properties at Hangingstone and Porcupine now.

Many Porcupine companies are being incorporated. Some of them are: Ontario Northern Mines, Sault Ste. Marie, $100,000; Porcupine Three Nations Gold Mining Company, Ottawa, capital $1,500,000; King Porcupine Mines, Toronto, $500,000; Pearl Lake Gold Mines, Toronto, $2,500,000.

The Porcupine Gold Mines has acquired the McDonald claims and will develop them in connection with the Vipond holdings.

The Porcupine Power Company, in which the Timmins syndicate is largely interested, states that it will be able to deliver power by June 15 next year. Contracts have been let for the plant to be installed at Sandy Falls, on the Mattagami. Two units will be installed, which will furnish about three thousand horse-power.

South Lorrain.—After a summer of reticence from the Wettlaufer mine, being worked by the Lewisohn interests, it is now learned that developments have been most satisfactory. Below the 250-foot level in a winze now sunk 30 feet, a vein of bonanza ore shows from a foot to a foot and a half wide. For a week the mine was producing 30,000 ounces per day. The Wettlaufer has been shipping much ore recently, but here again official reticence steps in the way of definite statements.

Owing to a disagreement among the directors of the company, the Haileybury Frontier mine has shut down. The Frontier will probably start up again as soon as power arrives, as it is one of the best prospects in South Lorrain.

Elk Lake.—The Lucky Godfrey and Mackenzie Syndicate has shut down, and the chief operating companies are now the Devlin and the Moosehorn. The latter has made a small trial shipment of ore. Some good finds are reported in Willett Township.

It is reported that the Otisse, Currie, and the Gavin Hamilton will pay their creditors. The good news from Porcupine has drained off many men from the Elk Lake and Gowganda fields.

Gowganda.—The principal news from Gowganda is in regard to the favourable developments at the Gates or Miller Lake-O'Brien. There is a high grade vein six inches wide at the 150-foot level of this property, and it will probably be a shipper this winter.

BRITISH COLUMBIA.

Nearly all the Geological Survey officials who have been working in the West this year have left to report to the director at Ottawa. Much useful work has been accomplished, both topographical and geological, and British Columbia in particular will derive benefit from the various investigations of topographers and geologists. The publication of the several reports and maps will be awaited with much interest.

Cariboo.—The Quesnelle Hydraulic Gold Mining Company is making good progress towards the completion of its works to bring in water from Swift River for hydraulicking purposes on its placer mining leases near Quesnel River, about 20 miles below Bullion. Of the 17½ miles of ditch, flume and pipe line, from the intake on Swift River to the pooling lake four or five miles above the ground to be hydraulicked, about 13 miles have been completed, and it is expected the remaining four to five miles will be finished in time for gravel-washing to be commenced next summer.

Slocan.—The agitation carried on for some time, with the object of inducing the Great Northern Railway Company to rebuild the destroyed parts of the Kaslo & Slocan Railway, which formerly connected Kaslo, on Kootenay Lake, with the town of Sandon, in the heart of the Slocan country, a distance of nearly 31 miles, has been resultless thus far. Strong representations have been made to both the railway company direct and the Provincial Government, and there have been communications passing between the Government and the railway company. It is too late now for anything to be expected this winter, but it is earnestly hoped the requisite work will be done next spring, at any rate as far as McGuigan, so that mines between Kaslo and the summit of the divide at Bear Lake may again be provided with railway transportation facilities to Kootenay Lake at Kaslo. Meanwhile horses and heavy sleighs have been procured by the Rambler-Cariboo Mines, Limited, for hauling ore over the newly-constructed wagon road from McGuigan to Three Forks, the latter being a station on the Canadian Pacific Railway Company's line from Sandon to Nakusp, on Arrow Lake. Much ore has been made accessible for shipment by the opening of new levels and the extension of old ones in the Rambler-Cariboo mine, so that production will be on a larger scale than for several years. Work is also being continued in the Washington mine, situated within a mile of the Rambler-Cariboo.

Around Sandon, the Richmond-Eureka and Ruth-Hope groups are the chief producers of ore this year, the Slocan Star not having shipped much of late. At Cody, the raise from the deep-level workings of the Surprise is still being made, and about half the distance to the old workings, 800 feet above, has been passed. Development of the Noble Five group is still in progress, and a report is current that a vein of ore several feet in width has been encountered.

The smaller mines about Sandon and New Denver, respectively, are nearly all closed for the winter, communication being difficult when the snow becomes deep. The Mollie Hughes is an exception, for it is only a little above Slocan Lake level, so can be kept open and worked with comparatively little trouble. In Four-Mile Creek camp, near Silverton, operations are being continued on three properties, namely, the Standard, Hewitt, and Van Roi. The last mentioned mine is not now taking out ore, for the term of the company's lease of the Wakefield concentrator has expired and construction of its own mill is not yet completed. However, the development of the mine is being carried on, so as to have plenty of ore available after completion of the new concentrator. The Wakefield mill is controlled by men largely interested in the Silverton Mines, Limited, which company is operating the Hewitt mine. During recent months ore has been shipped from the Hewitt to the Consolidated Company's smeltery at Trail, but not in considerable quantity, although there are large quantities of ore blocked out. The intention is to put much of the ore through the Wakefield concentrating plant and ship the resulting concentrates, which will be both silver-lead and silver-zinc. An interesting feature in the Hewitt mine is the occurrence of much ruby silver in the ore, the value of which is considerably increased by the presence of this rich mineral.

Lower down Slocan Lake there are only two mines attracting attention at present, those being the Eastmont group, owned by the Ellis Silver Mining Company, of Toronto, and Enterprise, which has been leased by Mr. S. S. Fowler, M.E., from the British company that owns it. Both these mines are in the vicinity of Ten-Mile Creek.

Nelson—A consolidation of a number of mining properties situated on Toad Mountain, near Nelson, has been effected, and a sale of them made to a strong syndicate. Several weeks ago, Mr. R. S. Lennie, for years a prominent citizen of Nelson, but now resident in Vancouver, was quoted by the Nelson Daily News as follows: "It is an absolute purchase which will positively be carried out, and the payment of the remaining 40 per cent. of the total price is guaranteed. The people I represent will absolutely own the properties. Work will be commenced just as soon as our engineers have completed their examinations,

and a method of treating the ore of the respective properties mine. thoroughly determined."

Other mines in the neighbourhood of Nelson worthy of mention are the Athabasca, Granite-Poorman, Eureka, and Ferrier group. The last of these is a property not yet much developed, having ore of high grade, and on which a small compressor has lately been placed.

Ymir and Sheep Creek.—These two camps, both in Nelson mining division, are more active now than for years, and both are adding substantially to the mineral production of the district, with much promise of their output being steadily enlarged. The shipping mines of Ymir camp are at present the Yankee Girl and Wilcox; among others that are being worked, though not shipping ore, is the Dundee, on which it is intended to install a compressor.

The Emerald, near Salmo, has sent about 1,700 tons of lead ore to Trail this year; it is the only mine in the southern part of Nelson division shipping lead ore. Below Salmo, in Erie camp, there are several properties, including the Second Relief, Arlington, and others that, unlike these two, have not made a continuous output of ore.

Sheep Creek camp is coming into more prominence as development work is proceeded with, but production is not general, the Queen and Nugget being the two chief shippers. The final payment on the purchase price of the Queen mine, which was $175,000, was made early in November, the amount paid then having been $71,428. The Queen-Yellowstone group and 20-stamp mill thereupon passed to the possession, absolutely, of the Wisconsin company, which has for more than two years been working the property. The Nelson Daily News quoted the president of the company as having said, in part: "The policy of the company will be to push development at an accelerated rate, not only in connection with the Queen vein proper, but on the numerous promising prospects which are included in our property. In past years shipments of ore have been made from the Alexandra, Hideaway, and Yellowstone veins. Our compressed air system will be at once enlarged, so that with air from our two compressors we may be able to operate hoist, pump and ten machine drills. It is well known that about 60 per cent. of the ore from the Queen mine is free-milling, that percentage of gold being caught on the plates and, except for the small quantity lost in the tailing, the remainder is recovered by the smeltery. If an addition to the stamp mill shall later be required, or a new mill of larger capacity become necessary, it will doubtless be provided. The provision of a cyanide plant to recover the gold from the tailing, will probably be made in the future."

It has been announced that the owners of the **Mother Lode**, which has been developed extensively during the last two years, are arranging to erect and equip a stamp-mill for this property, reports concerning which have been decidedly favourable. The provision of this treatment plant is expected to result in a substantial increase being made to the output of gold from this camp.

Rossland.—There is little to note of this camp, in which production of ore is being well maintained, and progress is being made. The total output of ore for the year to the middle of November was about 220,000 tons, of which approximately 165,000 tons came from the Consolidated Mining and Smelting Company's Centre Star group of mines, and 40,000 tons from the mines of Le Roi No. 2, Limited. Most of the remainder came from Le Roi, the production of several other mines having been small. Le Roi No. 2, Limited, paid another dividend on November 8th, amounting to about $60,000. Total paid to date is $1,065,000.

Boundary.—The aggregate output of Boundary district mines in 1910 will probably have reached 1,500,000 tons by the end of November. Fully two-thirds of this large quantity will have come from the Granby Company's mines, while nearly 370,000 tons will have been the share of the British Columbia Copper Company's several mines, and well on for 130,000 tons that of the Consolidated Mining and Smelting Company's Snowshoe

Similkameen.—The Hedley Gold Mining Company's Nickel Plate group is still the only ore-producing mine in this district. There are several other properties in Hedley camp that are regarded as promising to make profitable mines if money shall be available for their development, but at present this is lacking. The development of the coal resources of the district about Princeton and Granite Creek is being proceeded with. Mr. Arthur Hickling, managing director of the company owning the coal mine at Princeton, who lately came from England on one of his periodical visits to British Columbia, has been quoted as authority for the statement that his company has contracted to supply the Hedley Gold Mining Company with 10,000 tons of coal, and that next year the output from the Princeton colliery will be about 500 tons a day. Railway building in the upper part of the district, from the direction of Nicola Valley, is expected to considerably increase the importance of mining throughout that part. The coal mining industry in Nicola Valley is flourishing, with a steadily enlarging production.

Yale.—The new mining field, known as Steamboat Mountain, is not expected to make much progress until after the snow shall have melted next spring. Many mineral locations have been made, and several claims and groups of claims have been sold to men who can provide money to develop them. The occurrence of gold in quartz veins in the country lying between Hope, on the Fraser River, and the International Boundary line has been known for years, but its presence in the many porphyry dikes that exist was not recognized. Now, however, there is reason to think that some of these dikes will pay to work, and an effort will be made next year to prove whether or not they can be turned to profitable account. The quartz veins as yet discovered are not wide as a rule, though the ore contains good value in gold. There seems to be a reasonable prospect of the new field proving productive, but pending development of some of its properties this is necessarily as yet uncertain.

Coast.—There is nothing of especial importance to chronicle in connection with metalliferous mining in the Coast district. Work is being proceeded with at the Britannia mine, Howe Sound, and it is reported that late developments have been satisfactory. On Vancouver Island little, if any, mining is being done, so there is practically no ore production at present. The Tyee Copper Company's smeltery, however, is receiving supplies of ore from various sources, chiefly from southern Yukon and Alaska. In Portland Canal district, the most encouraging development is the continued successful operation of the Portland Canal Mining Company's concentrating plant, which is reported to be abundantly realizing expectations, in regard to suitability for recovering the valuable metals from the ore occurring in the company's mine. Some particulars of other properties in this camp, and in the neighbouring Observatory Inlet, are given in an article on mining in the Coast district sent by same mail.

A different account may be given of coal mining in the Coast district, to that above written relative to mining for metallic minerals. The Western Fuel Company, Canadian Collieries (Dunsmuir), Limited, and Pacific Coast Coal Mines, Limited, are all producing much coal. The first mentioned has had some temporary difficulty arising out of overheading in one part of its No. 1 mine, but this has been overcome and the miners are back again at work in the mine. The usefulness of the oxygen breathing apparatus provided here was demonstrated, for with it the underground troubles just mentioned were disposed of speedily and with much less loss in both time and money than would have been the case under old conditions, when without the advantage of the use of such appliances. The Pacific Coast Coal Company lately made its record daily production, that being an output of 1,000 tons of coal in one day, taken from its South Wellington mine, near Nanaimo. For a colliery that has been producing coal only about two years, this indicates creditable progress. This company is also developing another coalfield situated at Suquash, in the northern part of Vancouver Island.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

London.—A recent careful estimate figured out that for the nine months ending on September 30th there was a decrease of $800,000 in the world's gold production from the same period in 1909. At the same time it was suggested that this might be made up by increased output at the Rand mines during the last three months of 1910. Returns at hand show that for October, at least, the Rand fulfilled expectations. Output of gold there was $1,078,000 heavier than a year ago, and was the largest on record. Compared with three years ago, the month's output showed an increase of $2,100,000.

London, November 18.—The presence of William D. Haywood, of Idaho, a member of the Western Federation of Miners, in the Welsh coal fields, where extra police and military have been required to check the rioting of strikers, is interesting the authorities who have to cope with the situation. Considerable tension still prevails among the miners. A number of continental labour leaders are in the district, but the authorities are acquainted with their methods of conducting strikes, a knowledge of which is lacking in the case of American labour chiefs.

Cardiff, Wales, November 22.—The disorders in connection with the strike of the Welsh collieries in the Rhonda Valley are becoming serious. The rioters have attacked the houses of the mine officials, held up and searched trains, storming the signal boxes and keeping the signalmen prisoners while this was going on, and have threatened other outrages. There was a fierce conflict last night between rioters and the police at Ton-Y-Pandy, which was not quelled until the troops were summoned. Several policemen were severely injured.

AUSTRALIA.

Sydney.—The October gold yield of New South Wales is 17,423 ounces, valued at £59,641. The yield for the last ten months is 190,837 ounces, valued at £675,944.

Perth.—The Western Australian Government has decided to construct forthwith a temporary water pipe line from Southern Cross to the Bullfinch mine, where the gold discoveries were made recently. This line will provide an ample supply of water for domestic purposes. The Government has also decided to introduce a bill for the immediate construction of a railway to the Bullfinch centre via the Corinthian mine. Arrangements for the work are already being made by the department concerned.

CHINA.

The Pekin Syndicate announces that the output and sales of coal for the month ended 31st October, 1910, were as follows: Output, 33,400 tons; sales, 38,500 tons; boiler consumption, 3,250 tons.

UNITED STATES.

Cripple Creek, Colo., November 18.—Pouring out of the Roosevelt deep drainage tunnel at Cripple Creek is a flow of water estimated at about 2,000 gallons a minute. It is from the well of the El Paso shaft. The tremendous flow started at 3.45 o'clock yesterday morning and was followed by shrieking of whistles, blasts of dynamite and general jollification at the portal. Yesterday marked the real beginning of the draining of the deep levels of the Cripple Creek district and the recovering of $100,000,000 to $300,000,000 worth of ore. The water in the El Paso shaft has fallen about 75 feet from the old tunnel level. Of this distance, 50 feet was lowered yesterday morning and the drop is easily perceptible. There is little water now coming from the old tunnel. All work in the heading is being carried on through the intermediate shaft. At the portal of the tunnel the water is going out knee deep. At least 2,000 gallons a minute is pouring forth.

Houghton, Mich.—Edwin J. Hulburt, discoverer of the Calumet and Hecla mine, one of the most prolific copper producers in the world, is dead in Rome, Italy, according to advices received here. Mr. Hulburt was 81 years old.

Joplin, Mo.—Twenty-one camps were represented in the zinc and lead turn-ins from the Joplin district recently. The area of production extended from Aurora, Mo., to Miami, Okla., from Alba and Neck City on the north to Peoria on the south. The production tells a story of general activity throughout the entire Joplin district. It shows that operations are in progress in camps that are not always active, and when these conditions prevail nothing could tell more forcefully the story of the present prosperous times.

New York City, November 19.—J. Parke Channing, vice-president of the Miami Copper Company and consulting engineer of the General Development Company, has returned from an inspection of the Miami property at Globe, Ariz. He reports that while work on the mill has been delayed, the plant probably will be placed in operation in January. The mill, which is constructed of iron, and has cement foundations, has a capacity of 2,000 tons daily capacity, and the foundations for the 3,000-ton unit already have been laid. It is expected to treat 750,000 tons a year.

MEXICO.

Guadalajara, Mex., November 15.—Some ore is being shipped from the old Mololoa mine in the Hostotipaquilla district, the property of the Mololoa Mining Company, of Toronto, Canada. Work was recently resumed under the direction of W. M. Matthews. The Mololoa, which is a famous antigua, has produced some very rich ore during the last ten years. A fault interfered with profitable development for a time, and the mine was purchased by the Toronto interests from Carlos Romero, of Etzatlan, for $30,000. The mine has been the property of the Toronto company for over three years. Two additional tube mills have been ordered for the new reduction plant of the El Favor Mining Company in the Hostotipaquillo district of this state. They will make a total of four. There are twenty stamps, and with four tube mills for regrinding, coarse crushing will be done, and it is expected to handle up to 120 tons of ore daily. Some improvements are being made in the cyanide annex, with a view to the highest possible efficiency. The plant will go into commission as soon as electric power reaches the Hostotipaquillo district. The big El Favor mine, which has been systematically developed for several years, is in shape to supply any tonnage that may be called for. All levels have been given connection with the main transportation tunnel, and in anticipation of early milling, heavier track is being laid there.*

* Editor's Note.—The Mololoa and the El Favor mines were developed by two Canadian engineers—Mr. F. G. Stevens and Mr. S. N. Graham. Both are now in Canada. Mr. Stevens is in Kingston, Ont., and Mr. Graham is manager of the pyrite mine of the Canadian Sulphur Ore Company, Queensboro, Ont.

Parral, Mex., November 14.—The sale of the Hidalgo properties to a syndicate headed by A. J. McQuatters, of Dallas, Texas, once more brings this city into the limelight of trade and development. The Hidalgo properties are in the immediate neighbourhood of Parral and up to the middle of last month were controlled by Pittsburg men, with James I. Long as general manager. The mines have always been large producers and were worked steadily until July, 1907, when the company decided to close them on account of the large number of estates pending settlement among these stockholders.

KERR LAKE DIVIDEND.

Kerr Lake has issued the statement that the fourth dividend of the year will be made on December 15 at the old rate of 5 per cent. regular and 5 per cent. bonus. They will thus have paid 40 per cent. in 1910, or $1,200,000. Altogether, at the end of the year they will have paid 91 per cent., or $2,730,000.

COMPANY NOTES.

CROW'S NEST PASS.

For the first nine months of the present year profits of the Crow's Nest Pass Coal Company show an excess of over $100,000 over the corresponding period of last year. For the whole of last year profits were $145,000, which would make the profits for the first nine months of last year—if in proportion—$108,000. At this rate the total amount for this year to date is almost double that of last year.

Wyandoh stockholders met on November 15th in Montreal and elected the following directors: Alexander Pringle, John P. Black, Shirley Ogilvie, Dr. Milton Hersey, A. Pierce, F. H. Ward and B. Neilly.

The financial report as read showed 500,000 shares left in the treasury, about $11,000 cash on hand, and a balance of about $18,000.

The property produced one car of ore, netting $11,683 during the year. Ore on hand is estimated at $820.

MCKINLEY-DARRAGH.

The announcement of a 12 per cent. bonus and 3 per cent. regular quarterly dividend on McKinley-Darragh was made on November 22nd.

STATISTICS AND RETURNS

DOMINION COAL SHIPMENTS.

For the present season the Dominion Coal Company has shipped 1,228,000 tons of coal up the St. Lawrence.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending November 11th, and those from January 1st, 1910, to date:

	Nov. 11. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	226,217
Buffalo	62,530	2,068,878
City of Cobalt	.....	548,875
Chambers-Ferland	64,000	1,591,300
Cobalt Central	.....	293,286
Cobalt Lake	.....	300,900
Cobalt Townsite	.....	601,120
Colonial	64,150	309,730
Coniagas	.....	1,816,436
Crown Reserve	.....	5,314,140
Drummond	440,000	1,504,200
Hargraves	.....	564,070
Hudson Bay	.....	481,215
Kerr Lake	.....	9,059,468
King Edward	.....	263,406
La Rose	87,130	9,342,971
McKinley-Darragh	.....	3,599,449
Nipissing	446,620	11,051,177
O'Brien	.....	1,115,250
Peterson Lake (Little Nip.)	.....	497,420
Provincial	.....	65,000
Right-of-Way	.....	1,545,187
Rochester	.....	60,750
Silver Cliff	.....	268,720
Standard Cobalt	.....	258,951
Temiskaming	.....	1,913,350
Tretheway	103,870	957,490
Waldman	.....	63,992
Wyandoh	.....	48,300

Ore shipments for the week ending November 11th were 1,268,300 pounds, or 634 tons.

Total shipments from January 1st to November 11th were 55,731,248 pounds, or 27,865 tons.

Following are the shipments from the Cobalt camp for the week ending November 18th, and those from January 1st, 1910, to date:

	Nov. 18. Ore in lbs.	Since Jan. 1. Ore in lbs.
Beaver	.....	226,217
Buffalo	55,510	2,124,388
City of Cobalt	60,000	608,875
Chambers-Ferland	.....	1,591,300
Cobalt Central	.....	293,286
Cobalt Lake	.....	300,900
Cobalt Townsite	64,000	665,120
Colonial	.....	309,730
Coniagas	63,800	1,880,236
Crown Reserve	146,700	5,460,840
Drummond	440,000	1,944,200
Hargraves	.....	564,070
Hudson Bay	.....	481,215
Kerr Lake	60,240	9,119,708
King Edward	.....	263,406
La Rose	260,870	9,603,841
McKinley-Darragh	169,060	3,768,509
Nipissing	252,620	11,303,797
O'Brien	64,110	1,179,360
Peterson Lake (Little Nip.)	.....	497,420
Provincial	.....	65,000
Right-of-Way	60,100	1,605,287
Rochester	.....	60,750
Silver Cliff	52,680	321,400
Standard Cobalt	.....	258,951
Temiskaming	.....	1,913,350
Trethewey	.....	957,490
Waldman	.....	63,992
Wyandoh	.....	48,300

Ore shipments for the week ending November 18th were 1,749,690 pounds, or 874 tons.

Total shipments from January 1st to November 18th were 57,480,938 pounds, or 28,740 tons.

In addition to the ore tonnage 106 bars of bullion were shipped from Cobalt last week, this being probably the record for any one week since bullion has been shipped from the camp:

Buffalo mine, 9 bars, 12,912 ounces, value $5,750; Crown Reserve, 65 bars, 45,000 ounces, $24,268.67; O'Brien, 19 bars, 15,888 ounces, $10,230.55; Nova Scotia, 11 bars, 9,156 ounces, $5,579.96.

BRITISH COLUMBIA ORE SHIPMENTS.

The Aurora mine, at Moyie, made its initial shipment of the year the past week, to the Consolidated smelter at Trail, as disclosed by the returns.

The following are the returns of the ore production and movement for the week ending November 11th, and for the year to date:

Boundary Shipments.

	Week.	Year.
Granby	19,370	966,307
Mother Lode	7,160	306,139
Snowshoe	2,989	129,039
Jack Pot	350	13,251
Rawhide	3,200	19,100
No. 7	75	517
Other mines	.....	9,523
Total	33,144	1,443,876

Rossland Shipments.

Centre Star	3,739	166,566
Le Roi No. 2	597	27,453
Le Roi No. 2, milled	300	13,500
Le Roi	58	11,454
Nickle Plate	69	711
Other mines	.....	852
Total	4,763	220,536

Slocan-Kootenay Shipments.

St. Eugene, milled	2,775	124,875
Van Roi, milled	800	36,000
Queen, milled	420	18,900
Granite-Poorman, milled	250	11,250
Nugget, milled	110	4,950
Highland, milled	250	8,600
Wilcox	75	900
Richmond-Eureka	91	3,586
Standard	96	1,470
Emerald	21	1,661
Yankee Girl	192	4,663
Eastmont	30	649
Sullivan	428	18,373
Hope	28	205
Panama	37	55
Idaho-Alamo	32	103
Aurora	19	19
Other mines	.....	33,754
Total	5,654	270,013

The total shipments for the week, including the estimated milling, were 43,561 tons, and for the year to date, 1,934,425 tons.

British Columbia Copper Company's Receipts.
Greenwood, B.C.

Mother Lode	7,160	306,139
Jack Pot	350	13,251
Rawhide	3,200	19,100
Other mines	.....	9,339
Total	10,710	347,829

Granby Smelter Receipts.
Greenwood, B.C.

Granby	19,370	966,307
Other mines	.....	120
Total	19,370	966,427

Consolidated Company's Receipts.
Trail, B.C.

St. Eugene, concentrates	185	12,390
Le Roi No. 2, part concentrates.	597	27,453
Queen, concentrates	42	738
Centre Star	3,739	166,566
Le Roi	58	11,454
Snowshoe	2,989	129,039
Richmond-Eureka	91	3,586
Standard	96	1,470
Emerald	21	1,661
Yankee Girl	192	4,663
Eastmont	30	649
Sullivan	428	18,373
Hope	28	205
Nickle Plate	69	711
Panama	37	55
Idaho-Alamo	32	103
No. 7	54	496
Aurora	19	19
Other mines	.....	20,326
Total	8,707	399,957

The total receipts at the smelters, including concentrates, were, for the week, 38,787 tons, and for the year to date 1,714,213 tons.

BOUNTIES.

The following were the concerns participating in the bounties paid by the Dominion Government on iron and steel during the fiscal year ended March 31st last:

Algoma Steel Company	$ 318,814
Dominion Iron and Steel	1,029,503
Nova Scotia Steel	97,345
Hamilton Steel and Iron	238,408
Lake Superior Iron and Steel	54,628
Ontario Iron and Steel	4,463
Canada Iron Corporation	41,146
Atikokan Iron Company	15,099
Standard Chemical Company	10,120
Total bounties paid	$1,808,533

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—November 23, 1910.

	Bid.	Ask.
Amalgamated Asbestos	12	13
Black Lake	15	17
Dominion Coal	63	..
Dominion Steel	63	..
Dominion Steel Corporation	61¾	..
Granby	44	45
Consolidated Mining	40	50
Nova Scotia Steel	..	86¼
Crow's Nest	..	80

Cobalt Stocks—November 23, 1910.

Amalgamated	.01	.03
Bailey	.08⅛	.08¼
Beaver Consolidated	.26¾	.27
Buffalo	2.02	2.15
Chambers-Ferland	.16¾	.17½
City of Cobalt	.21	.22
Cobalt Central	.07¾	.08⅜
Cobalt Lake	.14⅜	.14½
Coniagas	4.70	4.90
Crown Reserve	2.74	2.76
Foster	.05	.08
Gifford	.04¼	.05
Great Northern	.08¾	.09
Green Meehan	.02½	.02¾
Hargraves	.31⅜	.32
Hudson Bay	97.00	110.00
John Black	.01	.04
Kerr Lake	7.45	7.55
La Rose	4.60	4.68
Little Nipissing	.20⅝	.20⅞
McKinley	1.30	1.31
Nancy Helen	.03	.05
Nipissing	10.95	11.12½

Nova Scotia	.22	.24½
Ophir	.16	.25
Otisse	.02	.02¼
Peterson Lake	.19½	.19⅞
Right of Way	.26	.28
Rochester	.08⅜	.08½
Sivlre Leaf	.05¾	.06
Silver Bar	.02	.05
Silver Queen	.05	.05¾
Temiskaming	.86¾	.87¼
Trethewey	1.22	1.25
Watts	3 sellers	
Wettlaufer	.84	.89

New York Curb—November 23, 1910.

Boston Copper	17	19
British Columbia Copper	6⅜	6½
Butte Coalition	19½	20½
Canadian Mines	..	..
Chino Copper	24⅜	24½
Davis-Daly Copper	1½	1⅝
Ely Consolidated	.39	.41
Giroux Mining	7 7/16	7 9/16
Goldfield Consolidated	8	8⅛
Greene-Canadian	7⅜	7⅝
Harcuvar Copper	10	15
Inspiration Copper	9 11/16	9 13/16
Miami Copper	20	20¼
New Baltic Copper	7	8
Nevada Con. Copper	20¼	20⅝
Ohio Copper	1½	1⅝
Rawhide Coalition	.03	.03½
Ray Central	2 7/16	2½
Ray Consolidated	20½	20¾
Union Mines	13/16	⅞
Yukon Gold	3 9/16	3⅝

SILVER PRICES.

	New York. cents.	London. pence.
November 8	Holiday.	25⅞
" 9	55⅞	25 13/16
" 10	55⅞	25 13/16
" 11	55¾	25 13/16
" 12	56	25⅞
" 14	55⅞	25 13/16
" 15	56	25⅞
" 16	55⅞	25 13/16
" 17	55½	25⅝
" 18	55⅜	25 9/16
" 19	55½	25⅝
" 21	55¼	25½
" 22	55⅜	25 9/16

TORONTO MARKETS.

November 23.—(Quotations from Canada Metal Co., Toronto).
Spelter, 5.25 cents per lb.
Lead, 3.70 per lb.
Antimony, 8 to 8½ cents per lb.
Tin, 39 cents per lb.
Copper, casting, 13.50 cents per lb.
Electrolytic ,13.50 cents per lb.
Ingot brass, 8 to 12½ cents per lb.

November 23.—Pig Iron (Quotations from Drummond, McCall Co., Toronto).
Summerlee No. 1, $23.00 (f.o.b. Toronto).
Summerlee No. 2, $22.50 (f.o.b. Toronto).
Midland No. 1, $20.50 (f.o.b. Toronto).
Hamilton No. 1, $20.00 (f.o.b. Hamilton).
Hamilton No. 2, $19.50 (f.o.b. Hamilton).
Clarence, $20.00 (f.o.b. Toronto).
Cleveland, $20.00 (f.o.b. Toronto).
Coal, anthracite, $5.50 to $6.75.
Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

November 21.—Connellsville Coke (f.o.b. ovens).
Furnace coke, prompt, $1.40 to $1.50 per ton.
Foundry coke, prompt, $2.00 to $2.15 per ton.

November 21.—Tin (Straits), 36.95 cents.
Copper, Prime Lake, 13.00 cents.
Electrolytic Copper, 12.90 cents.
Copper Wire, 14.25 cents.
Lead, 4.50 cents.
Spelter, 6.00 cents.
Sheet zinc (f.o.b. smelter), 7.75 cents.
Antimony, Cookson's, 7.87½ cents.
Aluminium, 22.75 to 23.00 cents.
Nickel, 40.00 to 45.00 cents.
Platinum, ordinary, $39.50 per ounce.
Platinum, hard, $41.50 per ounce.
Bismuth, $1.95 per lb.
Quicksilver, $43.50 per 75-lb. flask.

TEMISKAMING AND HUDSON BAY.

The directors of the Temiskaming & Hudson Bay Mining Company, of Cobalt, have declared another dividend of 300 per cent. on the capital stock to be paid on Saturday, November 12, 1910.

This is the 28th dividend declared by this company, and the seventh this year as follows:—

	P.C.	
January 11	300	$23,263
February 17	300	23,263
April 12	300	23,263
May 25	300	23,263
July 29	300	23,263
August 29	300	23,263
November 12	300	23,263
	2,100	$162,841

Thus making 2,100 per cent. paid this year, and a total of 17,200 per cent. since the company started paying dividends.

The capital stock of the company issued is $7,746, so that a 300 per cent. dividend means a distribution of $23,263 amongst the shareholders.

With its dividend just declared the company will have paid $1,319,335, or $172 on every $1 share.

TEMISKAMING STATEMENT.

The following financial statement, covering the operations of the Temiskaming Mine for the nine months ending October 31, 1910, will accompany the dividend cheques, which will be mailed to shareholders in the course of a day or two:

Assets.

Capital assets	$2,640,624.51
Cash in Union Bank	171,811.26
Ore at smelters	241,340.77
Ore on hand	56,049.00
Petty cash	18.23
Open accounts due company	6,956.00
Supplies on hand	8,901.44
Treasury stock	829.00
	$3,126,530.30

Liabilities.

Ottawa Bank	$ 3,707.40
Open accounts payable	544.87
Wages payable October	10,610.05
Capital stock	2,500,000.00
Revenue account (surplus):	
Balance brought down	14,303.68
Profit for nine months	579,364.30
	$3,126,530.30

For the last quarter the profits of the Temiskaming Company were $284,762.93, or at the rate of $94,920.98 per month.

United States Smelting, Refining & Mining Co.

Buyers of

Ores and Matte

Blister Copper Lead Bullion

Custom Copper Smelter .	Chrome, N. J.	Custom Copper Smelter . .	Midvale, Utah
Custom Copper Refinery .	Chrome, N. J.	Custom Copper Smelter . .	Kennett, Calif.
Custom Lead Refinery. .	Grasselli, Ind.	Custom Lead and Copper Smelter	Needles, Calif.
Custom Lead Smelter . .	Midvale, Utah	Cia de Real Del Monte . .	Pachuca, Mexico
International Metal Selling Co. . .	New York City		

INQUIRE OF

The United States Metals Refining Co., 42 Broadway, N.Y. City
United States Smelting Co., Salt Lake City, Utah
The Mammoth Copper Company, Kennett, California
The Needles Mining and Smelting Co., Needles, California
The Cia de Real Del Monte, Pachuca, Mexico

Main Office: 55 Congress St., Boston

United States Smelting, Refining and Mining Co.

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles of Enclosed and Sheltered Waters LESS THAN FOUR DAYS AT SEA

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent, Board of Trade Bldg., Montreal

J. S. CARTER, Gen. Agent, 450 Main St., Winnipeg, Man.

I. E. SUCKLING, Gen. Agent, S. E. Corner King & Yonge Sts., Toronto, Ont.

Newton & Treloar

Commercial & General

PRINTERS

14 Johnson Street, Toronto



ON TIME

One of the most important business transactions which sensible minded men should perform on time is that of making proper provision for those who are dependent on them for the necessities of life.

The only way to do this is by means of life insurance. The only way to do it on time is to act now while in health. The most satisfactory way is to insure at once in the

North American Life
ASSURANCE COMPANY
"Solid as the Continent"
HEAD OFFICE, - - TORONTO

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Mine Management

Our organization offers many advantages to investors and mine owners seeking competent management. Under our scheme of management a continuity of policy is assured regardless of changes in the local staff. We are willing that our compensation depend upon results obtained. We know that our methods mean low working costs and maximum profits. Let us make you a proposition.

GOLD

Its Geological occurrence and Geographical distribution by J. Malcolm MacLaren, D. Sc., 700 pages, one colored plate and 278 illustrations. Price $7.00, including postage.

Stamp-milling of gold ores

by T. A. Rickard, price $2.50. A careful description of the gold-milling processes on both sides of the equator. This book is well illustrated.

Book Department,
CANADIAN MINING JOURNAL,
TORONTO.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Gwillim, J. C.
Groch & Groch
Hassan, A. A.
Hitchcock, C. H.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont.

O. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E.
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

Lamb, R. B.
Mining Engineer and Metallurgist
Traders Bank Bldg.
Toronto, Ontario

Loring, Frank C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

Leckie, J. Edwards
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

McEvoy James
Mining Engineer,
Stair Building,
TORONTO.

Ralph A. Meyers, E.M., B. Sc.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

Magee, Boyd
Consulting Mining Engineer
HAILEYBURY AND TORONTO

Miles, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris-France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: Obadul Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

Perkins, Frank Clinton
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

Alexander H. Smith
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

Scott, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

Smith, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

Spencer, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

Sutcliffe & Neelands,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

Walter E. Segsworth
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

Tyrrell, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

Willmott, A. B., M. A., B. Sc.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

Webb R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq.. Buffalo, N. Y.

Woolsey, W. J.
Mining Engineer
THETFORD MINES, QUE.

Survey of Mining Claims Townsites, Town Lots, Etc.
Mine Surveying Municipal Engineering
CODE & CODE
Ontario Land Surveyors and Civil Engineers;
Offices: COBALT and GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

John, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

Carey, Elmer Ellsworth,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

Brown, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - Cobalt, Ont.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B. Sc.
Manager

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office; McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

S. F. KAVANAGH
Assayer
Mining Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Civil Engineers.
Contractors. Assayers.
Mining Properties bought and sold.
Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont.
Fabre and Chibogamou, Que.
627 Goristine Bldg.,
Phone M-7515 **Montreal.**

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
404 Lumsden Bldg, TORONTO.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

JOHNSON, ALBERT
Assessment Work—Drifting and Sinking contracted in Northern Ontario. Absolute Satisfaction Guaranteed.
Thirty Years experience in Gold, Copper and Iron Mining. Mining Claims for Sale.
Cobalt, Ont.

G. W. DIXON
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building,
Montreal

ENGINEER with influential connection in British Isles will be visiting Montreal shortly to negotiate with firms wishing first-class representation. Address R. J., c/o Canadian Mining Journal.

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price,

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

THE FOLLOWING GEOLOGICAL MAPS HAVE BEEN RECENTLY ISSUED:—

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1025. Waverley Sheet. Scale 1 mile to 1 inch.
1037. Windsor Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1076. Gowganda Mining Division. Scale 1 mile to 1 inch.
1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.

BRITISH COLUMBIA

1002. Geological Sheet, Special Map of Rossland. Scale 400 feet to 1 inch.
1004. Geological Sheet, Rossland Mining District. Scale 1200 feet to 1 inch.
1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1041. Geological Map Whitehorse Copper Belt. Scale 1 mile to 1 inch. Also several detail maps of the ore bodies of the same belt.
1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
973. Catalogue of Canadian Birds, by John Macoun and James M. Macoun.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
980. Report on a portion of Algoma and Thunder Bay Districts, by W. J. Wilson, and on the region lying north of Lake Superior between the Pie and the Nipigon Rivers, by W. H. Collins. A map showing the geology along the water courses from Lake Superior to the Albany River and from Missinabi to Nipigon River accompanies the report.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

YUKON and NORTH WEST TERRITORIES

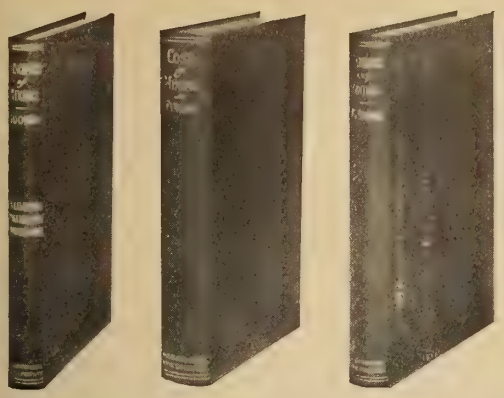
1050. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

NEW CATALOGUE

1073. Catalogue of Publication 1843—1909.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, *Confederation Life Building* TORONTO

The Davis Handbook of the Cobalt Silver District

Illustrated with Photographs

PRICE

Paper Cover = = $1.50

Stiff " = = = $2.00

by H. P. Davis

¶ The first section of this volume is an outline on the Goelogy, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general infromation necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = Canadian Mining Journal = Toronto

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea

ALL DESCRIPTION OF **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

MACHINERY FOR SALE

Owing to change in power from steam to electric, we have a large quantity of machinery for sale, consisting of Steam Engines and Boilers, Air Compressor, a complete Lighting Plant (600 lights), Double Drum Hoisting Engine, Concentrating Tables and miscellaneous lot of other machinery.

Write for particulars and catalogue.

DELORO MINING & REDUCTION Co. Ltd.
DELORO - - ONTARIO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Goverment of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unserveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minium being 40 acres in unserveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street. Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries.
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING AND SCIENTIFIC PRESS

Controlled by T. A. RICKARD — Established 1860 — Published weekly at San Francisco, Cal.

In every issue valuable articles are published on mining, metallurgy, and geology, the latest news from special correspondents at the principal mining centers, letters giving the ideas and experience of successful men, and other items of useful knowledge.

THE MINING MAGAZINE

Established September, 1909

T. A. RICKARD, Editor — Published monthly at London, England

A monthly magazine is the natural corollary of a technical weekly. It permits of more deliberate and more extended notice of matters concerning which the news element is less important.

The Mining Magazine includes a review of the world's progress in mining, metallurgy, and economic geology, written by men who have personal knowledge of the regions and conditions discussed.

COMBINATION RATE: To new subscribers to both papers in

	Combination yearly rate
United Kingdom and Canada	$7.00
U. S. and Mexico,	6.00
Other countries in Postal Union	8.00

Address either office:—
MINING AND SCIENTIFIC PRESS, 667 Howard St., San Francisco
THE MINING MAGAZINE, 819, Salisbury House, London, E. C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

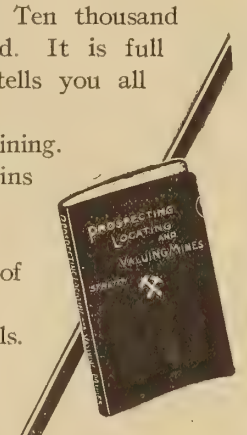


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,

TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co.....vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszasger, Jacques & Co.....xi
Bellis & Morcom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Canadian Fairbanks Co., Ltd..xviii
Canadian Copper Co..... ...xxiv
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd..... xvi
Scott, O. N. xx
School of Mining xxiii
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co...ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH, LTD.

NEWCASTLE-on-TYNE: ENGLAND

Specialists in the manufacture of improved plough steel wire ropes for aerial ropeways, winding & haulage in collieries, mines, etc.

The Red Thread brand

Highest actual breaking stresses, combined with maximum ductility & wearing properties.

CANADIAN REPRESENTATIVE
D. W. CLARK. TORONTO.

AGENTS

EVANS, COLEMAN & EVANS, VANCOUVER B.C. : ANGEL ENGINEERING & SUPPLY CO. LD., ST. JOHN'S N.F.
DOMINION EQUIPMENT & SUPPLY CO., WINNIPEG, MAN. : BAINES & PECKOVER, TORONTO, ONT.

The Canadian Miner's Buying Directory.

SEE INDEX TO ADVERTISERS PAGE XXVIII.

Before purchasing supplies, machinery or equipment, consult the firms mentioned in this Directory. They are prepared to fill your order with all possible despatch If requiring anything not listed in these columns, address THE CANADIAN MINING JOURNAL and you will be put in touch with responsible firms. In writing advertiser kindly mention this Journal.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link-Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,
John McDougall Caledonian Iron Works Co., Ltd.

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg. Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,
John McDougall Caledonian Iron Works Co., Ltd.

Condensers—
John McDougall Caledonian Iron Works Co., Ltd.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
John McDougall Caledonian Iron Works Co., Ltd.
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
John McDougall Caledonian Iron Works Co., Ltd.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
John McDougall Caledonian Iron Works Co., Ltd.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

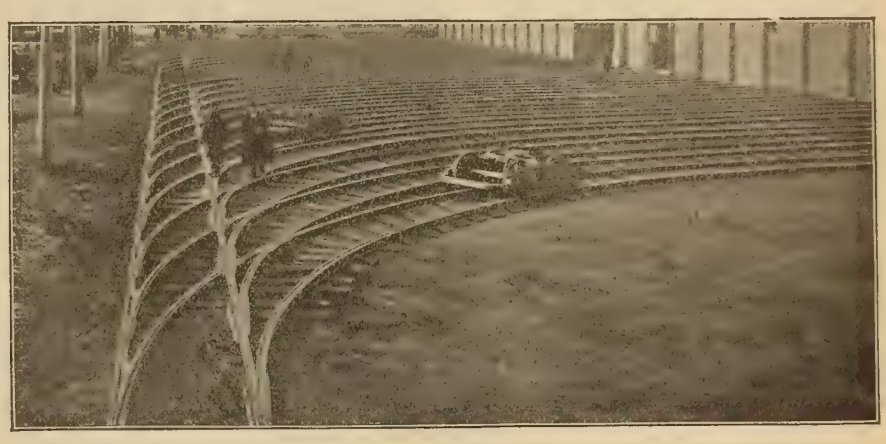
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

BARROW HAEMATITE STEEL CO., Barrow-in-Furness, England

Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Baldwin-Westinghouse
Electric Mine Locomotives

Economical Mine Operation

and modern methods demand that you use electrical equipment. The same power used for cutting and drilling, is also used for hauling.

Service Records show that you should use **Baldwin-Westinghouse Mine Locomotives.**

Let us tell you more about them, and give you figures on their records in some large mines.

Write nearest office.



Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

Traders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.
For particulars address nearest office: HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind. Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

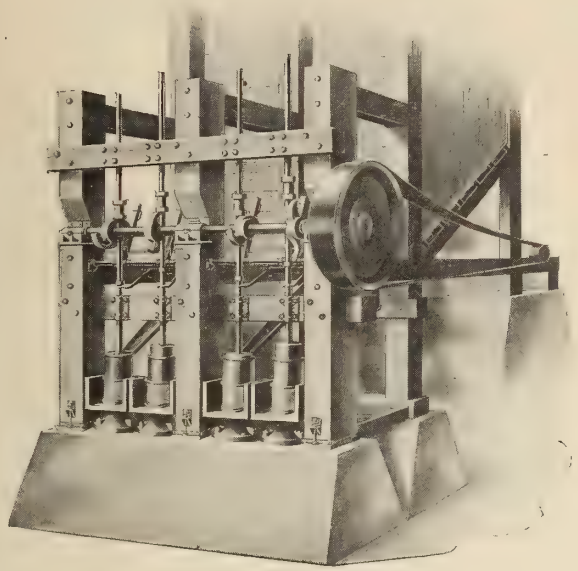
Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY. ALTA. NELSON, B.C.

The Nissen Stamp Mill



Nissen Stamp Mill

STAMP. The Nissen Stamp drops with great crushing effect upon a feed comparatively free of the fines caused by preceding impacts. This causes a a tural splash which radiates from the centre of the die, carrying the pulp to a circular screen, every aperture in which presents a full opening for the pulp which has already reached size to pass through. As the stamp ascends preparatory for the succeeding blow, a partial vacuum is formed under the stamp shoe, which greatly assists the rapid return of the oversize to the die. This condition, the circular form of mortar, and the ascending stamp, lead to a suction effect which hastens the return of oversize to the die, a feature distinctive to the Nissen Stamp. Thus, a greater number of effective drops per minute is possible, resulting in greater capacity.

FEEDER. Each Nissen Stamp is provided with a tappet driven, automatic ore feeder of the Challenge type. This feeder is easily adjusted for different rates of feed, and is very sensitive in responding to the action of the stamp.

MORTAR. The Nissen Mortar is circular in plan and made to accommodate but one stamp, thus confining the crushing zone to a field of activity which forbids pulp coming to rest or becoming sluggish in that circulatory movement essential to efficiency.

The screen of the Nissen Mortar is circular and extends more than half way around the mortar, forming an area of discharge for one Nissen Stamp equal to about two-thirds that employed for five stamps of the old type.



Boston Consolidated Type "B" Nissen Mortar

THE CANADIAN FAIRBANKS CO., Limited

Fairbanks Scales—Fairbanks Morse Gas Engines—Safes and Vaults

MONTREAL TORONTO ST. JOHN, N.B. WINNIPEG SASKATOON CALGARY VANCOUVER

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:
Board of Trade Building, Montreal

WORKS:
Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora



BELL ASBESTOS MINES

No. 3 Mill. This Mill is built in two units. Each unit has a milling capacity of from 25,000 to 30,000 tons of marketable Asbestos fibres per annum. The Bell Asbestos Mines are capable of supplying the world's demands for Asbestos

For Crude, Carded and Cleaned Fibres, address

Bell Asbestos Mines

Thetford Mines
P.Q.
Canada

Ambler
Pennsylvania
U.S.A.

Victoria Square
Montreal
Canada

The Most Productive Mines of High-Grade Asbestos Crudes and Fibres in the World.

THE CANADIAN MINING JOURNAL

L. 31 TORONTO No. 24

THE

"Hardy Simplex" Hammer Drill

Extremely Simple and Durable. Will give splendid results on low air pressure.

In speed is equal to any ordinary 3in. piston drill.

It is not a converted chipping hammer, but a rock drill of great power and high economy.

The drill steel is turned automatically by means of a very carefully designed special rotation device, upon which the great success of the machine is founded to no inconsiderable extent.

This is a feature which is not found in other drills.

Let us send you a fully illustrated and descriptive Catalogue.

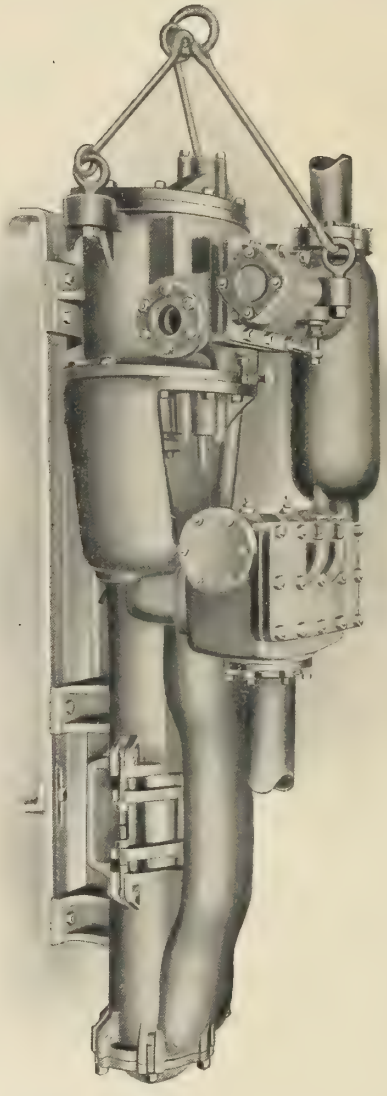


MUSSENS LIMITED

MONTREAL, 318 St. James St. | TORONTO, 73 Victoria St. | COBALT, opp. Right of Way Mine | WINNIPEG, 259-261 Stanley St. | CALGARY, Crown Bldg. | VANCOUVER Mercantile Bldg.

BLAKE PUMPS

For Mining, Power House & General Service



SINKING PUMPS OF ALL CAPACITIES.

SOLE AGENTS FOR CANADA.

The John McDougall Caledonian Iron Works Co.

LIMITED

Works: 512 William Street, Montreal. Sales Offices: Montreal, Toronto, Cobalt, Winnipeg, Calgary, Vancouver.

BELLISS
STEAM TURBINES

Installations supplied include

HIS MAJESTY'S DOCKYARD, MUNICIPAL POWER STATIONS, MINES AND IRONWORKS

Each One Giving Absolute Satisfaction. Why? Because all the experimental work was done in the builders' works, extending over many years, before a single unit was offered to the public. Result—a Belliss design of Turbine of the same high standard as their well-known reciprocating engines.

Shall we send you a descriptive pamphlet?.

BUILDERS—

BELLISS & MORCOM, Ltd.
BIRMINGHAM, ENGLAND

LAURIE & LAMB,
CANADIAN AGENTS
Board of Trade Building, MONTREAL

"CLEVELAND" STOPE DRILLS



EFFICIENCY:—Of course you want the stope drill which has the highest efficiency, but you must pick out the one that will have as high an efficiency a year from to-day. Isn't it true that your stope drills decrease steadily in efficiency as they grow older?

REPAIRS:—Repairs which must be made from time to time after the part has given long and satisfactory service, are not a source of dissatisfaction, but dont you find that your stope drills are constantly needing something new?

DRILLING CAPACITY:—As long as your stope drill will put in sufficient holes per shift to drill up your stope there is no argument in favor of your changing to our drill just becanse it will drill faster. We know that. But we know that the "CLEVELAND" Stope Drill will do as much work per shift when it is one year old as it will when one week old, and that is what you want, isn't it?

THE "CLEVELAND" Whether you purchase your stope drills after considering efficiency, repair cost, or drilling capacity, the "Cleveland" should be the stope drill you specify, for its design is such that the initial efficiency is the highest possible in an air tool, and the piston and valve action are so related that the "Cleveland" is just as efficient when it is a year old as when it is brand new; we know, and our information is gained from hundreds of installations that the "CLEVELAND" will cost less for repairs per year than any stope drill made; a 30 day trial will convince you that the "CLEVELAND" will drill as much per shift as any other stope drill, and we have machines always in stock ready to ship for trial if you will drop us a line, As you have everything to gain and nothing to lose, why not investigate NOW?

Bulletin 40-A



CANADIAN CLEVELAND DRILL CO. LIMITED

COBALT, ONT.
Box 310

NELSON, B. C.
P. O. Box 73

Dominion Coal Company
Limited

GLACE BAY NOVA SCOTIA

Yearly Output 3,500,000 Tons

High-grade Steam and Gas Coals

BUNKER COAL

Special facilities for quick bunkering of Ocean Steamers at Sydney and Louisburg.

For Prices and Terms apply at the Offices:

Dominion Coal Co., Limited, Glace Bay, N. S.
or at the offices of the Company at
112 St. James Street, Montreal, or
171 Lower Water Street, Halifax, N. S.

and to the following Agents:

R. P. & W. F. Starr, St. John, N. B.;
Peake Bros. & Co., Charlottetown, P. E. I.;
Hill, Blyth & Co., 4 Fenchurch Ave., London, E.C.
Harvey & Co., St. John's, Nfld.

SPEED

A single motion is quicker to make than two.

Only one motion is needed to make any character desired on the complete, straight-line, key-for-every-character keyboard of the

easy action
light running **Model 10**

Smith Premier

The Smith Premier Typewriter Company, Inc.
Syracuse, N. Y.

Canadian Representatives:
National Typewriter Co.,
87 Victoria St., Toronto
Wm. H. Hall & Co. 221 Notre Dame St. W., Montreal
E. R. McNeill,
166 Sparks St., Ottawa
A. Milne Fraser,
1157 Holis St., Halifax, N.S.



"Sullivan Value"

In Rock Drills

means that, under *your* working conditions, the drill that will cut fastest, and cost least for power, labor and repairs, is a "Sullivan."

Our Drill Book 660, tells why.

The last *Mine and Quarry* contains articles on:

Rapid Shaft Sinking — Coal Mining by Machinery — Iron Mining at Commonwealth, Wis.
An Arizona Copper Mine — A Southwestern Marble Quarry — Care of Stoping Drill Bits

Ask for a Copy.



Sullivan Rock Drill in a Menominee Range Iron Mine.

Air Compressors — Fans — Hammer Drills — Hoists — Diamond Drills — Coal Cutters

Sullivan Machinery Co.

150 Michigan Ave., Chicago, U.S.A.

BIRMINGHAM
BUTTE, Mont.
CLAREMONT, N.H.
DENVER
EL PASO
JOPLIN, Mo.
KNOXVILLE
NELSON, B.C.
NEW YORK
PARIS, FRANCE
PITTSBURG
COBALT, ONT.
ST. LOUIS
SALT LAKE
SAN FRANCISCO
SEATTLE
SPOKANE
SYDNEY, AUS.

BAGS!

JUTE COTTON DUCK

FOR

ASBESTOS COAL ORE CONCENTRATES

FLOUR GRAIN FEED

Printing a Specialty.

The Canadian Bag Company, Limited,
Head Office, Montreal,
Toronto, - Winnipeg



BEST FOR MINE BUILDINGS

Amatite has a genuine mineral surface.
This means that it requires no painting.
Contrast this with the fact that all ready roofings of smooth surface require painting regularly.
Figure out how much it costs you to paint the roofs of your mill, your shaft-house, repair shop and the other buildings?
Think of saving this amount not once—but three, four or five times—smooth-surfaced roofing requiring painting about every other year.
Amatite does not require any attention whatever after it is once laid.
Another point that recommends it to the Mine Manager is that it is easily laid and has galvanized nails and liquid cement in the center of each roll.
We can offer no more convincing argument in favor of Amatite than a sample of the roofing itself. The practical man recognizes its value immediately—its thickness, strength and durability.
We also have a booklet of facts. **Send your request for this free sample to the nearest office.**

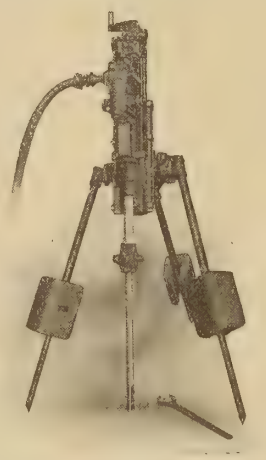
THE PATERSON MANUFACTURING CO., LTD.

MONTREAL TORONTO WINNIPEG
VANCOUVER ST. JOHN, N.B. HALIFAX, N.S.

ROCK DRILL EFFICIENCY

Rock Drill Efficiency is measured by the length of time the drill stays on the job doing good work, standing up to its original capacity without breakage delays.

MATERIALS—The most carefully selected materials are used in the manufacture of "**Rand Drills.**" Vital cast parts are made of high-grade open-hearth steel castings and steel parts are made of the finest steel, each selected to perform its particular function in the operation of the machine. Special treatment of steel parts insures the utmost service from each part.



WORKMANSHIP—**Rand Drills** are built by mechanics who are experts in their line, with years of experience and every facility and incentive for the best work, in a shop equipped with every modern convenience.

—

Can you afford to buy anything but the best—**RAND DRILLS.**

AIR COMPRESSORS
ROCK DRILLS
HAMMER DRILLS

CANADIAN RAND Co. LIMITED

COMMERCIAL UNION BUILDING
MONTREAL, QUE.
TORONTO, COBALT, ELK LAKE, WINNIPEG, ROSSLAND, VANCOUVER, HALIFAX

PNEUMATIC PUMPING SYSTEMS
PNEUMATIC TOOLS

Another Victory for the "DEISTER"



Price $350.00

We are placing 180 Improved No. 3 Deister Slime Tables and 132 No. 2 Deister Sand Tables in the Miami Copper Company's mill, Miami, Arizona. This large order was the direct result of the showing made by the Deister Tables. The No. 2 Deister competing against all of the well-known makes of tables on the market—The Improved No. 3 Deister competing against vanners.

By eliminating teeth in the roller and rocker arm, our driving mechanism is now the most effective, noiseless and durable on the market.

The Deister Concentrator Co., Ft. Wayne, Indiana, U.S.A.

The Canadian Bank of Commerce

Have opened a Branch at

PORCUPINE

A general banking business will be transacted.

Draeger Rescue Apparatus

Will enable rescuers and fire fighters to do strenuous work amid the foulest atmosphere.



Write at once for Free Catalogue.

RICH. JACOBSON

70 SHOE LANE, LONDON, E.C. ENGLAND

Successfully used at the following

EXPLOSIONS and MINE FIRES

Courrieres	1906
Reden	1907
Merlbach	1907
Wharn-Silkstone	1907
Hamstead	1908
Kharkov	1908
Maypole	1908
Sydney Mines	1908
Marianna	1908
St. Paul	1909
Stellarton	1910

IN USE AT

The Dominion Coal Co.'s, Ltd.
Nova Scotia Iron & Steel Co.
and all the leading
English
American,
French,
German,
Belgian, etc.
Rescue Stations

3,000 IN USE

The Michaelsen Ore Crusher and Pulverizer

CHARLES O. MICHAELSEN, owner of Pat. No. 113991 is now prepared to furnish to the mining trade a new device in the line of an **Ore Crusher and Pulverizer.** This Crusher and Pulverizer is unexcelled in capacity, economy of power, economy of labor and repairs, and most essential of all, it accomplishes even pulverization.

MANUFACTURED BY

Northern Foundry & Machine Co., Ltd.

SAULT STE. MARIE, ONTARIO, CANADA

For further particulars address CHAS. O. MICHAELSEN, care of Northern Foundry and Machine Co.

Specify Distinctly  Allen's Stag Brand

"STAG" BRAND.

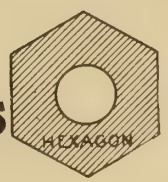


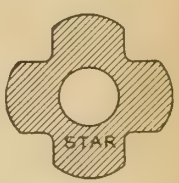


SOLID OR HOLLOW

Mining Drill Steels

All Sizes and Sections from Stock

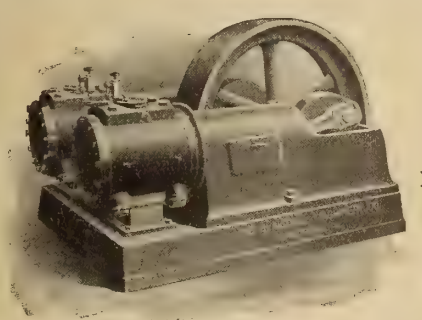




SOLE MAKERS AND SELLERS: **EDGAR ALLEN & Co., Limited**

THOS. HAMPTON, Manager for Canada

330 ST. JAMES ST., MONTREAL



AIR COMPRESSORS

STEAM---ELECTRIC---POWER

FOR ALL CLASSES OF SERVICE WRITE US YOUR REQUIREMENTS

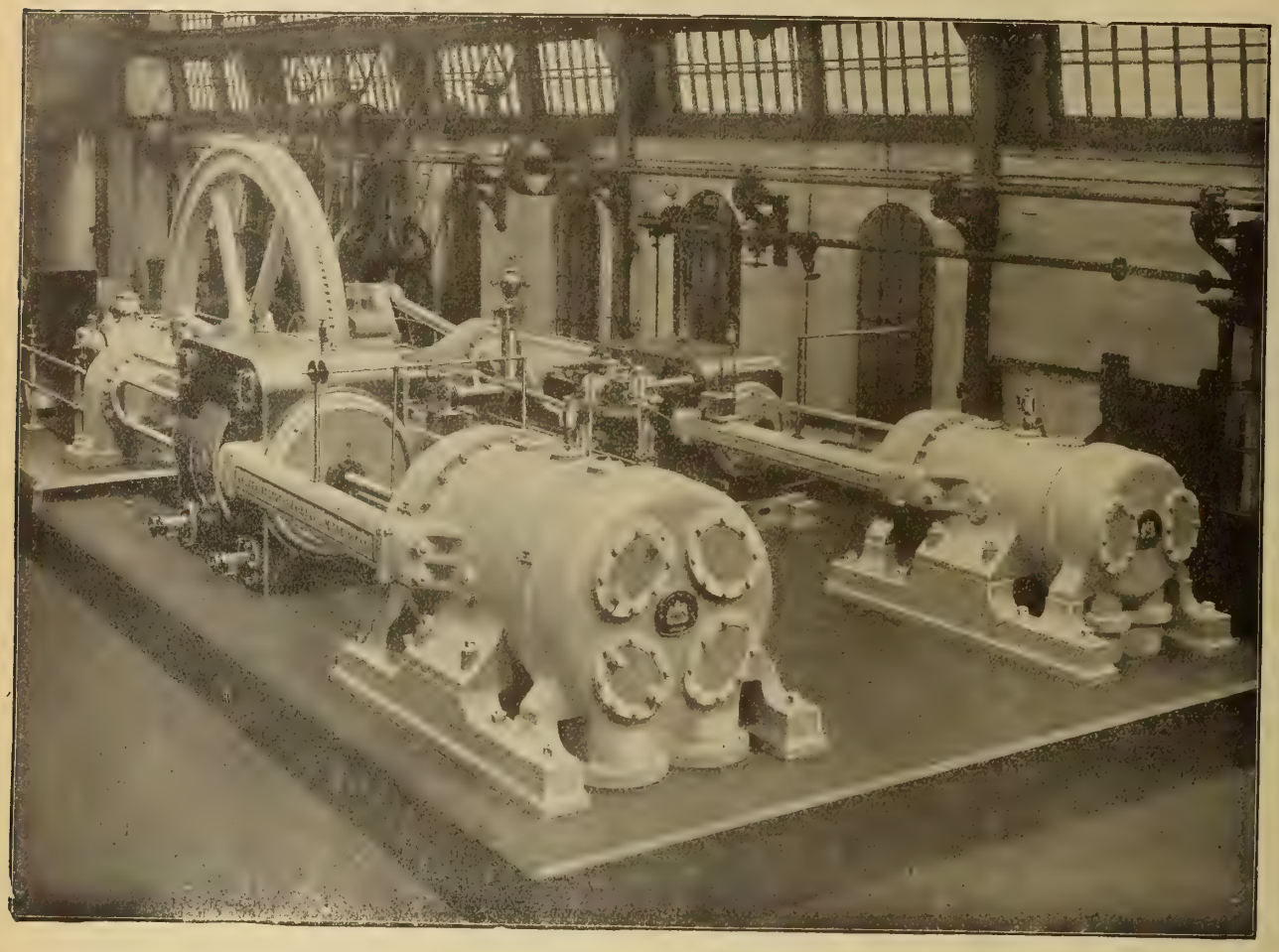
Canada Foundry Company,

LIMITED

Toronto Montreal Halifax Ottawa Cobalt Winnipeg Calgary Vancouver Rossland

Walker Brothers (Wigan) Limited

WIGAN, ENGLAND



Pair Compound Corliss Steam Two-Stage Air Compressing Engines, with Valves to Walker's Latest Patents.

AIR COMPRESSORS

DRIVEN BY STEAM OR ELECTRICITY.

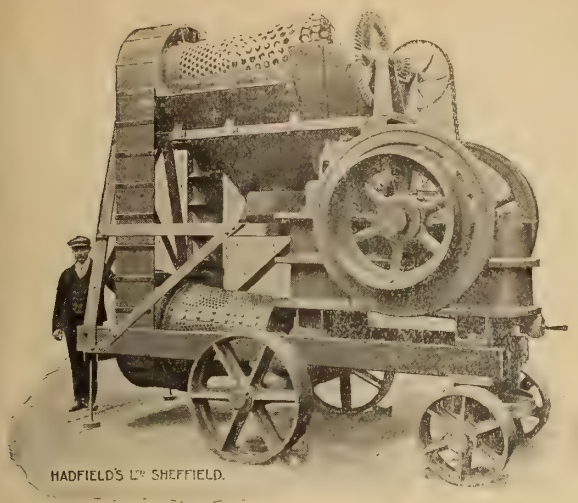
To New Patented Designs, giving Increased Efficiency with Higher Piston Speeds. **(Applicable also to Existing Engines.)**

THE FOLLOWING COMPANIES HAVE INSTALLED **WALKER BROTHERS** AIR COMPRESSORS, IN CAPACITIES RANGING UP TO 6300 CUBIC FEET OF FREE AIR PER MINUTE, ALL OF WHICH ARE PROVIDED WITH **WALKER PATENT AIR VALVES.**

Dominion Coal Company, Limited
Dominion Iron & Steel Company, Limited
Intercolonial Coal Mining Company, Limited
Nova Scotia Steel & Coal Company, Limited
Belmont Gold Mine, Limited
Cape Breton Coal, Iron & Railway Company, Limited
The Crow's Nest Pass Coal Company, Limited

SOLE CANADIAN REPRESENTATIVES **PEACOCK BROTHERS** 68 BEAVER HALL HILL, MONTREAL, P.Q.

When answering Advertisements please mention THE CANADIAN MINING JOURNAL



HADFIELD'S PORTABLE COMBINED CRUSHING, SCREENING, ELEVATING and LOADING APPARATUS

HADFIELD'S STEEL FOUNDRY CO., LTD., . . SHEFFIELD

Manufacturers of

COMPLETE CRUSHING PLANTS

of every description,

Embodying Hadfield's Latest Improvements

Hadfield's Patent 'Era' Manganese Steel

is used for all the wearing parts. This steel is the supreme material for Tramway Track-work and parts of machinery subject to great abrasive strain.

Steel Castings of every description

ETC., Including

WHEELS AND AXLES, ROLLERS, PULLEYS, PEDESTALS, ROPE CLIPS, HAMMERS, PICKS, SHOVELS, ETC., ETC.

Sole Representatives for Canada of the Hadfield's Steel Foundry Company, Limited, Sheffield.

PEACOCK BROS.

68 Beaver Hall Hill, - - Montreal, P.Q.

FOR **DYNAMITE, ROCK-CHIEF**

AND ALL KINDS OF

BLASTING SUPPLIES

QUALITY UNSURPASSED
ALL PRODUCTS GUARANTEED
CAPACITY UNEQUALLED IN CANADA

OUR SPECIAL AIM:

Prompt Attention and Absolute Satisfaction

WRITE, WIRE OR TELEPHONE

ONTARIO POWDER COMPANY LIMITED

KINGSTON, ONT.

DANIEL SMITH, President — C. A. MACPHERSON, Sec-Treas.

MINING MACHINERY

Revolving Tipples, Screens, Car Hauls, Mine Cars, Conveyors, etc.

Canadian Manufacturing Agents for James Ore Concentrating Tables and Edwards Ore Roasting Furnaces.

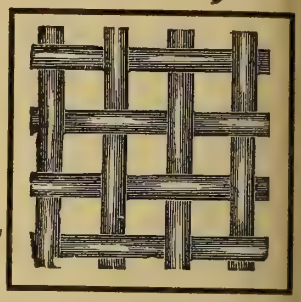
CORRESPONDENCE SOLICITED

THE BROWN MACHINE COMPANY, LIMITED

NEW GLASGOW — ENGINEERS — NOVA SCOTIA

THE DOUBLE CRIMP

in the wire of Greening's Mining Screens is a very valuable feature. It insures absolutely square and uniform openings, adds greatly to the strength and prevents displacement of the wires in use. We are the largest and oldest established manufacturers of mining screens in Canada. Write for Catalogue 2.



THE B. GREENING WIRE CO., Limited

HAMILTON, ONT. MONTREAL, CAN.

NOVA SCOTIA STEEL & COAL CO., Limited

Proprietors, Miners and Shippers of **Sydney Mines Bituminous Coal.** Unexcelled Fuel for Steamships and Locomotives, Manufactories, Rolling Mills, Forges, Glass Works, Brick and Lime Burning, Coke, Gas Works, and for the manufacture of Steel, Iron, Etc. **Collieries at Sydney Mines, Cape Breton.**

Manufacturers of HAMMERED and ROLLED STEEL for Mining Purposes.

Pit Rails, T Rails, Edge Rails, Fish Plates, Bevelled Steel Screen Bars, Forged Steel Stamper Shoes and Dies, Blued Machinery Steel 3/8" to 1/4" Diameter, Steel Tub Axles Cut to Length, Crow Bar Steel, Wedge Steel, Hammer Steel, Pick Steel, Draw Bar Steel, Forging of all kinds, Bright Compressed Shafting 5/8" to 5" true to 2/1000 part of one inch. A full stock of Mild Flat, Rivet Round and Angle Steels always on hand

SPECIAL ATTENTION PAID TO MINERS' REQUIREMENTS. CORRESPONDENCE SOLICITED.

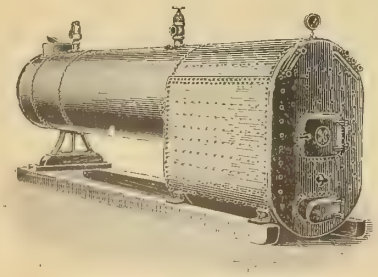
Steel Works & Head Office: **NEW GLASGOW, NOVA SCOTIA**

DOMINION BRIDGE CO., LTD., MONTREAL, P.Q.

BRIDGES

TURNTABLES, ROOF TRUSSES
STEEL BUILDINGS
ELECTRIC and HAND POWER CRANES
Structural METAL WORK of all kinds

BEAMS, CHANNELS, ANGLES, PLATES, ETC., IN STOCK



BOILERS AND ENGINES

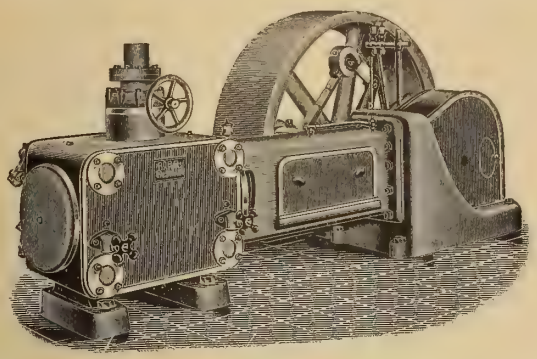
Of all Types and Sizes for Mining and General Work
HEATERS, TANKS, RETORTS, RIVETED PIPE, ETC.

E. LEONARD & SONS

LONDON, ONT.

Agencies and Warehouses:
ST. JOHN, N.B. MONTREAL WINNIPEG, MAN. CALGARY, ALTA
VANCOUVER, B C.

Robb Corliss Engines



Have the Armstrong-Corliss valve gear, which will operate at a higher speed than the ordinary releasing gear.

This valve gear does not depend on springs or dash pots for closing and runs without noise.

The wearing parts of the valve gear are enclosed in a casing and run in oil so that friction is reduced to a minimum.

Robb Engineering Co., Ltd., Amherst, N.S.

DISTRICT OFFICES:

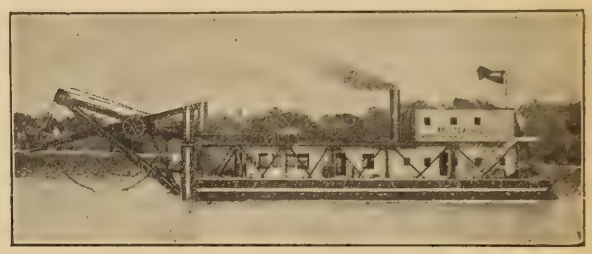
Canadian Express Building, Montreal, Que.	R. W. Robb,	Manager
Traders Bank Building, Toronto, - -	Wm. McKay,	"
Union Bank Building, Winnipeg, - -	W. F. Porter,	"
Grain Exchange Building, Calgary, Alta. -	J. F. Porter,	"

M. Beatty & Sons

Limited

Welland, Ontario

MANUFACTURERS OF



Dredges, Ditchers, Derricks,

Steam Shovels, Steel Dump and Deck Scows,
Mine Hoists, Hoisting Engines,
Centrifugal Pumps,

Submarine Rock Drilling Machinery,

Steel Skips, Clam-Buckets,
Coal and Concrete Tubs,
and other Contractors Machinery.

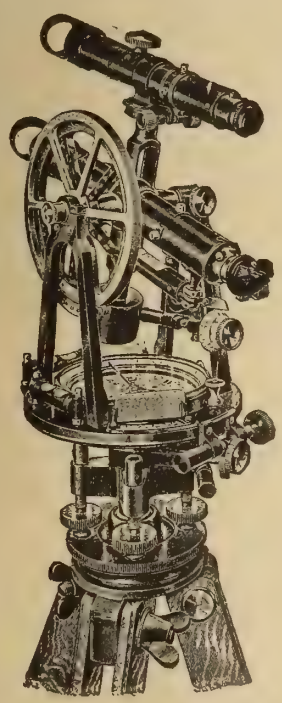
Sole Canadian Maker Williams "Faivrette" Clams

Agents: H. E. PLANT, Montreal, Que.; E. LEONARD & SONS, St. John, N. B., Calgary, Alta. R. HAMILTON, & CO., Vancouver, B.C.

DIETZGEN'S Field Instruments

FOR

Civil, Mining Engineers & Surveyors



Manufacturers Instruments of Precision

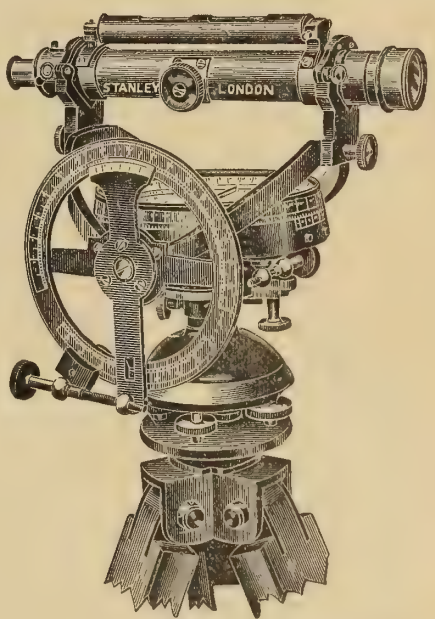
also

Engineers and Draftsmens Supplies

Eugene Dietzgen Co., Limited

TORONTO

STANLEY, LONDON



Combined Mining Dial, Level, and Theodolite

The Largest Manufacturers of Surveying and Drawing Instruments in the World Please send for our J65 Catalogue, &c. (post and duty free) and compare our prices with those of other first-class makers.

TRADE STANLEY MARK

W. F. Stanley & Co.

LIMITED

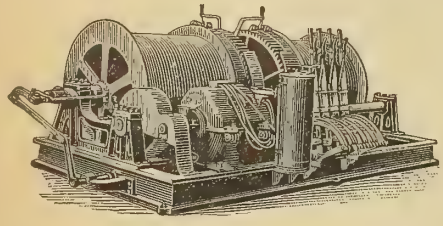
Great Turnstile, London, England

Flory Hoisting Engines

STEAM AND ELECTRIC

Especially designed for Mines, Quarries and Contractor's work, such as Pile Driving, Bridge Building, and general Construction work.

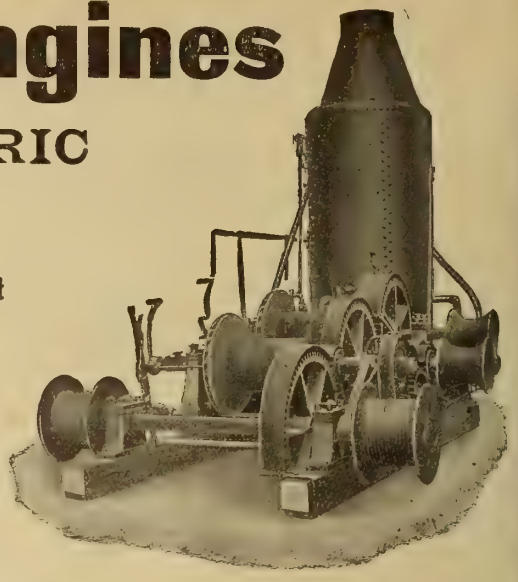
The FLORY CABLEWAY SYSTEM is Superior to any on the Market



Slate Mining and Working Machinery

SALES AGENTS:
J. MATHESON & CO.,
New Glasgow, Nova Scotia.
MUSSENS LIMITED,
Montreal, Que.

S. Flory Mfg. Co.



ASK FOR OUR CATALOGUES

Office and Works: BANGOR, Pa., U.S.A.

Canadian Mining Institute

Members visiting Montreal are invited to make use of the rooms for reading or writing purposes.

Office hours: 9.30 a.m. to 1.30 p.m. and 2.30 p.m. to 6.00 p.m.

The Secretary will also be glad to receive mail matter addressed to members in his care to the above address, and to forward same when required.

OFFICES AND LIBRARY,
ROOMS 3 AND 4,
WINDSOR HOTEL,
MONTREAL.

Why the C.P.R. North Toronto Route to Ottawa and Montreal is the Logical One

The train leaves as follows:

Leave North Parkdale - - -	9.15 p.m.	Leave West Toronto - - - -	9.30 p.m.
Arrive North Toronto - - -	9.40 p.m.	Leave North Toronto - - -	10.00 p.m.
Arrive Ottawa, 6.50 a.m.		Arrive Montreal, 7.00 a.m.	

Daily except Sunday.

¶ The residents of Toronto are adjacent to either North Parkdale, West Toronto or North Toronto stations, same being easily accessible and closer to residential districts.

¶ The North Toronto route is over an hour faster and overcomes a long hill climb for the train obviating any inconvenience and ensuring early arrival at Montreal and Ottawa.

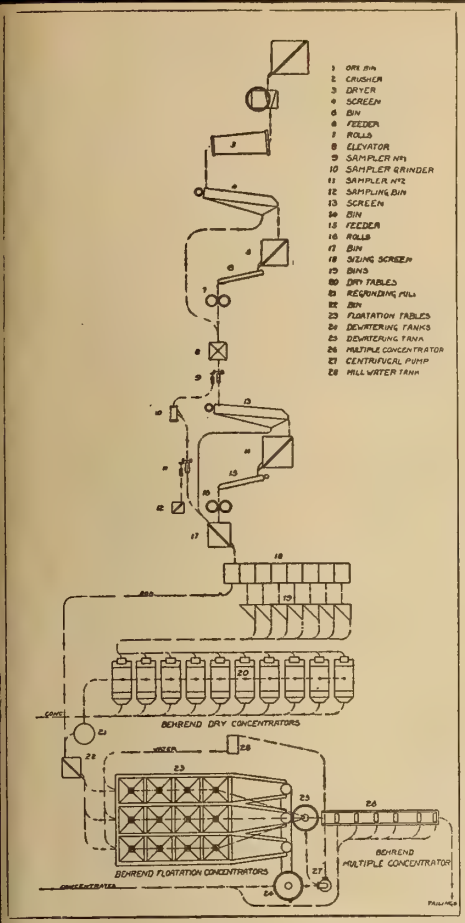
¶ The roadbed has been improved till it is unexcelled in Canada. Practically half the line is double tracked.

¶ The equipment is "Canadian Pacific Standard," a synonym for the "best" and attentive porters, non-obsequious, ensure efficient service.

SLEEPING CAR SPACE HELD

Toronto City Office, S. E. Corner King and Yonge Sts.

North Toronto Station **West Toronto Station**



FLOW SHEET

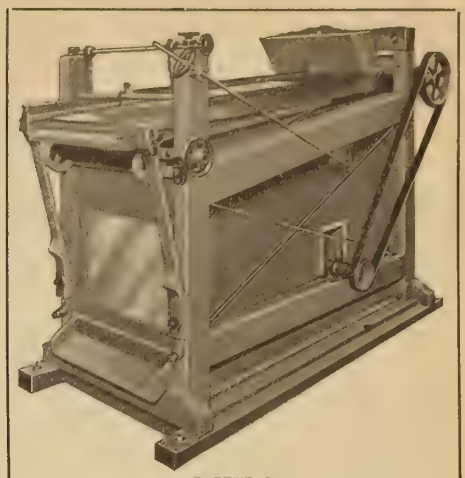
OF A

MODEL PLANT

FOR THE

BEHREND SYSTEM

OF



PATENTED
BEHREND DRY CONCENTRATOR

DRY and WET CONCENTRATION

NOTE:—OUR *NEW* TESTING PLANT is capable of treating 10 tons of ore per day, and is equipped to test any kind of ore, having all necessary appliances, such as Driers, Crushers, Rolls, Sizing Screens, DRY CONCENTRATORS, FLOTATION CONCENTRATORS, and WET MULTIPLE CONCENTRATORS. ALSO a MODERN LABORATORY and MECHANICAL DEPARTMENT with competent staff under the supervision of an expert engineer and analyst.

Send us small sample of ore for our preliminary report.

BEHREND CONCENTRATORS, LIMITED

32 ST. SULPICE STREET, MONTREAL



There have been 22 championship contests for speed in typewriting. The Underwood has won them all.

Being the best machine for the most exacting requirements it does not lose any of its efficiency in the more ordinary uses.

United Typewriter Co., Ltd.
Toronto

and all other Canadian cities.

NEW YORK PARIS LONDON

JACQUES BASZANGER & CO.,

108 Fulton St., New York City.

Importers of

Carbons

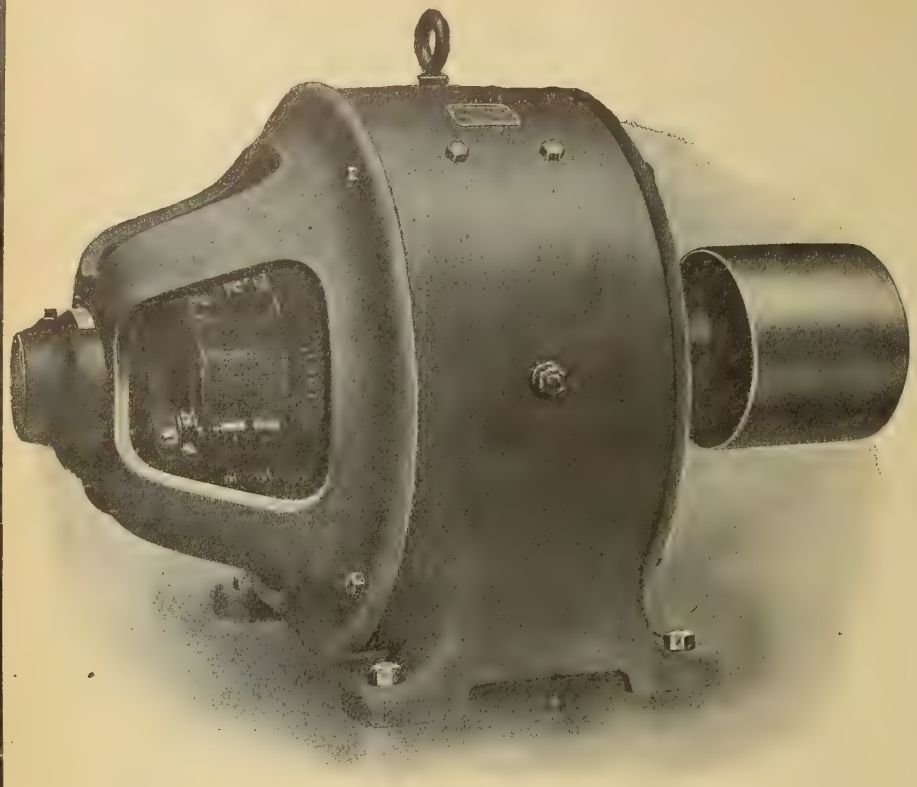
(Black Diamonds) for Diamond Drills



Largest carbon ever found. ¼ actual size.
Sold by us Sept. 24th, 1895.

Scranton, Pa. - - 314 Peoples Nat. Bank Bldg.
Duluth, Minn. - - 710 Torrey Bldg.
Denver, Col. - - 225 E. Maple St.

When wanting goods write nearest office.



"Bruce Peebles" Standard Protected Type

Bruce Peebles & Co., Ltd.

****

Dynamos and Motors for all Conditions of Service

***

Turbo Generators

***

La Cour Converters

***

Reliability and Economy Guaranteed

***

VANDELEUR AND NICHOLS

Dineen Building, TORONTO

Eastern Representative
A. P. Bury, MONTREAL

Gasoline Hoisting Machinery

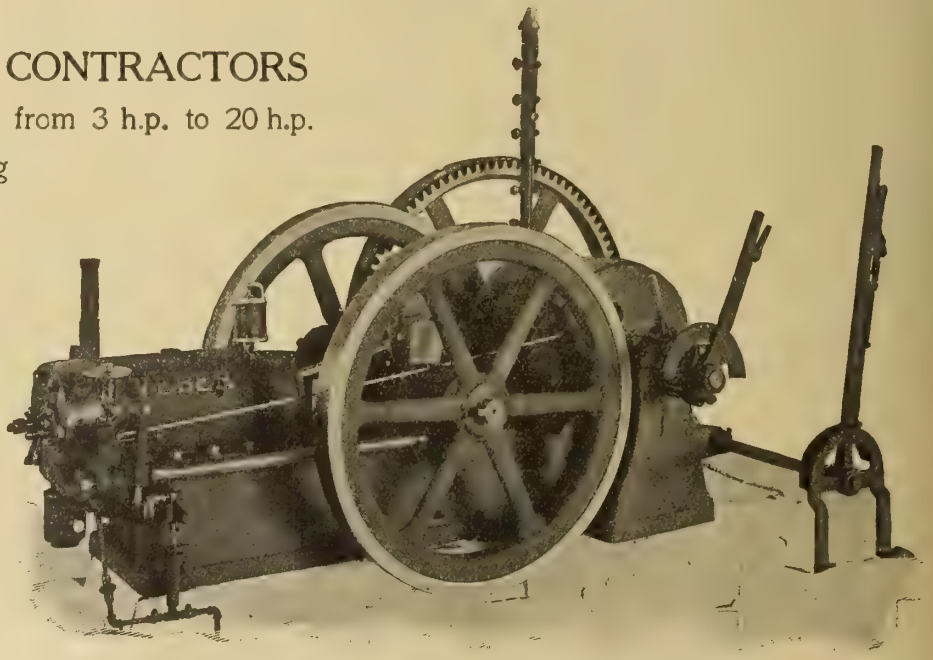
FOR MINERS AND CONTRACTORS

Built in all sizes from 3 h.p. to 20 h.p.

The ideal power for hoisting

NO BOILER
NO SMOKE
NO STEAM
SIMPLE
ECONOMICAL
RELIABLE
EASY TO TRANSPORT

Prices on Application



The Canada Producer and Gas Engine Co., Limited

S. Dyment, Pres. **BARRIE, ONT., Canada** Wm. Thompson, Man. Director.

A PROPER SAFETY LAMP

SHOULD BE SAFE, STRONG, SIMPLE AND EASY TO MANIPULATE IN THE LAMP CABIN —OURS FILLS THIS BILL.



"Hailwood's Improved Safety Lamp."

By means of Expensive Special Accurate Machinery we produce nothing but the very best possible lamp.

Don't continue risking your Mines with worn out unsafe old style lamps but possess an installation of our goods and follow the example of the majority of the best Colliery Concerns in existence by obtaining from us a complete installation of Oil Lamps, Electrically Ignited and Magnetically Unlocked together with Cabin Lamp Lighting and Unlocking Machines, Oil-filling Machines, Underground Fool Proof Lamp Re-lighting Machines.

ACKROYD & BEST, LTD.

MORLEY, NR. LEEDS, ENGLAND

For Prices and Particulars address:—

ACKROYD & BEST, LIMITED

No. 2 Arrott Power Buildings, Barker Place

PITTSBURGH, PA., U.S.A.

JENA

GLASSWARE

THE BEST IN THE WORLD

Sole Agents for Canada

LYMANS, Limited

(ESTABLISHED 1800)

Laboratory Apparatus and Chemicals

MONTREAL

DIAMOND DRILLS

We manufacture the most complete line of Diamond Drills of any concern in the world. 20 varieties, 350 to 6000 ft., $400 to $10,000. Hydraulic Feed, Screw Feed, Hand Power, Horse Power, Gasoline, Steam, Air and Electricity. **Send for Catalogue.**

Standard Diamond Drill Co.

138 Washington Street, Chicago, U.S.A.

MILLING AND MINING MACHINERY

Shafting, Pulleys, Gearing, Hangers, Boilers, Engines, and Steam Pumps, Chilled Car Wheels and Car Castings, Brass and Iron Castings of every description, Light and Heavy Forgings.

Alex. Fleck Ltd. - Ottawa

Measuring Tapes



K & E Measuring Tapes possess every desirable quality—clearness, accuracy and durability. They are made in largest variety to meet every requirement of engineering work.

All **K & E** Steel Tapes have the KECO finish, which produces an even black tape line with brilliant, bright steel graduations and figures. The KECO finish guards against rusting and obviates the necessity of greasing the line to protect it.

Send for Complete Catalogue.

KEUFFEL & ESSER CO.

MONTREAL, 252 Notre Dame St. W.

General Office and Factories,

HOBOKEN, N.J.

New York Chicago St. Louis San Francisco

Mathematical and Surveying Instruments

Drawing Materials Measuring Tapes

Northern Canada Supply Company, Ltd.

Importers and Dealers in

Mines, Mills, and Contractors' Supplies

Office and Warehouse

Cobalt, Canada

We Stock at Cobalt: Boilers, Hoists, Rock and Hammer Drills, Ore Cars, Buckets, Steel Rails, Pipe and Fittings, Valves, Steel Plates, Bar Iron, Shafting, Pulleys. Belting, Hose, Packings, General Mining and Steam Fitters' Tools; Contractors' and Miners' Supplies.

NORTHERN ONTARIO AGENTS FOR:—

The Sullivan Machinery Co., Ltd. Chicago
The Dodge Manufacturing Co., Ltd. Toronto
Gutta Percha & Rubber Manufacturing Co. Toronto
Robb Engineering Co., Ltd. Amherst, N. S.
Canadian Buffalo Forge Co., Ltd. Montreal
London Machine Tool Co., Ltd. London
Waterous Engine Works Co, Ltd. Brantford
Canadian Bag Co., Ltd. Montreal
Denver Fire Clay Co. Denver, Col.
J. C. McClaren Belting Co., Ltd. Montreal
Dominion Wire Rope Co. Montreal

ARE YOU CONFRONTED WITH A DIFFICULT ORE-SEPARATING PROBLEM?

THE WETHERILL MAGNETIC SEPARATING PROCESS

MAY PROVE THE SOLUTION.

For Information and for Illustrated Pamphlet, apply to

WETHERILL SEPARATING CO., 52 BROADWAY, N.Y.

GOLD MEDAL awarded at the WORLD'S FAIR, ST. LOUIS, MO.

Mfg. Agents for Canada: ROBERT GARDNER & SON, MONTREAL. P.Q.

Beath's Steel Kegs

Beat any Shipping Package in the World. Unequalled for Shipping Concentrates, Oxides and in fact everything requiring protection in transit.

They're **Light, Cheap and Strong.**

Write for Samples and Prices

W. D. BEATH & SON, Ltd. Toronto

CONTRACTORS TO ADMIRALTY, WAR OFFICE AND COLONIAL GOVERNMENTS

Allan, Whyte & Co.

CLYDE PATENT WIRE ROPE WORKS

Rutherglen, Glasgow, Scotland

WIRE ROPES

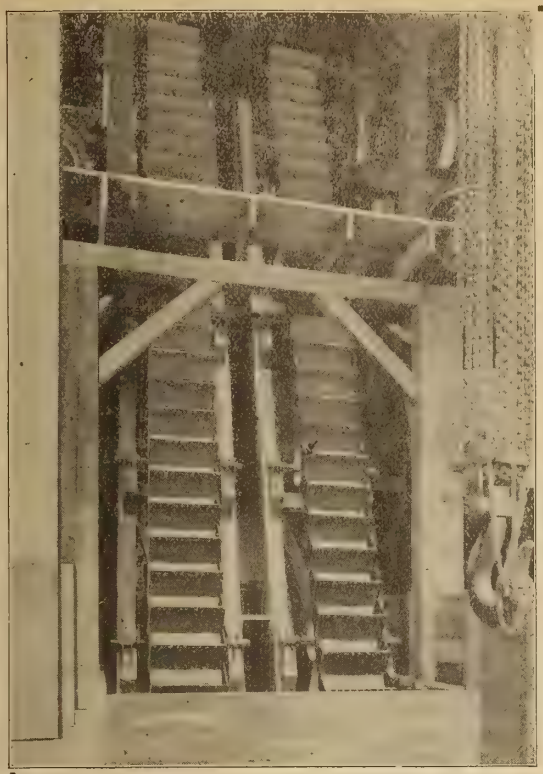
For Winding and Haulage in Collieries and Mines, Aerial Ropeways, Transmission of Power, Suspension Bridges, etc. SPECIALLY FLEXIBLE ROPES for Hoists, Winches, Loading and Discharging Cranes, Shipping Purposes, Towing, Alligator and Dredger Ropes, etc. SPECIAL ROPE FOR LOGGING.

Our Ropes are made from wire drawn for our exclusive use, and are at work all over Canada. Messrs. Nova Scotia Steel & Coal Co., Ltd., who use them largely, write that one of our haulage ropes at their Wabana Mine has been in use for **5 years**, drawing over 1,750,000 tons and still in good condition. From the Atlantic to the Pacific they are well known and our agents will be only too pleased to give all information to enquirers. They may be had from the following, viz:

Nova Scotia: Wm. Stairs, Son & Morrow, Limited. New Brunswick: W. H. Thorne & Co., Limited.
Montreal and Toronto: Drummond, McCall & Co. Vancouver, B.C.: John Burns. Winnipeg: David Philip, Portage Ave.

HIGHEST Quality. MODERATE Price. Prompt Delivery. SATISFACTION in use.

Cables: "Ropery, Rutherglen." Codes: A. B. C. (4th and 5th Editions), A.I., Liebers and Private



Two Jeffrey Continuous Bucket Elevators, 65 feet high between centres, handling stone at a large Stone Crushing Plant.

Jeffrey Elevators

For Handling Coal, Stone, Ore, etc.

They are the most dependable Elevators built and can be adapted to meet all practical requirements.

Write for Catalog 81

Jeffrey Electric Locomotives, Conveyers, Coal Tipples, Screens, Complete Coal Mine Equipments

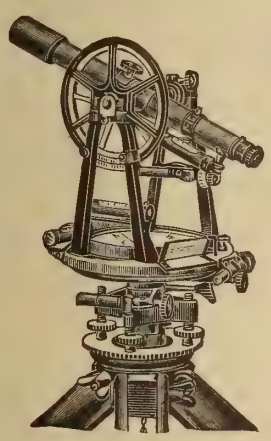
See Catalog 42

The Jeffrey Mfg. Co.

Canadian Works - MONTREAL

Cote and Lagauchetiere Streets

Toronto Office, 174 King St. East



C. L. Berger & Sons

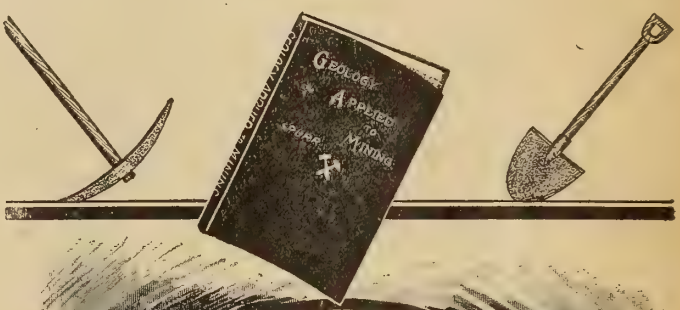
37 WILLIAMS STREET

BOSTON, - MASS.

SPECIALTIES :

Standard Instruments and Appliances for Mining, Subway, Sewer and Tunnel, and all kinds of Underground Work.

SEND FOR CATALOGUE.



Geology Applied to Mining

By Josiah Edward Spurr, A.M.

Mining men, prospectors, investors and students have found this book a treasure house. It is a plain, simple, straightforward application of economic geology to mining problems. It is a concise summary of the principles of ore deposits for the man who wishes to exploit them. It isn't *geology*, but *geology* as *applied to practical mining*. It boils down the abstract science for the practical mining man and student—the processes of deposits, the arrangement of stratified rocks, igneous rocks, structures, placers, chemical geology, etc., etc.

Library edition, cloth, $1.50 net, postpaid
Leather, pocket size, $2.00 " "

BOOK DEPT.
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING,
TORONTO

Springhill Coal

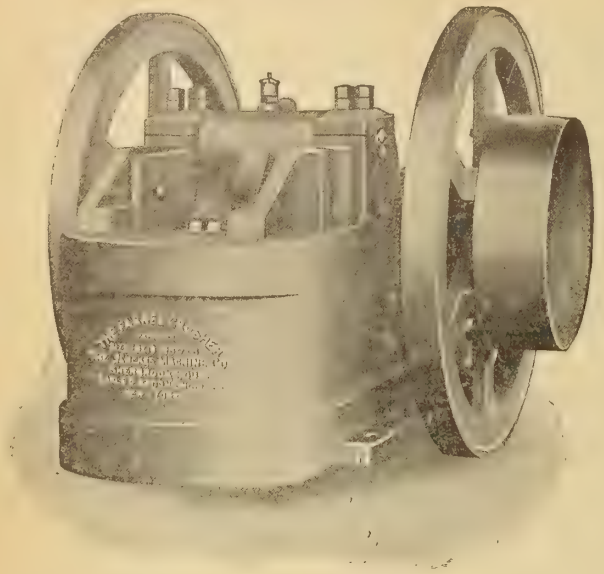
The Cumberland Railway & Coal Co.

Are prepared to deliver this well known Steam Coal at all points on the lines of G. T. R., C. P. R., and I. C. Railway and connections.

HEAD OFFICE

80 St. Francois Xavier Street, Montreal

Address P.O. Box 196



The Farrel Bacon Crusher

STYLE "B"

Will crush the hardest rock quicker and at less cost than is possible with any other.

Wearing parts such as Jaw Plates and Toggle Seats can be easily renewed even in the largest crushers without dismantling the machine, these parts are not expensive and can be put in place with practically no loss of time.

Catalogue No. 603 sent on request.

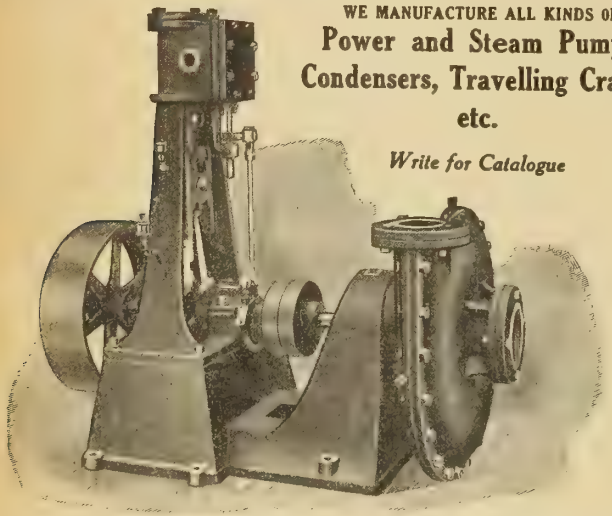
The Jenckes Machine Co., Limited

General Offices: Sherbrooke, Quebec.

Works: Sherbrooke, Quebec - - - St. Catharines, Ontario

Sales Offices :

Sherbrooke St. Catharines Cobalt Montreal Rossland Vancouver

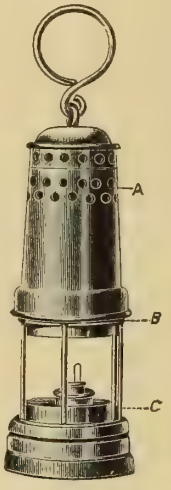


WE MANUFACTURE ALL KINDS OF

Power and Steam Pumps, Condensers, Travelling Cranes, etc.

Write for Catalogue

The Smart-Turner Machine Co., Ltd. - Hamilton, Ont.



DAVIS | DERBY.

Miners' Safety Lamps

GAS TESTING LAMPS

(STOCK AT MONTREAL)

SEND FOR CATALOGUES

PEACOCK BROS.

68 BEAVER HALL HILL

MONTREAL

Write for pamphlet No. 42 M.

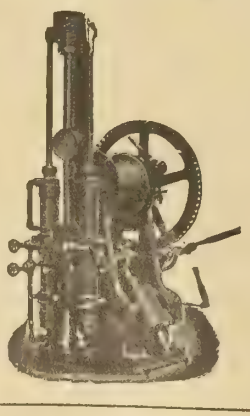
Diamond Drills

Machines of all capacities for Prospecting Mineral Veins, ETC.

Take out a solid core

AMERICAN DIAMOND ROCK DRILL COMPANY

90 WEST ST. NEW YORK



LUDWIG NAUEN

HAMBURG & LONDON

IMPORTER AND DISTRIBUTOR OF

ASBESTOS, CRUDE, & FIBRE

PLEASE ADDRESS YOUR INQUIRIES WITH SAMPLES TO "HAMBURG I."

THE CANADIAN MINING JOURNAL

VOL. XXXI. TORONTO, Dec. 15, 1910 No. 24

The Canadian Mining Journal

With which is incorporated the
"CANADIAN MINING REVIEW"
Devoted to Mining, Metallurgy and Allied Industries in Canada

Published fortnightly by the
MINES PUBLISHING CO., LIMITED

Head Office - - Confederation Life Building, Toronto
Branch Offices Montreal, Halifax, Victoria, and London, Eng.
London Office . . Walter R. Skinner, 11-12 Clement's Lane, London, E.C.

Editor:
J. C. MURRAY, B.A., B.Sc

SUBSCRIPTIONS—Payable in advance, $2.00 a year of 24 numbers, including postage in Canada. In all other countries, including postage, $3.00 a year.

Advertising copy should reach the Toronto Office by the 8th, for the issues of the 15th of each month, and by the 23rd for the issues of the first of the following month. If proof is required, the copy should be sent so that the accepted proof will reach the Toronto Office by the above dates.

CIRCULATION.

"Entered as second-class matter April 23rd, 1908, at the post-office at Buffalo, N.Y., under the Act of Congress of March 3rd, 1879."

CONTENTS.

Editorials 741
(a) President Eliot on Education 741
(b) A European View of Porcupine 742
(c) Developments in Nova Scotia 743
(d) English Railway Coal Bills 743
(e) Porcupine and Papers. 743
(f) A Railway to Porcupine 744
(g) Newspaper Comment 744
(h) Editorial Notes 744
Book Reviews 744
Correspondence 745
Mining Case Dismissed 746
Porcupine and the Mother Lode, by R. E. Hore 746
The Standard Mine, Slocan District, British Columbia, by E. Jacobs 747
Mining and the Industrial Evolution, by R. B. Lamb 749
Our London Letter 752
Granby Company's Annual Report 754
Unique English Device for Detecting Fire-Damp 756
Electric Smelting 756
Cobalt Mine Royalties 757
Rock Crushing Plant 757
A Remarkable Compressed Air Mine Locomotive 763
Hidden Creek Copper Mine, Observatory Inlet, B.C. 763
Personal and General 764
Special Correspondence, etc. 764

PRESIDENT ELIOT ON EDUCATION.

Not many years ago the equipment of the best of our Canadian mining schools consisted essentially of "a blackboard and a piece of chalk." There are men still in the prime of life who were pioneers in other branches of applied science in this country. If we consider Canadian history to have begun at the time of the American revolution of 1776, when the people of the northern half of the continent became distinct politically from those of the southern, it took over a hundred years for our people to learn that the old educational system of Europe was not adapted to the needs of a young country. For nearly a century our system of higher education at least was based on that of the old world. Attention was given merely to book-learning, which resulted chiefly in memory training. It is true that the sciences were taught in our universities, but the methods of instruction were similar to those employed in the classics. Practical work was not encouraged. For instance, in 1853, when the late Dr. Chapman began his work as Professor of Mineralogy and Geology in the University of Toronto, his request for laboratory facilities met with refusal from the board of trustees. He was told that practical work was out of place in a university and that he was to teach by book methods.

However, during the latter part of the century referred to, changes of view in methods of education were taking place abroad. Herbert Spencer's "Education" was published in 1860. "It is a vindication of the study of nature and the rightful supremacy of science in education. It proves that the latest and most highly evolved form of knowledge is the best, both for guidance of life and for the discipline of the mental powers." This book had a profound influence. It crystallized the more or less hazy ideas that had begun to be held by certain educationists and others. The controversy is still waged, but much more mildly, as to the comparative merits of the so-called "cultural" studies and science or utilitarian subjects.

Mining engineering can scarcely be said to be classed as a profession in Britain. It is considered *infra dig* for sons of "society people" to take up the study of mining or metallurgy, although Britain owes her standing among the nations as much, if not more, to her engineers and men of science as to any other class. Mining engineering there is classed as a trade and its members as mechanics. It is considered quite proper, however, for a man of the highest social position to occupy the post of dummy director on the board of a mining company.

At the present time the Dominion Government's Royal Commission on Technical Education is holding sessions in various parts of the country. For this reason and owing to the fact that false views concerning the

difference between cultural and practical studies still exert baneful influences, although small compared with formerly. President Eliot's recent address in the University of Toronto "On the Development of the American University during the Last Sixty Years" was timely and of great value.

Dr. Eliot became a student of Harvard College in 1849, when the studies were all "cultural," the only faculty trained being the memory. Since then all his time has been spent in college work. He was president of Harvard, the greatest and oldest of American universities, from 1869 to 1909, when he retired as president-emeritus. His long experience as president and teacher in Boston, "the centre of culture," and his acknowledged high standing, not only as an educationist but as one of the most eminent of Americans, give great weight to his opinions on educational problems in general and especially to his views on the relative cultural values of the various subjects of study.

Parts, at least, of Dr. Eliot's address must have come as a great shock to the sticklers for "cultural" as opposed to utilitarian studies. They must have rubbed their eyes and asked themselves, "Can this be a Harvard man and a Bostonian?" Let us give Dr. Eliot's own words concerning cultural studies: "I think we should have everything taught by utilitarian examples. It has too long been believed that nothing which is useful can be cultural. I would reverse the maxim and say that nothing can be cultural—in a democracy at any rate—which is not useful. Many believe that culture must come from books; that the usefulness of a thing is to its positive detriment; that the fact that it can be applied shows that it is inappropriate material for educative purposes. I believe these views to be fallacious."

Even after the views of Spencer, Eliot and others of the same school of thought have been widely accepted, there have been great practical difficulties in getting the teaching of utilitarian subjects on a proper basis. Classics and other subjects of the memory-training kind have been taught for centuries. Methods of teaching these subjects have been perfected, while the teachers of science or utilitarian subjects have had little experience to draw upon and have employed cruder or more imperfect methods. Naturally when the purely book subjects were better taught in the schools, preparing pupils for entrance to technical institutions or universities, than were the sciences, the latter subjects would attract few of the best pupils. They naturally take up the subjects of study taught by the best teachers. Until within a very few years courses in science or technology have not attracted a fair percentage of students of first rate ability. Science is only now coming into its own. The best students instead of following the older courses of study are entering the science courses in increasing numbers. A good instance of this is found in the case of the University of Toronto. This university has an entrance class in Arts of about four hundred annually. The Prince of Wales prize, for general proficiency in the subjects of the entrance examination, is competed for each year. Many of the winners of this prize during recent years have chosen a course in science when beginning their university work.

When we consider the vast improvement that has taken place since the study of utilitarian subjects has been taken up in earnest—improvement, we believe, not only in the physical well-being of man, but also in his mental and moral condition—we must join with President Eliot in his optimistic hopes: "Looking forward to the future, and we all like to look forward, I find in the modern development of our universities my chief grounds for hope that democracy means the good of the commonwealth, and that it will ultimately lead the way to the final goal of civilization, the greatest happiness for the greatest possible number."

A EUROPEAN VIEW OF PORCUPINE.

The opinions of disinterested visitors are usually of value. Dr. A. L. Simon, well known in the world of mining, spent some time this year in Porcupine. To the November number of The Mining Magazine (London, Eng.), he contributes a general article embodying a description of the summer trail, and his own impressions as to the district. That trail is now practically a thing of the past. The winter road is now in full commission, and a government railway is assured for next summer. Hence this part of Dr. Simon's article is already out of date. Incidentally, also, we can assure Dr. Simon that he need not have expressed doubt as to the special privileges that attach to veteran claims.

Dr. Simon suggests that the absence of a road and of a telegraph line, point to a lack of confidence on the part of the Government of Ontario. We cannot see that the Ontario Government is called upon to display confidence in Porcupine. The Government has recognized a moral obligation in consenting to construct a railway. But the Government is doing this because it desires to help the bona fide operator; it is not animated by a wish to create a boom. It would be distinctly unfair to make capital out of a generous concession to the needs of a mining camp. In so far, however, as the railway will facilitate and cheapen transportation, Porcupine has been given a helping hand at the proper moment.

Dr. Simon, in commenting upon the ore bodies, alludes to the almost complete absence of an appreciable oxidized zone, and to the fact that the country rock exhibits decomposition neither on the walls of the veins nor on the surface. He comments specifically upon two or three well-known properties.

But the most interesting part of his article is the concluding paragraph, in which he holds up to scorn the prices asked for Porcupine properties. After alluding to the rumour that for one property a price of about $7,500,000 was asked, Dr. Simon proceeds as follows: "These figures are mentioned to emphasize the utter hopelessness of doing any serious business as far as slightly developed property is concerned; but the terms

asked for properties where merely a quartz vein in to be seen or even where nothing has been proved as yet, are similarly unapproachable. The prices asked for claims vary from about $15,000 to $350,000. . . . No owner can explain why he asks $15,000 and not any other sum. The whole idea of purchase at the present time is regarded as a lottery game."

Whilst these strictures are, in the main, just, they are a trifle too sweeping. Owners of Porcupine claims are not lacking who are willing to dispose of their properties on reasonable terms. It is quite true that unreasonable prices and terms are asked for most of the properties. But we frankly believe that the purchaser is more to blame than the vendor. So long as there are people foolish enough to pay disproportionately large prices for undeveloped mining claims, there will be little difficulty in finding persons willing to receive their money.

Dr. Simon's parting fling at the operators who have installed small mills is unjust. He implies clearly that these mills have been erected solely for the purpose of playing the stock-market game. We cannot see that Dr. Simon or any other casual visitor to Porcupine is qualified to pronounce upon the motives actuating the operators in question. And in any case it would have been more in accordance with fair play had Dr. Simon made a direct accusation.

DEVELOPMENTS IN NOVA SCOTIA.

By far the most significant news that has reached us lately from the east is the announcement that the Dominion Steel and Coal Corporation has taken over the Springhill collieries of the Cumberland Coal and Railway Company.

Since both companies have been parties to several previous transactions, this event is hardly a surprise. It is, however, an occurrence that will influence strongly the development of coal mining in Nova Scotia.

Under the old regime the Springhill collieries suffered many vicissitudes. They never could and, apparently, they never would have been brought up to the point of maximum production. It were invidious to allocate the blame for this state of affairs. But facts cannot be blinked. Springhill has lost continuously and enormously through the lack of sympathy between operators and employees.

Trouble has arisen from the refusal of the previous management to deal with the U. M. W. A., and there is little room for disputing the justice of that refusal. We hope and believe that the new owners will live up to their announced policy of ignoring that unwholesome society. But we may also express the hope that many local causes of friction will disappear with the advent of a new management. Mutual concessions there will have to be, and it is but reasonable to suppose that both parties will be only too eager to establish a modus vivendi.

The Springhill collieries produce about 350,000 tons of coal per annum. The coal is somewhat high in sulphur, but much of the run-of-mine is lower in ash than the other mainland coals of Nova Scotia, and makes a bright clean coke. The collieries are situated in such a way that they can command a large share of the maritime market and can also compete successfully for a substantial proportion of the Intercolonial Railway contracts. In addition they can make a strong bid to supply the demand in the most northerly sections of the New England States.

Considered in all material aspects, the change of ownership will be beneficial. It should certainly mean better times for Springhill and ampler opportunity for the Glace Bay collieries to exploit the St. Lawrence. Not less important will be the probable expulsion of the U.M.W.A. from its greatest stronghold.

We would not for a moment imply that the new owners of the Cumberland Railway and Coal Company have been seriously influenced by a desire to take a fall out of the U.M.W.A. But we believe that the latter organization cannot and will not survive.

In our news columns will be found the particulars of price paid, etc. These need not be repeated here. All that it is necessary to add is that we consider this last move an indication of a sound and courageous policy.

ENGLISH RAILWAY COAL BILLS.

It is with genuine surprise that we note in English exchanges the fact that the Miners' Eight Hour Act has not augmented the price paid for coal by the principal English railways during the past year. Following are the total expenditures for fourteen large companies:

Year.	Total amount paid for fuel by 14 leading railways.
1903	£4,959,000
1904	4,874,000
1905	4,810,000
1906	5,048,000
1907	6,175,000
1908	6,540,000
1909	5,550,000

The total expenditure by eleven of the largest during the latter half of 1909 was £2,478,000; and for the former half of 1910 the figures are £2,434,000

To determine the factors that had induced this reduction, or that have at least prevented an increase, is not practicable. But it is most gratifying to note that at present there is no sign of prices being enhanced. It appears, also, that new contracts are being placed at favourable figures.

PORCUPINE AND PAPERS.

We wish to felicitate our friend the Toronto Globe upon the constructively sane tone of its remarks concerning Porcupine. It is truly edifying to notice the improvement, not only in the Globe, but in not a few other daily papers.

In discussing new camps like Porcupine it is hard to observe the strict line of common sense. Anything savouring of destructive, or even of instructive, criticism is likely to be resented. Hyperbole is popular; but, in the long run, it is terribly costly. Thus it is with unfeigned appreciation that we read the sincere efforts of our daily contemporaries to warn their readers off the shoals of hysterical speculation.

When, however, a public journal undertakes to advise and to guide and to criticize, the dictates not only of good sense but also of the moral law demand that that journal keep its own skirts clean. Applying this dictum to the case at hand, it is apparent that the paper that warns the public against the blandishments of Porcupine promoters must of necessity refrain from selling its advertising space to mongers of dubious shares. So far as we have observed, our daily journals have not yet erred wittingly—at least as regards Porcupine. They appear to have grasped the fact that they must practice what they preach. Incidentally they may have learned by experience that honesty is the best policy.

A RAILWAY TO PORCUPINE.

Tuesday, November 29, was an eventful day for Northern Ontario. On that day Sir James Whitney announced that the Provincial Government would immediately undertake the construction of a branch of the Temiskaming & Northern Ontario Railway from a point on the main line near Kelso to Porcupine. The distance to be covered is about 31 miles, and the estimated cost of construction is less than $500,000. It is probable that the road will be ready to operate early next autumn.

All those who are struggling to develop claims in Porcupine will be thoroughly grateful to the Ontario Government. The work of mining will be greatly facilitated, and Porcupine will be given a chance to prove itself without costly delays.

But the success of the new railway will not wholly depend upon Porcupine. The farmer is following hard upon the heels of the prospector. A considerable proportion of the territory tapped by the T. & N. O. is admirably suited to agriculture. This fact will certainly influence favourably the future position of the whole line.

The action of the Ontario Government is wholly commendable.

NEWSPAPER COMMENT.

A curious change has come over Canadian newspapers since the early days of Cobalt and Larder Lake. The lessons taught by experience deter self-respecting papers from accepting inspired "mush." Also, the intelligently critical attitude of such papers as the Telegram, News, Star, and Globe, of Toronto, and the Star and the Herald, of Montreal, is distinctly profitable. But one outstanding exemplar of caution and common sense is the Cobalt Nugget. The surroundings of the last named paper must be peculiarly difficult. It is in the very centre of the maelstrom. Up to the present it has refused to soil its pages with unseemly advertisements. Long may it and its larger contemporaries refuse to bow the knee to Baal.

EDITORIAL NOTES.

The declaration of a one per cent. dividend on Granby, though disappointing in size, is in itself encouraging. There seems to have been undue alarm as to the physical condition of the company's mines.

The Cobalt Provincial mine has made its first shipment. Long may they continue.

BOOK REVIEWS.

TESTING FOR METALLURGICAL PROCESSES—BY JAMES A. BARR, B.S., M.E.—200 PAGES—PRICE, $2 POSTPAID—PUBLISHED BY THE MINING AND SCIENTIFIC PRESS, SAN FRANCISCO, AND THE MINING MAGAZINE, LONDON, 1910.

The problem of hitting upon the right process for any given ore can be partly or wholly solved in the laboratory. Mr. Barr seeks to guide the investigator into the shortest and best paths. Laboratory tests to determine the suitability of ores to amalgamation, chlorination, or cyanidation are outlined. Zinc, copper, silver ores are also included. Concentration tests, furnace tests, the examination of slags, are among the numerous subjects presented. The concluding section, giving data as to the cost of the various kinds of ore treatment, lends added value to the book. Necessarily the book is written for persons who already are acquainted with the principles of chemistry and of metallurgy.

MILL COSTS.

In Mr. J. A. Barr's new book, Testing for Metallurgical Processes," published by the Mining and Scientific Press, some very interesting cost data are given. For instance, in Californian stamp-mills, 10 to 40 stamps, the cost of amalgamation and concentration, is put at from 40 to 50 cents per ton. In Black Hills mills the same figures are given for mills of 200 stamps. Cyanidation costs from 85 cents to $2 per ton, in plants of from 100 to 200 tons capacity. The corresponding costs for chlorination (barrel process) are from $3.50 to $5 per ton.

PRACTICAL STAMP MILLING AND AMALGAMATION — BY H. W. MacFARREN—166 PAGES — INDEXED—ILLUSTRATED—$2 POSTPAID—MINING AND SCIENTIFIC PRESS—667, HOWARD STREET, SAN FRANCISCO, AND THE MINING MAGAZINE, 819, SALISURY HOUSE, E.C. LONDON, ENG. 1910.

A book that "goes straight to the details of the practical work" of stamp milling has long been a desideratum. The "how" and the "why" of stamp milling have never received fair treatment. "Practical Stamp Milling and Amalgamation" is a good beginning. In this book of 166 pages an attempt, a very fair attempt, is made to outline the practice and the philosophy of the stamp mill.

All practical and professional work is a function of applied common sense and experience. Sometimes the theorist has too much to say; and sometimes the empiricist has sway. But neither is the man who makes precedent. The stamp mill, probably more than any other human contrivance, has suffered from both. Nevertheless, to-day modern stamp milling is the conjoint product of the practical worker and of the theorist. The mill man, content with fairly good extraction, is not apt to change either the sequence of his stamps or any of the numerous items that go to make up the art of stamp milling. But the theorist is always a disturbing factor. Using the experience and disregarding the conservatism of the mill-man, he treads where angels fear to tread. And sometimes he gets results. Also it is this kind of result that, in the aggregate, constitutes progress. However, all this is beside the point, and is inspired solely by the fact that the reviewer has before him a good and a sound book on the use of the stamp-mill.

If the reader can pardon the preliminary discursus, the reviewer will hasten to make amends by indicating the ground covered by Mr. MacFarren's book. And, to proceed forthwith, the book is divided into ten chapters. Chapter No. 1 touches on the location and design of the stamp-mill, and discusses the rock-breaker, grizzly, ore-bin, battery frame and mortar-block. Chapter No. 2 treats of the integral parts of the mill unit, the mortar, die, shoe, bosshead, tappet, and cam. The third chapter treats of the stem, stem breakage, height of drop, order of drop, etc. Chapter four takes up water supply, rate of drop, weight of stamp, height of discharge, and so on. In this chapter a cursory comparison of the individual stamp and the 5-stamp battery is made. The remaining chapters are devoted to mill practice.

"Practical Stamp Milling and Amalgamation" gives evidence of care, experience, and knowledge. It is a good book.

Correspondence

Editor, CANADIAN MINING JOURNAL:

Sir,—The article on gold production in Nova Scotia, in your issue of December 1st, signed by yourself, has brought up a query in my mind. Some years ago my assistance was asked in connection with a gold mining project in Nova Scotia. At that time I knew nothing of the mines of this Province. Enquiry elicited the fact that a report, supposed to have been unfavourable, had been in the hands of the Government for some time. I could not obtain a copy of this report. But the rumour was in itself discouraging, especially as the report was said to have been made at the request of the Nova Scotian Government. Other circumstances conspired to prevent me from taking up the matter. But my curiosity as to the character of the alleged report has not yet been satisfied.

I enclose my card, which, I think, will identify me sufficiently. As I may in the near future undertake to revive one of the old mines, I wish to sign myself, merely,

QUERY.

EDITOR'S NOTE—Six years ago Mr. T. A. Rickard, now editor of the "Mining Magazine," London, England, made a provisional report upon the gold mines of Nova Scotia. This was done at the request of the Provincial Government. Mr. Rickard was selected for the work by the Mining Society of Nova Scotia. As to the tenor of that report nothing has been made officially public. The report was withheld from publication for the reason that it contained severe strictures upon certain operating companies.]

Editor CANADIAN MINING JOURNAL:

Sir,—The letter from Mr. Denis, in your issue of Nov. 15th, can hardly be called a reply to my criticism of his report issued by the Mines Branch on the Manganese Deposits of the Maritime Provinces. It is rather a short dissertation of personal characteristics.

It is true I did apply for an opportunity to write up this subject for the Government and had I the opportunity I certainly would have given the industry a just and fair report, but what this has to do with my observations on Mr. Denis' report is not clear, nor do I understand why he should attempt to cover his deficiencies by such personal allusions.

I have, in the past, operated for commercial purposes a few of the Nova Scotia manganese deposits and have examined and reported upon all the known deposits, except one, in the Maritime Provinces and many other deposits, outside of these provinces. All the information gained in this work, was offered free to Mr. Denis. He evidently had no use for it and the result is the publication of the report, which I repeat "is not only misleading but useless and detrimental to the industry."

Until the Mines Branch can explain how they can form an intelligible opinion of the "Canadian Ores of Manganese," from Mr. Denis' examination and his "unpretentious" notes, I will refrain from further criticism and consider the subject closed.

In conclusion I may say that I am, without "useless unpleasantness and ill-feeling, spite or disappointment," charged against me by Mr. Denis,

Yours, etc.,
W. F. JENNISON.

Truro, Nova Scotia,
Nov. 25th, 1910.

Mechanical and Metallurgical Progress on the Rand

In the Consolidated Mines Selection Company's report reference is made to the mechanical and metallurgical progress made on the Rand during the past year in the following terms: "Most of the notable mechanical improvements effected during the past year have been in connection with the increasing popularity of electric power, now rapidly replacing steam in many departments. Amongst the more notable in mining conditions—apart from the tendency towards better housing and general conveniences for both white and coloured employees—may be mentioned that of artificial ventilation, sand-filling in stopes, and greater efficiency in rock drilling. In the department of ore reduction and treatment many new ideas have been and are now being experimented with. Broadly speaking, the progress of the mining industry grows apace and the outlook continues promising. The Union Government will no doubt follow in the steps of the late Transvaal Government in assisting the mines as regards labour supply to the best of their ability in order to keep the finances of the Union in a healthy condition. It may be mentioned that this company has formed a labour department for the benefit of mines under its control, and that same is in charge of an experienced official."

MINING CASE DISMISSED.

Clifford E. Smith, of Brockville, vs. Dr. Hersey, et al.

In the case of Smith vs. Wyandoh, tried before the Honourable Sir John Alexander Boyd, Chancellor of Ontario, at Toronto, the following statements were made by counsel, as appears from official record:

Mr. Cowan: My Lord, in view of your Lordship's suggestion this morning, I am very glad to say that an adjustment has been made in the whole matter between the parties, satisfactory to all of the parties; and I desire, acting as counsel for the plaintiff, to withdraw from the record any and all charges of wrong-doing or fraud that have been made against any of these defendants. I think, however, it is only fair to the plaintiff to say that your Lordship will remember the dates in which the various transactions occurred, the plaintiff being up north and cut off literally from mail and telegraphic communication, that he became naturally suspicious; probably unkind friends may have urged him on, and he felt when he commenced this action that a state of facts existed which he has since learned did not exist. As the case has progressed, and the examinations for discovery have been had of literally all the parties to the transaction, that suspicion has gradually faded away. I have endeavoured to the best of my ability, as counsel for him, at the risk of trying the patience of your Lordship by travelling outside the record, putting the defendants one after the other in the box, to see whether or not there was anything in the charges spread on the record. I feel in duty bound, as counsel, to say that I am convinced that there is not, and the plaintiff authorizes me to make that statement to the Court and to entirely withdraw in the fullest and freest and frankest way all charges of wrong-doing or fraud against Mr. Brook, Dr. Hersey, and the other defendants in this transaction.

Mr. Shepley: I have only to say, my Lord, that there does not seem to be anything necessary for your Lordship to do, beyond noting that the withdrawal of the charges of fraud has been made in the ample fashion in which my learned friend has made it, and dismissing the action without costs.

His Lordship: The record will be then, charges withdrawn.

Mr. Cowan: Your Lordship may observe, there is a counter-claim made against the plaintiff. I suppose that is dismissed without costs?

Mr. Shepley: Yes.

His Lordship: Action and counter-claim dismissed without costs.

I am very glad a settlement has been arrived at in this case. It seemed to me, during the progress of the inquiry, that investigation was needed on some points, but, as Mr. Cowan has said, that has been cleared up very satisfactorily, and I hope nothing has occurred here which will disturb the business and friendly relationships of the parties in the future in any investigations they may have in that very wealthy region.

That will be the judgment of the Court, withdrawn, without costs.

PORCUPINE AND THE MOTHER LODE.

By Reginald E. Hore, Houghton, Mich.

In the November 26th number of the Mining and Scientific Press the editor comments on an article which appeared in this journal on November 1st, and calls attention to some interesting points of similarity between the Porcupine deposits described by the writer, and the Mother Lode of California. This editorial may prove of interest to readers of the Journal, and as there is in the case of the carbonate rocks even greater similarity than Mr. Bain supposes I add a few remarks concerning their composition:

"Judging from the description by Mr. Hore, the veins of Porcupine greatly resemble the Mother Lode of California, particularly those in Mariposa, Luohumne, Southern Calaveras County, in central Amador County near Jackson, and also at and near Placerville, El Dorado County. In these several localities there are huge masses of the carbonate of lime, magnesia, and iron, commonly known as ankerite, which are seamed with large and small veins of quartz, in much the same manner as that described at Porcupine. In California these great masses of ankerite, some of which are over 300 feet wide, are usually accompanied by an abundance of the green micaceous mineral, mariposite. No mention of mariposite, or any mineral answering its description, is made by Mr. Hore. However, mariposite is sometimes absent in the California ankerite masses. Generally, the ankerite of the Mother Lode is auriferous, though not to a profitable extent. That in Rawhide mine in Tuolmene County, was an exception, some of it being extremely rich in gold."

In view of Mr. Bain's remarks it may be interesting to note that one of the most characteristic minerals of the ferrodolomite at Porcupine, and also at Larder Lake, is a green micaceous mineral similar to mariposite. The mineral is usually present in very small and irregular particles so that it cannot be readily studied optically nor cleanly separated for chemical analysis. The mineral is present in nearly all the darker coloured masses of carbonates and, along with black iron oxides, is the cause of the colour. There are quartz veins in Porcupine which cut through such dark micaceous ferrodolomites, but those deposits described by the writer happen to be in lighter coloured masses which are chiefly carbonates and quartz. A few feet north of the Connell vein, for instance, the carbonate is quite dark in colour with much green mica (mariposite?) and black iron ores. There are a number of masses of similar rock in which the carbonate becomes a minor constituent. Crystals of the latter are larger than the dark particles and give the rock a porphyritic appearance. The carbonate is, however, easily recognized, as it is readily scratched with a knife and effervesces with dilute acid.

VALE ALASKA-YUKON-PACIFIC EXPOSITION.

Announcement has been made publicly that practically 90 per cent. of the dividend to be declared shortly by those who are winding up the affairs of the Alaska-Yukon-Pacific Exposition, so successfully held at Seattle, Washington, U.S.A., last year, will be applied in support of the local tuberculosis hospital. The greater number of the stockholders have already assigned to the hospital their share in the forthcoming dividend, and many others are expected to do likewise. Approximately $22,000 of the promised subscriptions is still unpaid, but payment of $3,750 of this amount will soon be made. Until after the settlement of pending litigation, the amount that will be available for disbursement as a dividend can not be definitely ascertained. It is claimed that the percentage of collections made in connection with the A. Y. P. Exposition is greater than that made for any other world's fair yet held.

The site of the A. Y. P. Exposition, on the campus of the University of Washington, has been cleared, and the university authorities are again in possession of it. The value of new buildings acquired by the university, and of improvements made to the grounds, is estimated at approximately $500,000, so the university has benefitted substantially as a result of the holding of the exposition on its lands.

THE STANDARD MINE, SLOCAN DISTRICT, BRITISH COLUMBIA

BY E. JACOBS, Victoria, B.C.

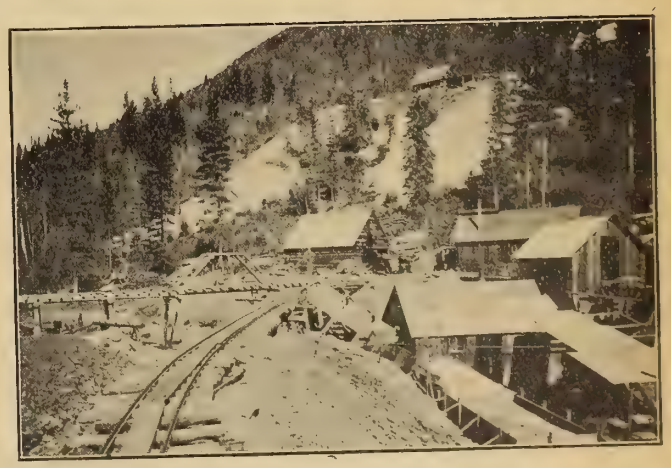
What is probably one of the largest showings of silver-lead ore of good grade yet seen in British Columbia has been opened in the Standard mine, near Silverton, Slocan Lake. It is in the part of the mine opened by No. 5 adit. When I was in the mine last June I saw two drift faces each having four to five feet of solid galena, with fahlerz carrying high value in silver. One vein was 30 feet wide, with four feet of shipping ore, and the remainder mostly concentrating ore containing silver-lead and zinc in quartz. Since then the greater part of the vein has at times been ore of good grade. A photograph taken a few weeks ago showed a face of 20.5 feet of ore, besides which there was two feet of ore on the hanging wall, separated from the big ore body by six feet of poor material which does not show in the photograph.



Standard Mine, Slocan, B C.



Part of Surface Works at Standard Mine, Slocan, B.C.



Standard Mine, Slocan, B.C.

The Standard Group.

The Standard group was described by Mr. Robert R. Hedley, in the Report of the Mining and Metallurgical Industries of Canada, issued by the Mines Branch of the Canada Department of Mines, as follows:

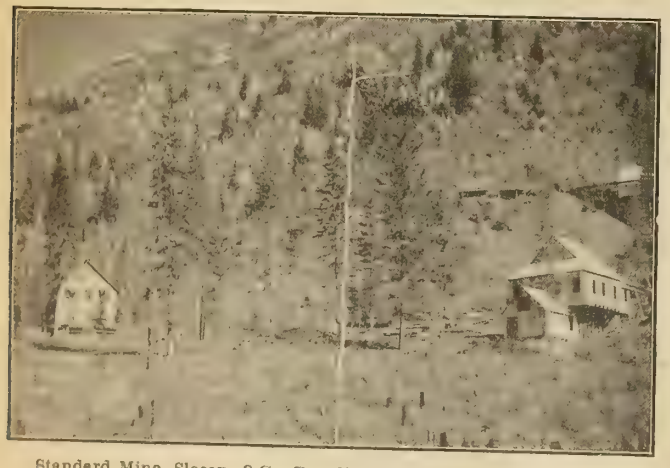
" This property is owned by G. H. Aylard and John A. Finch, and is situated above Four-Mile Creek, at an altitude of 3,700 feet, in the Slocan mining division. Its development is under the direction of G. H. Aylard, of New Denver. The property comprises the Shuniah, Standard, and Surprise, Crown-granted mineral claims, of 130 acres. The occurrence is a typical series of



Standard Mine, Slocan, Face of No. 5 Adit—shows 20 ft. 6 in. of ore, beside which there is 8 ft. of the Vein not shown in the photograph. This vein is 30 ft wide in places.

lenses, in Slocan slates, with the usual mineralization, galena being most in evidence. It makes an exceptionally clean sorted ore, carrying 60 per cent. lead, and 80 oz. silver per ton. The several upper levels have been worked out, No. 4 being now (December, 1907) the only producing level. This level has developed a very fine shoot of excellent ore, which, however, has not yet been extensively stoped. Two tunnels, at lower levels, are being driven to cut this shoot. The practice is to roughly sort for shipment, and to accumulate the second grade ore, with a view to its subsequent treatment by concentrating. It is hoped that the development of the mine will ere long warrant the erection of a concentrator. There is meanwhile on the dump probably 5,000 tons of second-class ore, which will carry 12 per cent. lead, 10 per cent. zinc, and 20 oz. of silver per ton. Shipments during 1907 aggregated 700 tons."

Development and production have been continued ever since Mr. Hedley obtained the foregoing information. In 1908 the quantity of ore shipped was rather more than 1,200 tons. The record for 1909 was that 2,100 feet of development work was done and nearly 3,000 tons of ore mined, of which 600 tons of sorted ore was sent to the smeltery and the remainder placed on the second-class ore dump. This year's output of first-class ore will be between 1,500 and 1,600 tons, for more than 1,300 tons had been received from the Standard at the Trail smeltery before the close of November. Meanwhile the quantity of concentrating ore awaiting the provision of milling facilities has been largely increased.



Standard Mine, Slocan, B.C. Boarding House, New Ore-sorting House and Dump of Second-class ore

Development work done in 1910 had, by the end of November, exceeded 1,000 feet, to which that done in December must be added. This work was done on levels 5 and 6, and on an intermediate level between 5 and 4. During the greater part of the year No. 5 has been in good ore, and it still is, as shown in the photograph. Practically all the ore shipped since last June has come from this level, the face of which is now about 1,200 feet from the portal of the adit. No. 6 started lower down the hill, is in 1,500 feet, but it has not yet reached the ore shoot which has been so productive in Nos. 4 and 5. It is estimated that by the end of 1910 the face of this adit will still be 150 to 200 feet from where it is expected the ore will be reached.

Alpha and Emily Edith Mines.

Above the Standard group, higher up the same mountain, is the Alpha group, from which ore rich in silver was taken years ago. Below the Standard is the Emily Edith group extending down to Four-Mile Creek. The Emily Edith mine was worked for some time by an English company, which spent much money on it, but eventually stopped work on account of there being so much zinc in the ore. Messrs Aylard and Finch now own the Emily Edith group, too, but they have not yet done much work on it, the Standard requiring their attention for the time being. It is thought that by extending the Emily Edith adits con-



Standard Mine, Slocan, B.C. New Ore-Sorting House and part of mine ore

siderably farther into the mountain, the shoots of silver-lead ore opened on the Standard will be found to continue down into the much deeper ground of the Emily Edith. This, however, can only be proved by doing a lot of development work, the desirability or otherwise of undertaking which will, in large measure, be determined by the results obtained from driving No. 6 level on the Standard.

The Standard an Object Lesson.

The Standard mine affords an object lesson to those who lack faith in the Slocan district. It was long neglected and considered of little value, but after Messrs. Aylard and Finch acquired it they pursued a policy of steady development over several years, with results of a most gratifying character. There are doubtless other properties in the Slocan district that could be made productive if extensive development was first done. Deep-level development has already given a fresh lease of life to several Slocan mines, and it is well within the bounds of reasonable probability that others would eventually become profitable enterprises if deep development on a comparatively large scale were done on them.

Mr. Aylard continues as manager of the Standard group, with Mr. John Vallance as superintendent of the mine. The latter has been mining in the Slocan district for about 15 years, so his practical experience has been of much service in the development of the Standard.

MINING AND THE INDUSTRIAL EVOLUTION

(Written for the CANADIAN MINING JOURNAL by R. B. Lamb.)*

THE PAST.

Mining in a crude way was, without doubt, carried on in pre-historic times. Even in the age of barbarism it is probably true that the crudest methods were employed to make use of various metals which were found in conditions easily rendered fit for the modest demands of the early peoples.

It is improbable that there was much, if any, improvement in methods during the patriarchal age. In feudal times the industry assumed larger and more definite proportions through the employment of chattel labour.

In the age immediately preceding the industrial or machinery age, or that period known as the beginning of the age of capitalism, we observe a steady growth in the industry. Beginning with the use of steam, we have organic development in all industries, and mining benefitted as abundantly as any other occupation.

In Mexico, among other countries, there remain splendid evidences of the character of work done from one hundred to four hundred years ago. This work was conducted on an extensive scale over long periods, almost entirely without machinery of any kind. The only requisites were an ore body, the ownership of that ore body, and plenty of labour. This labour was slave labour, and the mines were profitable according to the grade of the ore and the amount of labour used under the direction of the miner: so that practically the cost of ore extraction was the amount that would feed, clothe and shelter those employed during the period of extraction, and also maintain them in a state of maximum work efficiency.

"Bocas minas," or stairways, were used for entry and exit. Wooden horse whims were employed for hoisting purposes and for removing water. In later times, iron rods with steel tipped bits were used for drilling purposes. With unrivalled patience these old-time miners persistently followed their ore shoot, often working ores low in metal contents. Reduction plants consisted almost entirely of washing processes, ancient patio process methods, and small crude smelteries.

However, a description of ancient mining, treatment, and equipment methods, is quite unnecessary for the purpose that is in hand. We are hardly concerned with the mining industry earlier than a century ago.

It is the aim of this article to trace in a general way the influence of machinery on the industry of mining, and to enquire into what the industrial age means to the calling in which we are engaged.

Communities, both ancient and modern, have been forced to rely upon the products of the mines for their advancement; and it might with truth be said even for their existence. Mining is the basic industry of our modern world. It is the pioneer work of a vast and complicated industrial system. The miner is the herald of the newer and the coming civilizations.

The histories of the United States, of Australia, and of Africa disclose a rapidity of development (under conditions unparalleled in the world before) which has been brought about by the pioneering spirit of the mining and mineral industry.

It is not overstating the case to say that California would still be a plodding agricultural district imperfectly acquainted with eastern thought had she not been afflicted with a golden fever.

Tasmania and Australia were declared to be much too profitable for convict settlements by their miner pioneers, and the invitation was extended even unto the outcasts of society to abandon their ways, forget their sentences, and search for gold. The digging days of California and Australia marked the birth of a vast, extensive, and permanent mining industry; an industry not confined to gold alone but spreading itself and including all nature's valuable metals and minerals. We find, in fact, within recent times that the systematic search for metals and minerals has taken place in all countries under all conditions of climatic disadvantages, despite untold discouragements and fearful hardships.

THE PRESENT.

It is our theme to enquire into the causes of this unprecedented activity: this unusual demand for the products and the by-products of the mines; to find out why production has become so enormous; why it will be still greater in the immediate future; and to indicate the revolutionary changes that are rapidly taking place throughout the mining world.

The age in which we live is educational and evolutionary. It is marked by great industrial activities in all branches of human endeavour; and these activities are being daily increased and multiplied. It is only by the use of motor power applied through machines that such activities are possible, and as metals and minerals must be employed in all machines and in all industries we are right in saying that mining is the basic industry; and as such its profits are certain. Men are attracted to it and risk their lives in its development. It is especially alluring on account of the accident of location. When an individual finds an ore body of profitable kind (either by systematic intelligent search or by blind discovery), he is the potential possessor of wealth. By calling machinery to his aid, he becomes stronger, wealthier, and more powerful. It is this fact that has attracted and impelled the mining pioneer.

We will now trace the development of mining by machinery, and return later to a consideration of what organized machinery means to the future of the industry. It was impossible until the invention of the steam engine to make radical changes or real progress in mining methods. The methods of Mexico under Cortez would be the methods of to-day but for the steam engine. It is the steam engine that has made possible the mammoth tool. The steam engine has also made possible the social machine; and it is the steam engine that has made possible the mining industry of our time.

There is no doubt that one of the first steps towards the advancement of the industry along modern lines was the development of better pumping methods and hoist-

*Mining Engineer, Traders Bank Building, Toronto.

ing facilities. This development can be followed from the days when mines were unwatered by means of chain buckets moved by horse whims. It is unnecessary to go into the history of pumps and pumping methods; suffice it to say that the steam engine made possible the Bob pit pump, the Cornish beam pumping engine, the steam pump underground, the air actuated pump and the electrical pump. Each machine, each application of power to a machine, was a distinct advance over the immediate method before it.

The rapid development of electrical apparatus has made power transmission remarkably simple, and it is now possible to install in the mine with ease, safety, and convenience, pumping machinery of a capacity undreamed of before.

Hoisting has passed through the stages of the hand windlass, the horse whip, the horse whim, and the steam hoist. The electrical hoist and the water hoist have reached a capacity and speed that would have been thought impossible fifteen or even ten years ago.

Pumping and hoisting and the use of modern explosives have simplified and amplified in every respect underground mining methods. The metallurgy of steel and the development of the mammoth machine have made possible "T" rails, modern ore cars, and underground conveying and transportation systems. Mine timber framing machines have made it possible to prepare timber sets on a large scale with great rapidity, and thus it is possible to mine for profitable return ground before untouched.

Underground electric lighting has further facilitated operations; and by again commanding the machine the miner is enabled to ventilate his workings with a measure of success formerly impossible.

The steam engine was followed by the steam hammer. The steam hammer is the pioneer of all great modern tools and itself is the predecessor of the steam pump and the rock drill, both of which are modifications of the steam hammer. It is, however, to the rock drill that we usually attribute the credit for the greatest advance in underground methods, and costs have persistently and consistently fallen as this machine has been modified and improved. The rock drill makes possible a great amount of work at a greatly decreased expenditure of human energy. It increases the mining scope of the particular enterprise engaged upon; it makes for speed in mining operations, and, like all valuable machines, reduces cost. The great advance in underground and surface transportation in and around mines, and in the long distance transportation of supplies and labour to mines, and in carrying the product from mines to distant parts, is no doubt one of the most important features in the evolution of the mining industry or of any other industry.

It is almost unnecessary to point out that any system of transportation is merely an aggregation of machines or an organized machine. The railroad is a machine in the economic sense. The mines must use this machine as their prosperity is directly influenced by the facilities for transportation.

Human labour has been used for ore transportation in mines in barbarous and in modern times. We have seen the gradual replacement of human and mule transportation by hoisting methods. We have seen the wheelbarrow in the stopes replaced by automatic devices, and we have seen the wheelbarrow thrown out of the crosscuts and drifts and the ore car substituted.

We have followed with interest the methods of water and pneumatic transportation. The windlass has given way to the steam hoist, the air winch, and the electrical hoist. Large stopes have been fitted with belt and gravity conveying systems. The gravity tramway, aerial tramway, and other rope tramways defy mountain ranges, gorges, and valleys, and render transportation easy, expeditious, and vastly cheaper. It is convenient to work all these appliances; but it is also profitable: therefore it is commercially possible.

Hydro-electric power has been called to the aid of the miner. Streams and rivers of the Western mountainous mining sections have been harnessed and their power utilized for transportation in the mines themselves, around the mines, and around the mills, smelteries, refineries, and reduction works where the mines' products are prepared for the user.

All this has meant that more work has been done with greater ease, with greater comfort, with more safety, with less men, and with more profit than ever before. It has, moreover, made it possible to work lower grade ore bodies of greater magnitude than previously for no other reason than that the machine is cheaper than the man. A perfect machine requires only intelligent directing labour and performs the work that many men were required to do in its absence.

Long distance transportation to and from the mines is part and parcel of the mining industry in any nation. You can no more separate the railroad machine as an integral part of the mining business than you can separate the ore body from the industry and retain the industry. The locomotive and the steam railroad are called into service transporting metallic products of the mines to suitable smelting points where coke and fluxes are obtained. These ores are smelted through the metallurgist's skill, and by the agency of his machines the metals are separated from the waste; and again the railroad machine conveys the mines' final burden to the manufacturer.

It is this great transportation system more than any one thing that has made possible the great and increasingly greater scale of mining operations carried on at present.

Before leaving the subject of underground methods it would be well to notice the simplification of stope mining which is indirectly caused through mechanical agencies. The ready facilities for timbering, the rapid transportation methods underground, combined with pumping and blasting methods have modified mining systems, which, while they may not all be safer for the workmen, are certainly simpler, cheaper, and more expeditious.

We should notice here the great influence of electricity on mining in the arid and semi-arid regions. Power has always been a factor in modern methods and some ore bodies were located where steam power was of prohibitive cost, but long distance transmission of electricity generated by water power has solved the problem, and we find mines now being operated in regions that even a few, a very few, years ago were thought impossible and unprofitable.

Of course it is hardly necessary to point out that mining and all its dependent activities are subject to considerations of profit. If any portion of the industry become unprofitable it is eliminated and abolished. The miner expects for the risk of his capital greater profits than in any other modern industrial undertaking—and gets them. It is only as machines are developed and an organization of machines put into use that lower and still lower grade ore bodies are worked with an increasing profit. There is no period in the history of the world that can show such large quantities of all metals being produced as can this period of our own; and there

is no age that can show profits from the industry so large.

Perhaps the best illustration of how machinery renders very profitable that which was formerly unprofitable and worthless is dredging gravels for gold. The gold dredge is a mammoth machine. Dredging may be considered a form of mining and is usually so regarded; but dredging for its success depends entirely upon a machine which has intelligent direction. It does not in any sense depend upon unskilled labour for its profits. It demands the highest type of machine, handled by the most intelligent direction. Profits from dredging operations have been enormous, and it is probably the best illustration in mining of making possible that which seemed impossible.

A form of mining now being largely carried on illustrates the development of lifting material by machinery intead of by hand labour. We have seen the basket replaced by the wheelbarrow for moving ore in a mine. In turn we have seen the wheelbarrow replaced by the ore car. We have seen the ore car replaced by the conveyor, by the steam railroad, and by the electric trolley; and we now witness in some of the most gigantic operations in mining the hand shovel thrown aside for the steam shovel, moving five or more tons of material every dip this mammoth tool makes. Probably no better illustration of intelligent directing labour applied to a complicated tool can be given than the steam shovel. Here we notice that one man operating the shovel and a few others directing its movements have replaced the multitude of ignorant, poorly-paid, unskilled labourers formerly wielding hand shovels. Ill-paid as these individuals were, the time factor alone made their work unsatisfactory. Their methods were slow, clumsy, unorganized, unskilled, and, therefore, unprofitable. No steam implement or tool such as the steam shovel will ever replace hand or any other labour if mass human labour be more profitable than the machine. The machine can only live where it is profitable.

The so-called porphyry copper mines are an illustration of three machines,—the machine of transportation, the machine of disintegration (or the steam shovel), and the washing machine or concentrator. This last machine is an interesting evolution. It has its beginning in the crudest form of washing. Everyone is familiar with the action of water in separating earthy ingredients from one another. This water separation was early applied through simple machines such as the pan, the cradle, the strake, and the sluice. Then we reach the time when machinery and steam were called into service. We find first the older and cruder appliances, such as the various bumping tables. The hand jig (one of the oldest machines) was replaced by the power jig. Then a combination of hydrostatics, mechanics, and power called together the various mechanical tables and implements used to make close separation between mineral and waste material. These have been organized under technical direction into mammoth machines known as concentrators. These organized machines have reached capacities of 6,000 tons of material per day and are yearly becoming greater. They employ comparatively few men and are monuments of human ingenuity and skill.

But this evolution is far from complete. The giant washing machine concentrates several tons of crude ore into one ton of valuable concentrates. These are then taken by the transportation machine direct to the modern smeltery, and here we find a development in the business of separating and reducing the mineral to its metallic state and its subsequent refining before the manufacturer takes the metal for his purposes.

It is unnecessary here to describe the modern smeltery. It is a mass of machinery organized and highly developed in conjunction with chemical processes. Its plan is laid so that great quantities of material can be quickly and cheaply smelted. Machinery replaces men as in all the other organized machines, and speed becomes the profit-maker as before.

It is interesting to observe the tendency to concentrate a particular operation required by several mines at a point convenient for this work. We have touched upon this matter in the case of smelteries and refineries, but it is not confined to these divisions. At Colorado City an example exists of chemical treatment on a large scale. To this point the refractory tellurium gold ores from Cripple Creek are brought for reduction. If facilities and conditions did not obtain whereby those ores could be handled cheaply and profitably—more profitably than at the mines themselves—the work would not be undertaken at this point. Power transportation and labour are the determining factors here.

By a review of all conditions covering any particular metal or mineral, we find that one or several operations required to fit it for human wants and uses will be carried on at such points, times, and places as will place production at the lowest possible cost and enable the miner to dispose of it at the highest possible price. The factors regulating this are labour, transportation, power and materials. Transportation and power are largely dominant factors and are yearly becoming more so.

In present times the question of the disposal of mine products has greatly occupied the attention of all operators. The metallic as well as non-metallic minerals in seeking a regular and profitable market have called in the services of engineers and organizers of the highest type. Oil flows through pipes, and the system of conveyance and pumping employed challenges the admiration of the world. Non-metallic minerals as coal, mica, talc, gypsum, and so forth are taken in hand by machines and processes directed by technical skill to improve their market chances and increase their usefulness. Consider for a moment how impossible all this would be but for motive power, invention, and organized direction.

THE FUTURE.

The miner of a few centuries ago relied principally on his own resources, as the shoemaker did in the days of Elizabeth. The miner of to-day is an organized specialist. He requires the services of the chemist for his analyses. The geologist explains the rock structure and guides his development. The electrician is at his constant call. The transportation engineer must be at his elbow. Without the metallurgist his vocation would become profitless. The mechanical engineer is his indispensable ally. He calls upon the skilled artizan of every trade, and daily he consults accountants and business organizers whose duty it is to specialize further the industry and increase its returns.

At no previous period was this effort possible. We rejoice in the achievement and regard the machine as our guide and the mechanical tool our master.

Mining as an industry is interdependent on all other industries, as all industries are directly dependent upon mining. There is no line of separation between mechanical engineering and metallurgical engineering. Transportation has become involved and in many instances intricately blended with the working of the mines.

As the machine is exact in its work and universal in its application, we have been called upon to train men to direct its work. Technical schools and schools of mines and science have multiplied like machines, and are training yearly in all civilized countries great numbers of young engineers, electricians, mechanics, geologists, chemists, builders, and so forth, whose business will be to apply science and nature's laws through the products of our shops and foundries.

It is but a few years ago that skilled technical men were scarce, and hence commanded high compensation, but with the increased application of technical knowledge to industry and the use of machinery this highly-paid labour will cease as its rarity vanishes. Moreover, the days of unskilled labour are going and only those trained for work of the kind the industry demands can survive. Machinery demands exactitude, and within the memory of our own time we have seen the business of mining gradually improving in methods. Guesswork is not so frequently indulged in. The inquirer is fortified by scientific training and this he applies to his investigations of new fields and camps through geologists, engineers, and others who are held strictly accountable to him and to the inexorable demands of his machinery governed industry.

We must perceive that the days of wildcatting and purely stock mining will gradually but surely end. Mining will take to itself a more defined, a more intelligent and organized method. It will have a plan: and the embryo of such plan is seen in the development and exploration tendencies of to-day. We will never witness a return to hand methods in mining or in metallurgy. The future is inevitable. We shall find greater machines, greater concentration, greater advances in economical methods, more cost reduction, continued replacing of unskilled labour by machines, and the unabated development and invention of newer, greater, and more complex machines applied to the uses and the business of mining.

Large masses of capital will be directed towards the systematic search of useful metals and minerals and will select and control the valuable deposits. It will consolidate and operate on a vast scale, using only the newest and best machinery for all purposes. More perfect technical control means the certain disappearance of hand labour.

Capital will gather all before it and march to an era of increasing profits in all mining undertakings.

This system of co-operation between financial men, engineers, technical men and skilled workmen will in the course of a not very distant future entirely eliminate competitive methods in the industry. The small operator of to-day is merely the forerunner of the great capitalist who is an organized miner. The smaller operator merely proves up and develops a valuable ore body for his successor. His methods of mining are what may be termed cheap and crude and, being competitive, cannot long exist adjacent to the well-managed, machinery-driven mine. In the course of time he is bound to be absorbed, consolidated, or swallowed by his greater rival. Competition is warlike and therefore destructive. Trustification is co-operative, and is, therefore, the logical outcome of industrial evolution. Regardless of beliefs, we are bound to admit the facts and observe the benefits of the co-operation which machinery forces upon us. This co-operation is responsible for the consolidations, rings, trusts, and monopolies that have entered industrial mining. We are ever confronted with evidence and indications of greater trusts and consolidations in the immediate future for the mining world. They are as essential as they are inevitable. Industrial evolution has no absolute end. The tendency to increase production, replace men by machines, and take advantage through the agency of trustification for the disposal of products and the regulation of markets is essential to the profits that organized industry demands.

Newer and more intricate machinery will be required which will be more self-operating as time elapses, which will be almost human in its ingenuity and will, therefore, ultimately have the supreme power of eliminating unskilled hand labour, performing its work better than human hands. This is a human demand:—that nature's laws shall be applied through and by machinery and this postulates the co-operative or trust method.

No process or agency of law can possibly destroy the trust. It is the product of industrial evolution.

The machine has its economic masters to-day who will become its slaves to-morrow. Any return to competitive methods would mean disaster and social failure. The advocates of competitive mining methods might as well abolish electricity and go back to the tallow dip; or destroy steam shovels and return to the coal scuttle; blow up the dredge and rejuvenate the sluice box; stop the locomotive and seek the mule; burn the concentrator and return to the cradle; or send a blacksmith hammer to compete with the steam hammer; abolish the stamp battery and drag out the pestle and mortar. In the age of organized machinery competition is absurd and will soon be a matter of history. The conclusion seems to be that organized co-operation by and through the agency of machinery is the principal cause of the unprecedented activity of the mining industry of our time. Co-operation of men and machines gives surer profits, greater profits with greater certainty, than at any age before us. We are forced to admit that the end is not in sight and that greater production than ever will be possible if the human race demands for use the miner's goods and is ready to pay his exactions. We see, therefore, that industrial evolution applies to mining and may in the course of time have a meaning generally unsuspected. At the stage we have reached we can only marvel at the stupendous work accomplished and systematization effected. Thus is mining freed from the glamour of romance and established as the most profitable of human undertakings.

OUR LONDON LETTER

New Union of South Africa Suggests Interesting Statistics—Effect of the New Rich Gold Discoveries in West Australia—Power Equipment of Collieries—Chartered Company's Boast Unwarranted — New Petroleum Mining Book.

(Exclusive correspondence of the Canadian Mining Journal.)

London, November 19th, 1910.

The finishing touch to the growth of constitutional government in South Africa has been put by the inauguration of the Union of South Africa. High hopes are expected from the concentration of South African Government functions. The London "Times" on November 5th issued a special South African number running to 68 pages, which, amongst other things, gave a complete review of South African mining statistics and matters.

It is said that the minerals at present being worked are gold, diamonds, silver, coal, tin, copper, lead, zinc, asbestos, magnesite, limestone, flint, manganese, etc. The total mineral output from the beginning of the indus-

tries to the end of last December is given as 2,110,000,000 tons, gold accounting for more than half of this figure. The number of workmen employed in the mining industry at June last is given as 31,084 whites and 276,371 Kaffirs—all the Chinese having been repatriated. This is more than double the number of workers for the same month six years ago.

The total salaries and wages paid last year by the Transvaal mines was $64,041,205, the Kaffir portion being $26,162,850. The average rate of pay per shift of an average of 8 to 10 hours on the Rand in December last showed that shift bosses received $6 per day and banksmen $3.50. Miners on stoping machines received $5 per day and hand-stoping workers $4.40 per day. Contract workers on all machines, of course, earned considerably more money. For example, shaft sinkers at daily rates received $6, while those working by contract earned $11. Cyaniders earned $4 per day and slimesmen $3.50.

The total assets of the Transvaal mines—gold, coal, diamond, and base mineral—at June 30 last year are given as $631,646,135. Last December the Rand gold mines had 9,327 stamps and 150 tube mills at work, the total yield being nearly $150,000,000, or a shade over $7 per ton crushed. As compared with the total world's gold output the gold output of the Transvaal has risen from .03 per cent. in 1885 to 33.05 per cent. at the end of last year.

The largest gold producer on the Rand is the East Rand Proprietary mines. This works 4,312 claims and employed last June 19,309 workers. There were at work also at June 820 stamps, the heaviest weighing 1,750 pounds, and 25 tube mills. The rock hoisted amounted to 2,236,464 tons, and the rock milled was 1,938,338 tons. The gold recovered, including the value of bye-products, was $13,826,615, and the dividends paid for last year amounted to $4,651,795. It should be noted, however, that this, though the biggest producer, is not the biggest dividend payer. This distinction is held by the Crown mines, which paid in dividends last year $6,110,690. The tons given here are all 2,000 pounds each.

The total coal production in Natal and the Transvaal amounted last year to 3,623,656 tons, employing 19,000 workers.

A lot of excitement has been caused here by the recent reports of rich gold discoveries in Western Australia. The Yilgarn goldfields are the centre of the rush and on all the Australian Stock Exchanges companies are being floated daily with quotations rising to substantial premiums. Frank Wilson, the Prime Minister, speaking in the Westralian Parliament, said: "Even Kalgoorlie and the Golden Mile sink into insignificance when one listens to reports regarding this property (the Bullfinch), which bids fair to eclipse anything discovered in the history of the State."

G. P. Doolette, one of the best-known figures in Westralian mining, is the lucky chief proprietor of the Bullfinch mine, the wonderful developments on which have led to the pegging out of claims for miles in all directions. Development work on this property over distances of less than 200 feet laterally and vertically is reported to have opened up ore valued at nearly $1,250,000. The width of the principal reef runs up to 24 feet and assays of many ounces per ton have been got. A shipment of 60 tons from the mine returned nearly 7 ounces per ton. A parallel reef is stated to assay 35 pennyweights per ton. (One ton here equals 2,240 pounds).

The line of contact between granite and diorite on which the Bullfinch has been discovered runs for at least 25 to 30 miles across country, so that the scope for prospecting operations can be realized. Of course, the Yilgarn fields are not really new. As a matter of fact, shipments of gold were made from the district as far back as 1889, but the recent Government aid to the water supply of the area has vastly stimulated prospecting, and the advisability of carrying a pipe line from the goldfields' water main is under consideration.

Although so far not a single share of the new flotations is on the London market, no doubt this is a lack which will soon be remedied.

Sam Mavor, Chairman of the Glasgow local section of the Institution of Electrical Engineers, chose for his inaugural address on November 11th the subject of power equipment of collieries. A brief resume of his remarks may not be out of place. He declared that nowhere more than in coal mining had the introduction of electric power been more advantageous. The acceleration in the rate of hauling and winding, especially in the deeper collieries, increased pumping, a higher standard of ventilation, the replacing of manual and animal haulage by mechanical means, and the introduction of coal-cutting machines and face conveyors had all contributed to increase the requirements for power. The screening plant and the washeries, and often by-products recovery plant in connection with coking ovens, had also created a completely new set of conditions, under which the cost of power, formerly regarded as of little moment, had, with the growth in size of power plant, been endowed with considerable importance; further, the competition in the world's coal markets and the rise in wages at home imposed the necessity of checking waste.

The colliery manager now realized that in problems associated with power production the aid of a specialist was indispensable, and the electrical engineer, whose training had enabled him to deal in detail with such problems, had established himself in the premier position in this department of engineering. Therefore the electrical engineer was often entrusted, not only with the planning of the electrical arrangements, but also with the whole scheme of power production and distribution. The field for the power engineer was co-extensive with our coal-fields, and the present extravagance of fuel would be appalling if it were not the measure of opportunities. The mechanical engineering of Continental collieries generally differed from those in this country in respect of the greater elaborateness and the style of the equipment. Such a scale of expenditure in this country would be considered ruinous.

The capital expenditure on Continental collieries amounted not unusually to $5 per ton of coal produced yearly, whereas in this country the average was about $2.50. While Continental practice contained a good many suggestions for this country, there were also many warnings, especially in regard to over-elaboration of detail. Multiplication of appliances could be justified only by economies in fuel or in labour, but it was not true that in Continental collieries the output was handled by fewer men than in this country. As a matter of fact the opposite was the case. Foreign visitors were often surprised at the large outputs of many of our collieries with plant that was apparently inadequate, and was handled by men the number of whom would be considered quite inadequate on the Continent.

The explanation lay in the fact that, while Continental colliery managers were engineers rather than pitmen, our managers, although less highly educated, were practical miners, who planned their operations and coal-handling plant with the primary object of saving labour. But if on the Continent there was extravagance in power

equipment there was surely parsimony in this country; between the two extremes there was room for a middle course, and much might be done at our collieries without risk of exceeding the limits of prudence. Machinery, Mr. Mavor concluded, at the coal face had increased the output per man, and had reduced the ratio of personal accidents.

"Twenty-one years ago," I am reminded, "Queen Victoria affixed her signature to a memorable document. On October 29th, 1889, the British South African Company received the Royal Charter vesting it with administrative powers in Africa from the Transvaal to Tanganyika. In 1890 the company's pioneer column occupied Mashonaland, and in 1893 the power of the Matabele was broken. The trials and difficulties of those early days are now a matter of history. The unknown land of 1889, steeped in barbarism, is the civilized Rhodesia of to-day, with an assured position among the younger British Dominions and with a steadily increasing population of farmers and miners. Then Rhodesia was entered at the risk of life; now the country is a recognized resort for tourists, and the forthcoming visit of the Duke and Duchess of Connaught shows how far removed the conditions of 1889 are from those of to-day."

I trust the achievement of the happy state of affairs thus described will not lull the directors of the Chartered Company into resting on their laurels. During these twenty-one years the company has never paid its shareholders a penny of dividend, while, generally speaking, the various mining and other companies formed to exploit the territories have involved their shareholders in heavy loss.

Beeby Thompson's new book on "Petroleum Mining and Oil Field Development" practically brings up to date the literature of oil well drilling to which so many thousands of practical men are now devoting their attention. The author is at one with those who believe that there are vast stores of petroleum in the British colonies and dependencies by no means inferior to the foreign fields. It is impossible here to deal with the book at length but I note in passing that the author, in discussing the important matter of the selection of a drilling rig, puts forward the opinion that for general prospecting in a new field where little or nothing is known of the geological strata, the Canadian system is one of the safest to adopt; it permits, he says, strata of nearly all kinds to be penetrated, and requires less skilled attention than many other forms of drillers, both in the Dominion and in Galicia where this drill has been vastly improved, will not be likely to acquiesce in the view that it is the acme of simplicity in drilling operations, and, of course, we have not reached a time when, with any tool in any formation, drilling can be conducted without skilled labour and unceasing watchfulness and care.

In the drilling system there is only one reference to the Galician system. This reads: "The Galician system is practically a normal Canadian rig in which light iron rods are used instead of ash poles." This is an unsatisfactory way of disposing of a matter of considerable importance, and scarcely does justice to the well-known ingenuity of the world-famous drillers of the Galician school. The Canadian system has been technically improved by them to work in the deep and difficult formations of the Galician fields, and this has been done to such an extent that it does not require an experienced operator to recognize the superiority of the Galician rig over others of the same system. These rigs work down to 1,400 metres, and it is not an unusual thing for them to drill the first 1,000 metres in ten months without a day's stoppage.

There is an excellent chapter on contract drilling, a subject which has been warmly discussed in the oil fields of Europe, together with some useful information about Baku, and a reference to oil field fires.

It is announced that a new German asbestos syndicate has just been formed, which includes practically all the German manufacturers. The previous cartel was dissolved at the end of last year, and since then keen competition has prevailed and prices have been reduced very considerably. It is intended to bring about a more profitable state of affairs, and a moderate advance in prices has already been announced. Germany is a very important factor in the asbestos trade, controlling a number of Quebec and Siberian mines, which now practically supply the world's asbestos requirements. The Italian mines are smaller, and the product is not suitable for many purposes, and this applies also to the output of the Griqualand mines. Although the fire-resisting properties of the mineral were known to the ancients, it was not applied commercially until towards the close of the sixties of the last century, when the industry was commenced in America. About the middle of the seventies asbestos works were started in England and Italy, and in the early eighties the first German works were erected. It is in Germany that the industry appears to have made most progress.

Granby Company's Annual Report

The tenth annual general meeting of stockholders in the Granby Consolidated Mining, Smelting and Power Company, Limited, was held in New York on October 4th. The following extract from the statement of accounts for the fiscal year ended June 30th, 1910, will serve to show production and other figures; also the charges as compared with the immediately preceding fiscal year:

	Year ended June 30, 1910.	Increase or decrease.
Copper sold, lbs.	22,570,111	I. 848,583
Silver sold, ounces	355,749	I. 20,228
Gold sold, ounces	48,804	I. 3,043
Receipts from above sales.	$4,099,925	I. $116,388
Working expenses and foreign ores purchased	3,534,978	I. 232,576
Balance	$ 564,947	D. $116,183
Interest, discount, depreciation, etc.	529,264	I. 361,636
Balance	$ 35,683	D. $477,824
Dividends paid	270,000	.....
Deficit	$ 234,317	I. $477,824
Previous surplus	$2,698,687	I. 234,506
Total surplus	$2,464,370	D. $234,317

The report states that the amount expended on new construction, and equipment at the smeltery during the year was $53,634. Mine development was 13,267 lineal feet, diamond drill development, 6,438 lineal feet; Granby ore smelted, 1,175,548 dry tons; custom ore smelted, 21,829 tons.

The average price received for copper sold during the year was 12.91 cents per lb., as compared with 13.22 cents in the immediately preceding fiscal year, and 13.33 cents in 1907-9. Average price received for silver sold

was 52.33 cents per ounce, as compared with 51.25 cents in 1908-9, and 56.25 cents in 1907-8.

The total cost of copper, all expenses paid after deducting the value of gold and silver produced during the year, was 10.34 cents per lb., as against 10 cents in 1908-9.

Attention was called in the report to the sale to shareholders during the year of 13,500 shares of the company's treasury stock, at $85 per share, it having been decided to capitalize a portion of expenditures incurred during recent years and which outlay was properly chargeable to capital account.

Accompanying the president's report were reports from Dr. Otto Sussman, the mining engineer who examined the company's mines last spring, Mr. Jay P. Graves, vice-president and general manager; Mr. O. B. Smith, mine superintendent, and Mr. W. A. Williams, smeltery superintendent. The most important parts of these reports are the statements of Dr. Sussman and Mr. Smith, respectively, concerning the estimated tonnage of ore available, and the prospects for finding more ore. Dr. Sussman estimates 5,595,000 tons of ore that can be extracted; the average grade of this ore he gives as 1.24 per cent. copper, and 0.04 ounces gold and 0.25 ounces silver per ton. Mr. Smith estimates, as at July 1st, 1910, 6,429,169 tons of ore blocked out, of which 90 per cent., or 5,780,252 tons, can be extracted; the grade Mr. Smith places at 1.25 per cent. copper, and 0.043 ounces gold and 9.925 ounces silver per ton. It will be seen, therefore, that there is so little difference between the two estimates, that either of them may be taken as representing generally the available ore and its average grade. Dr. Sussman says that the ore-bodies in the Old Ironsides-Knob Hill group, which comprise the chief ore-bearing parts of the company's property so far as known, decreased in size from the No. 3 level downward. "The 500-foot level and all the diamond-drill work done on the 500-foot level disclosed no ore. A number of holes were drilled from the 400-foot level downward: all of them after a few feet passed out of the ore and entered barren ground. All the holes drilled from the 300-foot level and from the surface in an attempt to find the downward continuation of the ore-bodies passed out of ore above the lowest workings of the mine; in some cases they did not disclose any ore at all. Consequently, the limits of the ore-bodies in depth have been found to be a few feet below the 400-foot level." Mr. Sussman's conclusion is that the chances of developing any large additional tonnage of ore are "exceedingly slim." Mr. Smith says that the chief mineral claims owned by the company have been fairly well prospected with diamond drills, the drill holes ranging in depth from 200 to 500 feet. In all the holes in which ore was found, the drills passed through the ore into barren ground before drilling was discontinued.

Now, while it may not be stated with positiveness that the Granby Company will not find other bodies of ore than those included in the estimates above quoted, present prospects are not favourable to the expectation that more ore in considerable quantity will be developed. Under the circumstances it would appear that the actual position as to ore reserves of ore has been withheld from shareholders in the company and the public. Last May the JOURNAL published this comment made by its British Columbia correspondent: "The management of the Granby Company has not at any time, so far as has come to my notice, made public any information that would throw doubt on the general belief that the reserves of ore in the company's mines were large and equal to all demands likely to be made upon them for a longer period than is now suggested they will last at present rate of production." A statement by Mr. A. B. W. Hodges, then local manager for the Granby Company, made at a meeting of the Canadian Mining Institute, at which were present a number of influential geologists and mining engineers from Europe, that "We" (the Granby Company) "have in one of our mines 10,000,000 tons of good ore," was quoted, also a statement printed in a special bulletin of the Institute that at the Granby mines "there is said to be approximately 20,000,000 tons of ore in sight." Surely common honesty demanded that such statements should be contradicted by those in a position to know the truth as to the approximate quantity of ore in sight. Or if it was the belief of the management that such statements were true, the competence of the manager may well be questioned, since about eighteen months later it is stated on excellent authority that the total quantity of ore extractable—not simply from one mine, stated by the then manager to contain 10,000,000 tons, but from the whole group of mines—is less than 6,000,000 tons, not 1,500,000 tons having meanwhile been taken out of the mines. The revelation now made is certainly a great disappointment, and it seems reasonable to conclude that some one or other withheld the truth. It is noteworthy that the reports of the mine superintendent, if he made any, have not heretofore been made public. Judging by the report by that official, now printed, it seems probable the actual position would have been made known earlier had he been permitted to tell it.

It must not be taken for granted, though, that the position of the Granby Company is a desperate or hopeless one. The company at the close of its last fiscal year had cash and copper in hand to the value of approximately $900,000; it has a five-years' supply of ore working on a scale similar to that of the past year; it owns valuable assets in addition, including a considerable interest in the Crow's Nest Pass Coal Company; it is a going concern with large and modern equipment and a reasonable chance of doing an increasing custom smelting business; and it is in a position to acquire other mines and thus enlarge its sphere of operations. Notwithstanding that confidence in the company has been rudely shaken by reason of unreliable statements as to its reserves of ore having been permitted to go uncontradicted, it may be expected that it will pay dividends as soon as there shall be a fairly good increase in the price of copper—a rise of only one cent a pound would add nearly $250,000 a year to its net profits at present rate of production—and there is also a fair prospect of an enlargement that will prove profitable and assist in restoring the company to favour among the investing public.

THE LARGEST CUSTOMS SMELTER IN MEXICO.

The Torren Customs Smelter—the largest in Mexico—is situated outside the City of Torreon. The plant is modern and is equipped with nine furnaces for the treatment of silver-lead ores, each with a capacity of 115 tons daily and a copper stack with a capacity of 250 tons daily. There is also a copper converter with a capacity of 15 tons daily. These smelters have ore-buying agencies throughout the mining districts of northern and central Mexico, and have been an important factor in the development of the base metal industry in Mexico.

Unique English Device for Detecting Fire-damp.

By Frank C. Perkins.

The invention shown in the accompanying illustration is a burner adapted to existing miners' safety lamps as devised by Sir H. Cunynghame and Professor Cadman for detecting fire-damp in mines.

This gas-testing device consists of a strip of this asbestos treated with a solution of carbonate of soda (common washing soda), to which a few drops of hydrochloric acid have been added. The strip of asbestos is held in a horizontal position when in use, 3-16 inch above the flame. The wire supporting the asbestos is carried in a similar manner to a pricker wire through the vessel of the lamp, and when not in use is swung away from the flame.



In order to test for gas the strip of asbestos is brought over the flame, when gas (if in existence) is visible in a cap above. It is stated that in addition to the simplicity of the invention and the cost being exceedingly small, it commends itself to the mine manager, as it is unnecessary to reduce the flame while testing for gas, thus avoiding the chance of losing the light.

In using the device without lowering the flame, by means of the trigger the asbestos paper is turned completely over the flame. In the absence of gas, only the yellow flame is seen. When there is gas the cap is easily distinguishable, as it appears above the mantle and is quite sharp. As the percentage of gas increases, the cap becomes higher, until when it is about half-an-inch high there is one per cent. of gas. At two or three per cent. of gas the cap becomes very striking, being easily seen from a considerable distance. The brightness and clearness of the cap may be much improved by a little skilful manipulation, so as to bring the pieces of asbestos into the best position.

In case the piece of asbestos becomes broken or worn by constant use it can be replaced by another readily and without difficulty. It is stated that the usual care must be taken not to keep the lamp longer than necessary in dangerous quantities of air, containing, say, 3 or 3½ per cent. of methane.

It is said that experiments are being conducted by the inventors with a view of standardizing the appearance of the cap, due to various percentages of fire-damp.

Electric Smelting

Bulletin 3 of the Department of Mines entitled "Recent Advances in the Construction of Electric Furnaces for the Production of Pig Iron, Steel, and Zinc," has just been issued. The bulletin opens with a review by Dr. Haanel of present conditions and is followed by translations of several interesting Swedish papers on the subject of electric smelting. The rapid advance made in electric steel furnaces is evident from the fact that in 1904 when the first investigation was made by the Department of Mines there were only four electric furnaces in existence. In 1910 there were 114 furnaces of which 67 were in operation, 11 not working and 36 in the course of erection. Of these furnaces 30 were in Germany, 23 in France, 12 in Italy, 10 in Austria and 10 in the United States. Seventy-seven of them were of the arc type, 55 were induction furnaces and 2 a combination of the arc and resistance furnace. The capacity of furnaces has also greatly enlarged during the past six years, 15 metric tons being the size of the largest. These furnaces are used in the refining of high grade steels.

Notable advancement is also being made in the smelting of iron ore. As Mr. Bennie informed us at the meeting of the Canadian Institute last March, "It is no longer right to say that electric smelting will come; it has come." In a paper by Yngstron the operation of an electric shaft furnace at Domnarfvet, Sweden, is fully described. The paper opens with a theoretical investigation into the quantity of carbon required. There follows a description of the plant with a reference to the first furnaces built and the reasons for their failures. A full description is given of the operation of the furnaces, methods of charging, consumption of power, electrodes, ore, flux and carbon, analyses of pig iron produced, etc. The conclusions of the author are as follows: "Judging from the results achieved by the experiments at Domnarfvet, the problem of making pig iron from iron ore in the electric furnace seems to be technically as well as commercially solved, but in order to ascertain fully this matter, further experiments ought to be

conducted on a larger scale. The necessary condition for a profitable smelting of iron ore in the electric furnace is that sufficient and cheap electric power is available. The following are some points in favour of the electric furnace:—

(1) Cheaper cost of erection of the furnace, as blowing engines and hot blast stoves are not required.

(2) Saving about two-thirds of the fuel required in the blast furnace.

(3) Fine ore can be handled in the electric furnace without previous briquetting.

(4) The gas evolved has a high thermal efficiency, being free from nitrogen.

(5) The possibility of producing directly in the furnace iron with low carbon content.

(6) Some reduction of labour, as only about one-third of the fuel required in the blast furnace is to be handled.

It will probably prove advisable later on to combine the electric shaft furnace with an electric steel furnace, in which the liquid iron from the shaft furnace could be refined.

Other smelting furnaces are said by the bulletin to be in course of erection in Norway and in India.

Other papers in the bulletin are on:

1. Electric furnaces for the reduction of spelter and zinc oxide.
2. The Fick Electric Reduction furnace.
3. The Fick Electric Steel furnace.

The director of the Department of Mines is to be complimented on the issue of a bulletin of this character giving the authoritative results of foreign practices in electric smelting.

A. B. W.

Cobalt Mines Royalties

During the year 1909 according to the annual report of the Bureau of Mines four Cobalt mines paid the Ontario Government $338,426.66. Two of these properties have this year received a considerable reduction in their rate of payments, so that it is not likely to be so large. This, of course, takes no account of the royalty paid to the T. & N. O. Commission, which is another department of the Government.

From the sale of 81 parcels of land on the Gillies Limit $711,458.30 were obtained. The annual report in this particular of revenue and from sale and royalties reads:

There was received during the ten months from mining royalties the sum of $338,426.66, as follows:

Crown Reserve Mining Company	$145,437.46
O'Brien Mine	141,497.15
Temiskaming & Hudson Bay Mining Co...	44,403.26
Chambers-Ferland Mining Company	7,088.79
Total	$338,426.66

The Crown Reserve pays a royalty of ten per cent. of the value of the ore at the pit's mouth, this being one of the conditions of purchase from the Crown. The O'Brien mine contributes on a basis equal to 25 per cent. of the receipts from the sales of ore, less a proportion of surface expenses, and there is a similar arrangement with the Chambers-Ferland Company. The Temiskaming & Hudson Bay Company pay at the rate of 15 per cent. of the net receipts.

The accruals on account of royalty for the calendar year 1909 were as follows:

Crown Reserve Mining Company	$160,437.46
O'Brien Mine	141,497.15
Temiskaming & Hudson Bay Mining Co,..	52,263.62
Chambers-Ferland Mining Company	16,259.64
Total	$370,457.87

Of the amount only $338,426.66 fell due and was paid within the fiscal period.

Up to 31st October, 1909, there has been received by the Department in mining royalties an aggregate of $779,434.68, as follows:

O'Brien Mines	$474,357.52
Crown Reserve Mining Company	174,695.31
T. & H. B Mining Company	123,302.06
Chambers-Ferland Mining Company	7,088.79
Total	$779,443.68

ROCK CRUSHNG PLANT

Of Messrs. Laurin & Leitch.

(Written by PAUL C. VAN ZANDT.)

General Description.

The rock crushing plant of Messrs. Laurin & Leitch, engineers and contractors, Montreal, Canada, is unusually interesting from its enormous capacity of production and remarkable flexibility of operation.

Having obtained from the Montreal Water & Power Company the contract for constructing within four years a reservoir of 43,000,000 gallons at Outremont, one of the city's suburbs, they recognized the advantage of crushing and marketing the rock at the time the excavation is made, instead of piling it on a waste bank, the usual custom in the past.

As the reservoir will be 800 feet long, 400 feet wide and 40 feet deep, formed partly by excavation and partly by enclosing walls, it will be necessary to crush within four years approximately one million tons of hard trap and granite rock and to provide storage for approximately one hundred and fifty thousand tons in various sizes after crushing so that it can be marketed to the best advantage.

The limited time at the disposal of the contractors and the enormous quantity of stone to be removed within that time necessitated the erection of one of the largest rock crushing plants in the world.

[Editor's Note.—The magnitude of the crushing plant herewith described is our warrant for publishing the following article. The whole plant is a study in the reduction of operating costs.]

Quarry.

The site of the reservoir from which the rock is quarried is upon the north slope of Mount Royal, and quarry operations have been started at the lowest point in the reservoir site, where an excavation of approximately 20 feet has been commenced. From this point the quarry face will be gradually cut back towards the mountain parallel with the lower edge of the reservoir. The rock as fast as quarried is loaded direct by steam



Photo No. 776

shovels into six yardside dump quarry cars, which are made up into trains of four each, to be hauled to the crushing plant. The rock is drilled by Temple electric drills along the quarry face, which is 800 feet in length, and, after blasting, the cars are brought alongside of the steam shovel, close to the bank of blasted rock, by a Shay locomotive which is of the geared type so as to take the grades, pushing the empty cars up to the



Photo No. 779

quarry face, and bringing the loaded cars from the quarry face to the bottom of the incline haulage system leading from the lowest point in the reservoir to the crushing plant.

Hoisting System.

The crushing plant is situated upon an excellent site about 1,500 feet from the centre of the reservoir, and to bring the rock from the excavation to the crusher a haulage system has been installed operating in balance, drawing a train of four loaded cars up the haulage incline of about 4 per cent. to the foot of the two incline trestles leading from the ground to the dumping hopper over the large crusher. At the same time, a train of four empty cars is lowered down the haulage incline back to the quarry, balancing in part the up-going load. At the upper end of the haulage incline there is a third track for empty cars, and the trains of loaded cars which are gathered upon first one and then the other of the two outside tracks shown upon the cut accompanying this article, are hauled up these incline trestles of approximately 20 per cent. grade, one at a time and alternately upon each of the two trestles, as shown in photo 776, so that the large crusher is receiving a carload of rock first upon one side and then upon the other, making its operation almost continuous. The empty cars are dropped to the middle track for assembling into trains for the down-going trip on the haulage incline. All the switches shown are spring switches operating automatically, excepting the one that delivers the empty train to first one and then the other of the haulage tracks going back to the quarry.

Crushing Plant.

The crushing plant contains five Allis-Chalmers gyratory crushers. One of these is a No. 21, which is the largest gyratory crusher in use at the present time, having a capacity of 1,000 tons per hour. It has two openings, 42 inches across by 8 feet in length, shown in photo 779, each opening easily capable of receiving a piece of rock 3 feet x 5 feet x 10 feet, weighing 10 tons, which is the limit in size of any single piece that can be loaded by a steam shovel or carried on a single truck. This crusher, shown in photo 757, which weighs 225 tons, has crushed a piece of rock this size in forty

seconds down to pieces the size of a man's head and smaller. The primary object of this large crusher and the great advantage in its use is the elimination entirely of hand sledging in the quarry, and almost entirely of the re-drilling and re-blasting of large pieces of rock which may have been broken from the ledge in the quarry by a primary blast. Almost everything that comes down after a blast in the quarry can be loaded at once by the steam shovel and sent up to the

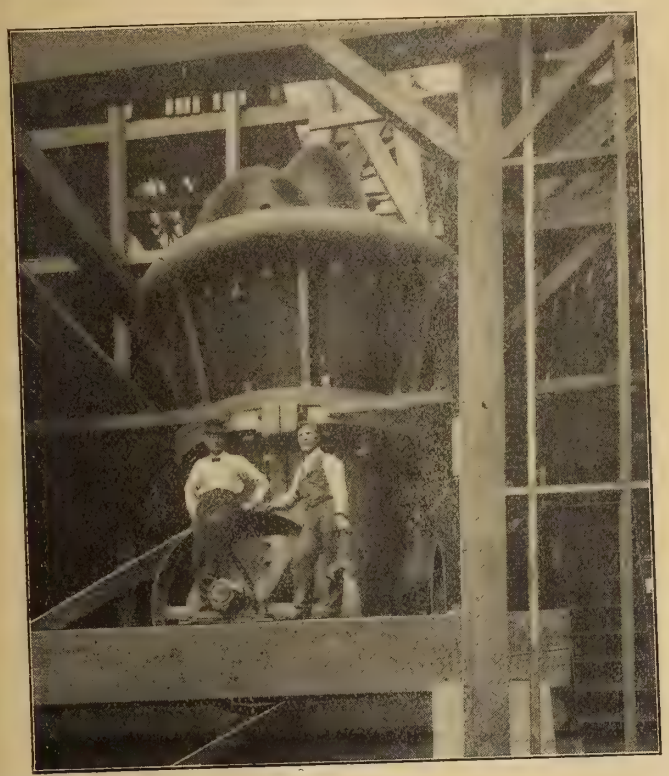


Photo No. 757

crusher without further work being done upon same. As hand-sledging, re-drilling, and re-blasting of pieces once broken from the quarry face, when smaller primary crushers are used, are always the largest items of expense in quarrying, it can readily be seen that the use of so large a crusher effects a great saving, even if we eliminate consideration of its large capacity. This crusher is made with a double discharge, each discharge spout delivering to a No. 18 bucket elevator and each of the two elevators delivering to a 6-foot diameter screen having approximately 2¾-inch openings, shown in photo 762. At this point a rough separation of the rock is made and any incidental fines from the first break that pass these openings are delivered to a cross belt conveyor which, in turn, delivers them to a short elevator and from this to a rotary screen 24 feet long over the rock storage bins. These incidental fines in this way by-pass the secondary crushers and are delivered to the bins direct ready for shipment. The rejects, or oversize, from the 6-foot diameter screens are delivered to two bins which feed six No. 6 Allis-Chalmers gyratory crushers. One of these bins and four of the crushers, shown in photo 760, are installed at the present time and a spout is arranged to take the oversize from one of these 6-foot diameter screens and deliver it direct to the present bin. The rock in this bin runs out of the four corners into the four No. 6 crushers automatically, and these crushing continuously reduce this oversize rock to marketable size (2½-inch and smaller), and all four deliver to a common belt conveyor, from which the re-crushed rock is received by a No. 8 elevator, which in turn delivers it to two rotary screens 24 feet long, duplicates of the one already mentioned, located alongside of it over the finished rock bins. The smallest product from these three screens consists of rock ¾-inch and smaller, which is divided again upon three shaking screens into dust, ⅛-inch product (which is a fine clean sharp sand), ½-inch product and ¾-inch product. The remaining sections in the 24-foot screens separate the crushed rock into 1¼-inch, 2-inch and 2½-inch sizes. Each of the above sizes is spouted directly into a compartment in the storage bins, directly beneath the point where it is screened, with the exception of the dust, which is conveyed in a dust-tight screw conveyor to a bin compartment properly covered over. The rock, which is very hard and clean, sizes very accurately, producing the very best of marketable stone.

Storage System.

The storage bins mentioned above have a total capacity of from 2,000 to 3,000 tons, and the bulk of the product is spouted direct from these bins into cars and waggons for shipment. The shipping tracks shown upon the illustration run under three of the compartments, the remaining two being for teams. The spouts and gates from the storage bins are so arranged that any bin may be made to deliver its product to a car or waggon in the compartment on either side as well as the one directly beneath the bin, making it very easy to load more than one size into a car at the same time or to load the same size into two or more cars at the same time. No provision is made for recrushing any of the different sizes of rock, but the excess of any size that does not market as fast as made is stored on one of four storage piles. The capacity for storage being approximately 150,000 tons, is sufficient to take the entire product of the plant for about 75 working days. When rock is to be stored, the particular size of which there is an excess is drawn from its bin on to a belt conveyor, which carries it out from under the bin to the system of storage conveyors extending over the storage yards. There are two belt conveyors extending under

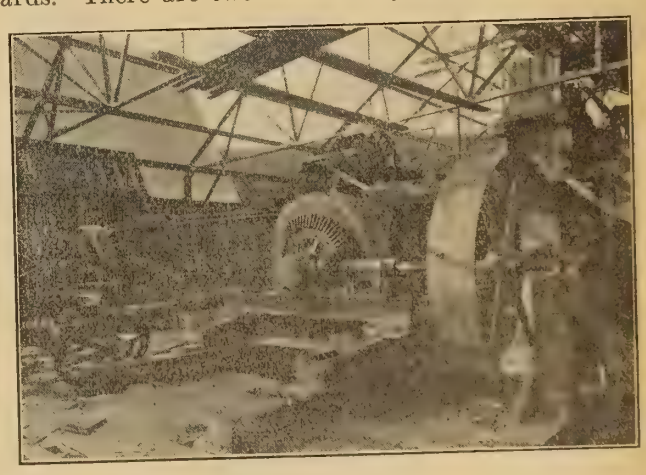


Photo No. 762

the bin, so that two sizes of rock may be piled at the same time, and the conveying system is so arranged that any size can be piled on any pile. The amount of rock to be stored cannot be predetermined and is not the same throughout the year. Moreover, some sizes are marketable only during the summer, while other sizes are marketable during the entire year, thus making the flexibility of the storage system above described of paramount importance. The conveyors used in this

storage system are partly 20-inch and partly 24-inch belt conveyors of the Stephens Adamson make, and the long storage piles are provided with moveable trippers which distribute the rock over the pile where desired. On account of the extreme hardness and sharpness of the rock, the belts are made of the best Diamond Rubber Company's brand, with 3-16-inch rubber cover for the narrower belts and ¼-inch rubber cover for the wider. One specially interesting feature of the conveying system is the distributing centre, where the two belt conveyors leading out from under the bins deliver the material into two small hoppers, where the product from either of these belt conveyors may be delivered to the same piling conveyor, or to any one of the three piling conveyors, without interfering with the other.

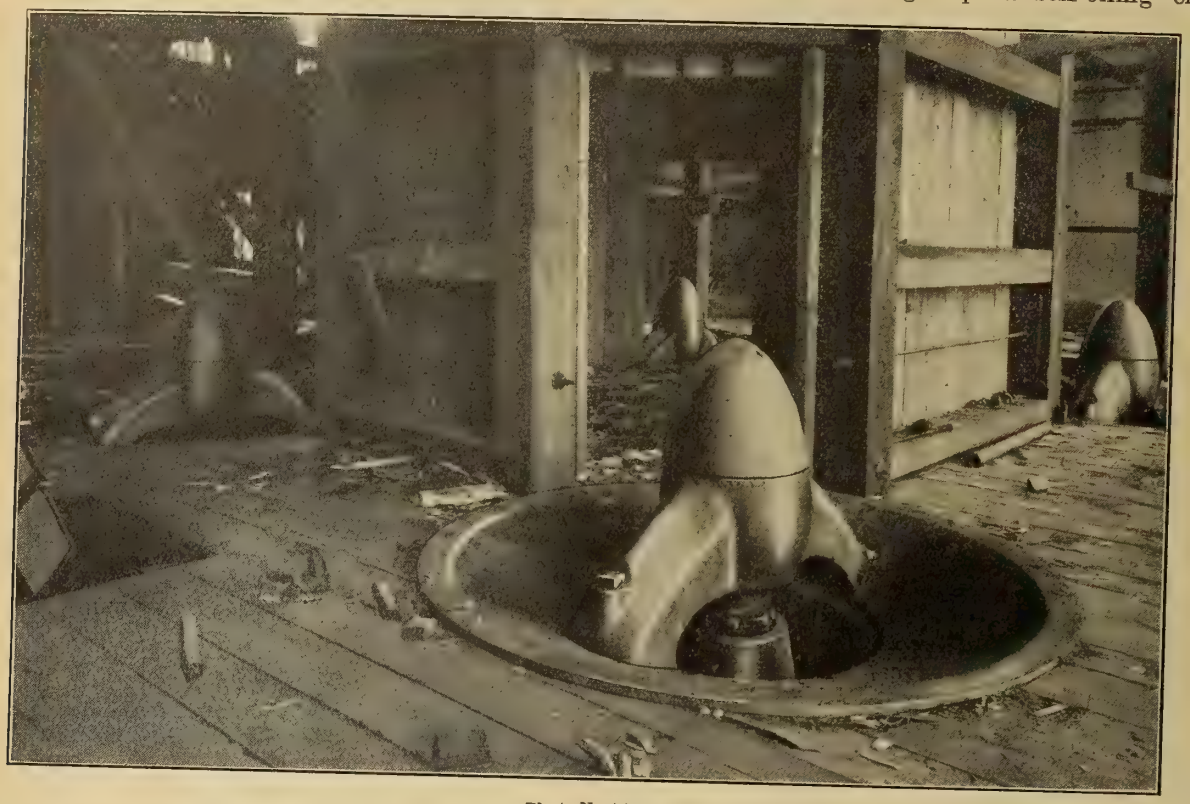


Photo No. 760

Shipping Arrangements.

The rock loaded directly on the cars from the bins is brought out upon the track shown in the illustration, photo 776, past the scales (which are of the Fairbanks-Morse recording type, printing upon a ticket the gross and tare), and from this point the railroad track leads to the street railway system of Montreal, upon which it can be distributed to any point in the city, or to any railroad or wharf for further shipment. The waggons leave the property from the other side, passing over another set of scales of similar type.

When the rock that has been piled on one of the storage piles is shipped, it is loaded in a railroad car or waggon placed alongside of the pile by steam operated clam shell derrick crane, made by the Bay City Industrial Works, which has a one-yard clam shell bucket upon a 40-foot boom so that it can reach from the car to any point upon the storage pile adjacent to it, so that the additional cost of rock taken from the storage pile when delivered upon cars is only a cent or two more than that delivered direct from the bins.

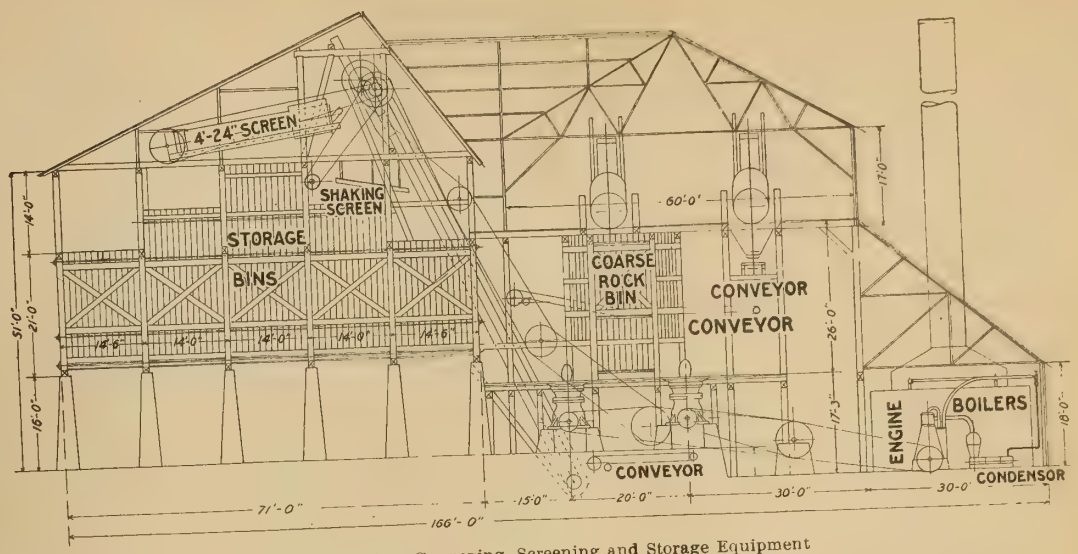
Power Plant.

The power plant consists of two 250 h.p. Erie City water tube boilers, and one 720 h.p. vertical triple expansion Belliss & Morcom engine, this engine being connected by an English system rope drive to the main line shaft which is, in turn, belted to the various machines mentioned. The belt conveyors are driven by Allis-Chalmers-Bullock induction motors, and the electric current for these (as well as for the Temple drills in the quarry and for lighting) is supplied by 175-k.w. Allis-Chalmers-Bullock generator. This generator is of the belted type, receiving power from the main line shaft, but is placed in the power house in line with a McEwen automatic high speed self-oiling engine of sufficient power to drive the generator when used either for operating the motors or the drills or the lighting system, when the main engine is shut down. The big



Photo No, 763

engine is run condensing, delivering the steam direct to a Knowles pump and condenser located alongside of it. The hot water from the condenser is elevated by a Worthington centrifugal pump to a water cooling tower

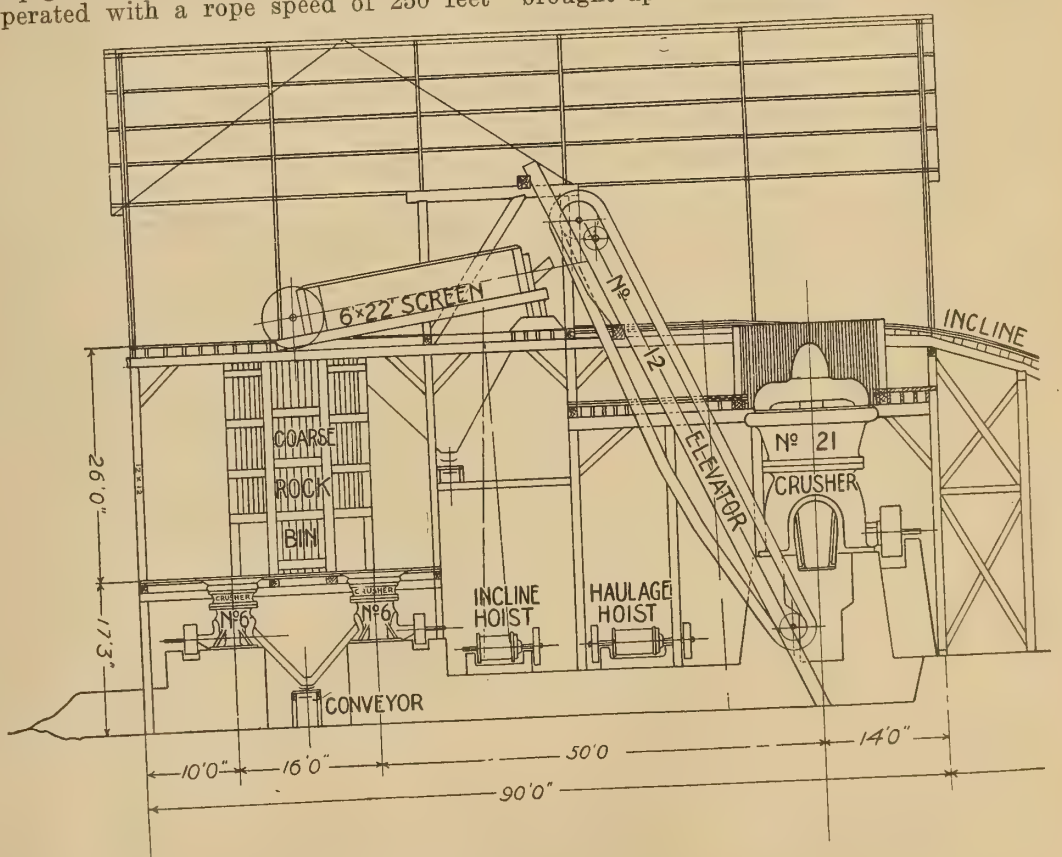


Section showing Conveying, Screening and Storage Equipment

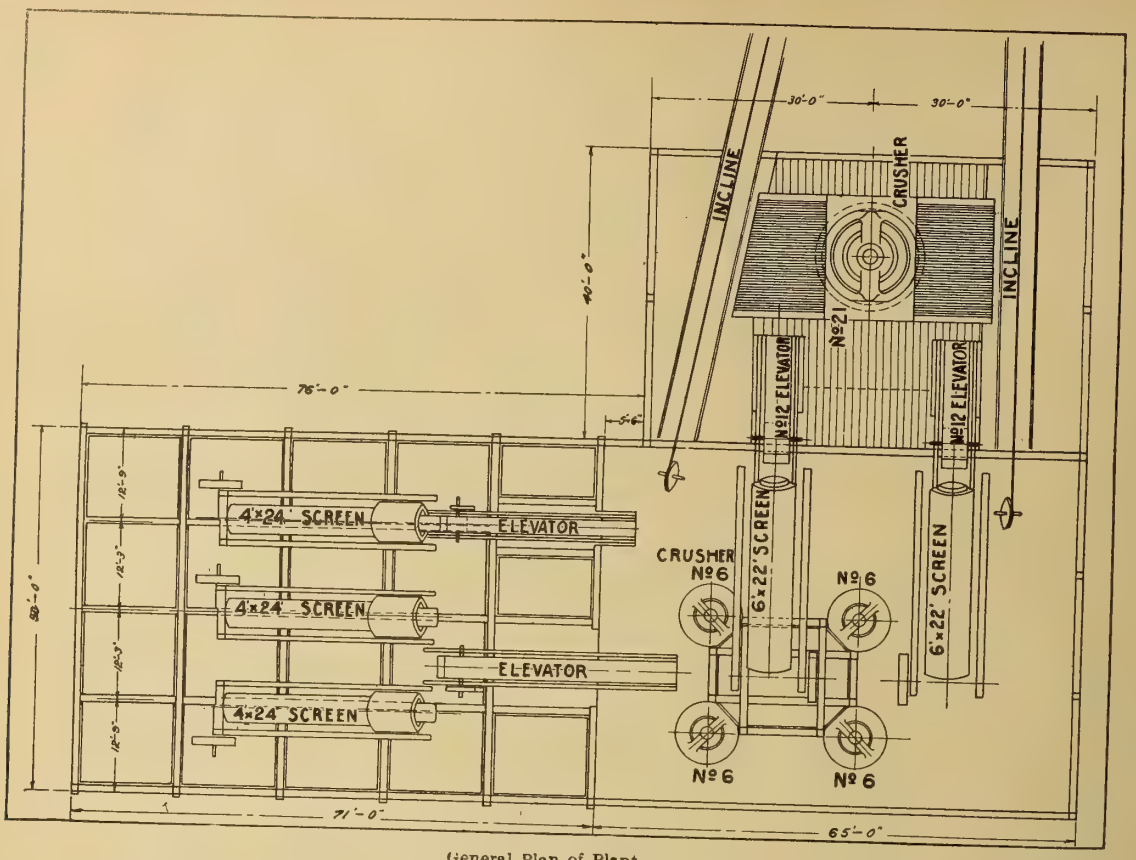
just outside the power house. Condensed steam from the auxiliaries is sent through a water heater and steam pressure upon the boilers is maintained at a constant amount of 160 pounds by an automatic blast arrangement. The steam plant is one of the most economical that can be installed, the advantage of which is seldom appreciated in a rock crushing plant.

Hoists.

The hoists are of the Allis-Chalmers-Bullock friction type. There are three hoists, one for the haulage system with a 4-foot drum long enough to wind 1,500 feet of rope upon it, which operates the haulage system with two ropes, the down-going cars balancing in part the weight of the up-going loaded cars. The hoist is reversible and operated with a rope speed of 250 feet per minute, bringing a train of cars from the extreme end of the quarry to the plant, in approximately five minutes. The remaining two hoists are for the two incline trestles, hoisting by a friction band and lowering by a band brake. The speed of these hoists is also 250 feet per minute, bringing a car from the foot of the incline trestles to the crusher hopper in about 45 seconds. The three hoists work in unison and are all controlled by one operator located above the crushing floor at a point where he can see the cars both at the bottom of the incline and at the dumping point. The speed of the hoisting equipment is such that by the time a train of four empty cars has been lowered to the quarry and four loaded cars have been crushed and returned to the empty track, four additional loaded cars have been brought up from the quarry.



Section Showing Crushers



General Plan of Plant

Auxiliary Apparatus.

Over the No. 21 crusher are installed two Yale & Towne triplex chain blocks, of 20-ton capacity each, for handling any of the heavy parts of the crusher should there be occasion to make repairs. The track for these blocks, which are fastened to a trolley or crawl, may be seen upon the illustration, showing how any part may be lifted clear of the building or a new part lifted in. Smaller crawls and chain blocks are provided over the number sixes and elsewhere around the plant. There is a belt conveyor for carrying coal direct from cars to the boiler house. There is a large machine and blacksmith's shop alongside of the plant, provided with a 24-inch x 18-foot lathe, a planer, radial drill, blacksmith's forge, steam hammer and other proper equipment. This shop is driven by an Allis-Chalmers-Bullock induction motor, so that it may also be operated when the crushing plant is not running, receiving current from the generator described in the power house.

Reservoir.

The reservoir, which will be the largest in Montreal, was designed by Mr. Frank H. Pitcher, chief engineer of the Montreal Water & Power Company. Approximately one-half of this reservoir is to be completed first and put into operation, while the remaining half is being completed. The main water pipe leading from this reservoir is now being laid by Messrs. Laurin & Leitch, and consists of a line of 60 inch cast iron pipe, the laying of which, with its valves, etc., is in itself an item of considerable interest, but which is dwarfed in comparison with the quarrying and crushing operations going on.

General.

This plant is unusual in many respects: primarily, on account of its size and initial cost in proportion to the amount of work to be done under this contract. The size of the plant and the excellence of its equipment result in a saving in the cost of construction of the reservoir and the disposal of the rock taken from it which should pay for the entire equipment. It has sufficient capacity to crush the rock as fast as taken from the quarry, so that the product can be marketed immediately after excavation. The rock is handled but once from the excavation to the marketing, and in this way it is immediately disposed of and is out of the way. The rock is excellent in quality and instead of being thrown away on a waste bank, as was the case of the rock taken from the excavation for the Chicago drainage canal, for example, is made to yield a profit. Messrs. Laurin & Leitch use a very great quantity of crushed rock in their own work on other contracts, noticeably street paving, concrete work, and other engineering work of similar character, and a portion of this rock will be used in this way, the cost of which will be less to them than rock purchased upon the open market. The plant, which was designed and equipped by the engineering force of Allis-Chalmers Company, possesses an unusual flexibility of operation in addition to unusual economy of production, so that it may be operated to suit both the work of excavation and the market for crushed stone, producing rock for the lowest possible cost of production. The plant is exceedingly compact, resulting in the smallest possible buildings, and is well arranged for operating with the smallest crew of men. One man handles the hoisting and haulage equipment, two men the dumping of cars and feeding of crusher, two men the handling of cars at the foot of the incline trestles, one man for the spring floor, one man for the number sizes, one man for the transmission and hoist floor, one engineer, two boiler men, one oiler and two men upon the conveyors, loading, etc., and these men constitute the entire operating force of the plant. One side of the haulage incline may be operated independently of the other if necessary, as can also one of the

incline trestles. One side of the No. 21 crusher, with its elevator and screen, can be operated independently of or without the other. Any one or all of the number sizes may be cut out temporarily, and when the balance of the plant is shut down rock may still be loaded or piled on the storage piles, or the drills at the quarry may be operated.

A Remarkable Compressed Air Mine Locomotive

By FRANK C. PERKINS.

The powerful mining locomotive utilizing compressed air as a motive power, shown in the accompanying illustration, is utilized by the Lehigh Valley Coal Company and has a total weight of 18,000 pounds and a tractive force of 3,260 pounds. The storage tank has a pressure of 800 pounds per square inch, while the working pressure is 140 pounds, the air tank capacity being 95 cubic feet.

Compressed air locomotives operate in a similar manner to a steam engine, the cylinders receiving air under



pressure instead of steam. On this air engine the cylinders measure 8 inches in diameter, and have a stroke of 12 inches, the power being transmitted to the driving wheels, which are 28 inches in diameter, in a similar manner to an ordinary locomotive.

This compressed air mine engine was designed for a gauge of 4 feet, and has a wheel base measuring 4 feet in length, the total length of the locomotive, over the bumpers, being 14 feet. The width of the locomotive is 5½ feet and its height only 5 feet 7 inches, these limits being necessary on account of the low and narrow passages encountered in the mine.

Hidden Creek Copper Mine, Observatory Inlet, B.C.

The Spokesman-Review, Spokane, Washington, recently published an interview with Mr. W. Yolen Williams, consulting engineer to the Granby Consolidated Mining, Smelting & Power Company, Limited, as follows:

"It is the general opinion in northern British Columbia that the Hidden Creek mine is destined to be one of the biggest producers in that province. My own judgment from all the surface indications and a study of the deeper development to date, is that I can see little chance for this estimate to be mistaken.

"One feature of the property which impresses me especially is the facility with which mining can be done cheaply, as great depth can be obtained by open cuts. The mine is located within two miles of the company's wharves on Goose Bay, and the site of the projected smelter. The latter is admirable both for convenience in handling ore from the Hidden Creek mine, and for receiving custom ores from the Portland Canal district, northern British Columbia and Alaska generally.

"Before I left the mine the plan of operation for the winter had been outlined. The intention is to continue work on the main crosscut tunnel, which is now 736 feet long, and to concentrate work there so soon as the season necessitates the suspension of surface operations.

"This tunnel cuts the first vein at a vertical depth of about 400 feet from the surface and extends 300 feet beyond that lode. It entered the ore body on an angle and was in ore for 125 feet. Considerable drifting has been done here on the hanging wall side of the vein.

"The winter's work will consist of extending these drifts and thoroughly exploring the ore body by crosscuts, with supplemental diamond drill work, both for depth and distance along the vein.

"At the same time the main crosscut will be driven about 300 feet further ahead, from which point the diamond drill will be used to prove the extent and value of the ore bodies in the second vein.

"The surface showings of both ore bodies, which are known locally as the Cabin and Mammoth bluffs, are large and promising. The Mammoth bluff is the one not yet reached by the tunnel. While both ore showings are of a similar character, the Mammoth bluff shows much the larger ore body and the better grade of ore of the two. Both have been extensively prospected by surface cuts."

The Spokesman-Review added the following information: Mr. Williams was a member of one of two parties sent north about the same time by the Granby Company to resume the development of the Hidden Creek mine, which is located on Goose Bay, Observatory Inlet, the latter being a branch of Portland Canal, which forms the boundary line between British Columbia and Alaska. The two parties included, beside Mr. Williams, Mr. M. K. Rodgers, the former manager of the property, who still retains a one-fifth interest in it; Mr. O. B. Smith, jr., superintendent of the Granby mines at Phoenix, B.C.; Mr. H. McDonald, an engineer long in the employ of the Hidden Creek mine; and Mr. Page Boyle, a diamond drill expert. They were accompanied by a force of miners and three crews of diamond drillers. All arrived at the mine about the same time. Mr. Smith has remained to see the work well started, while Mr. Williams returned to Spokane, in order to look after the development of the Cliff and Consolidated St. Elmo mines at Rossland, B.C., also under bond to the Granby Company.

During the winter a force of twenty men will be kept continuously at work on underground development of the Hidden Creek mine, and it is expected that by spring enough will be known about the property to justify the carrying out of Mr. Jay P. Graves' plan to equip it with a matting plant as a feeder for the Granby Company's smelter at Grand Forks, B.C.

Personal and General

Mr. I. L. Merrill, of Los Angeles, California, president of the Hedley Gold Mining Company, has been spending a week or two looking over the company's Nickel Plate mine and 40-stamp mill at Hedley, Similkameen, B.C.

Mr. A. H. Gracey, of Nelson, left the Kootenay for Spokane, Washington, on his way to Vancouver, B.C., where he will spend the greater part of the winter.

Mr. Ernest Levy, manager of the Le Roi No. 2, Ltd., at Rossland, and the Van Roi Mining Company, the latter operating a silver-lead mine in the Slocan Lake district of British Columbia, recently spent a week at Vancouver and other coast cities.

Mr. Geo. W. Wooster, of Grand Forks, B.C., treasurer of the Granby Consolidated Mining, Smelting & Power Company, was in Seattle, Washington, late in November.

Mr. J. E. McAllister, of Greenwood, B.C., general manager for the British Columbia Copper Company, went to New York lately on a business visit.

Mr. E. A. Bradley, well known in the Revelstoke mining division of British Columbia in connection with hydraulic gold mining in the Big Bend of the Columbia district, has been to Spokane, Washington.

Mr. George H. Aylard, of New Denver, Slocan Lake, B.C., was in Spokane early in the month, on his way to Victoria.

Mr. H. L. Rodgers, manager of the Yankee Girl Mines, has returned to Ymir, B.C., from conferring with the directors of his company, which has its headquarters in New York.

Mr. Wm. Yolen Williams, consulting engineer to the Granby Consolidated Mining, Smelting & Power Company, Limited, returned to Spokane late in November from the Hidden Creek Copper Company's mine, Observatory Inlet, B.C., which mine the Granby Company is further developing under an option of purchase of four-fifths interest in the Hidden Creek Company.

Mr. C. W. Laing has resigned the position of construction engineer for the Dominion Coal Company, and has acquired an interest in the Brown Machinery Company of New Glasgow.

Mr. Richard Kirkby, the mining engineer of the Dominion Coal Company, leaves for England about the middle of December. He will spend Christmas there, and will return to Glace Bay at the end of January. While over in England Mr. Kirkby will inspect colliery plants and coal washeries.

Mr. Reginald E. Hore, of the Michigan College of Mines, and formerly of Toronto, was recently appointed Assistant State Geologist of Michigan. He is now in charge of the Houghton office of the State Survey. During the past summer Mr. Hore worked in the iron districts of Michigan.

Mr. J. B. Woodworth has returned to Toronto from inspecting several mines in the southern states.

SPECIAL CORRESPONDENCE

NOVA SCOTIA.

Glace Bay, General.—The Dominion Coal Company's output for November was 325,174 tons. During the first half of the month the mines worked full time and the rate of production was higher than it had been during the whole of the shipping season. The St. Lawrence season closed about the twentieth, and during the last half of the month the mines have not worked so regularly. Extensive alterations are being made to the screening plant at No. 2 Colliery, for coal from the Phalen Seam. Both Nos. 2 and 9 Collieries were closed down for these alterations for a period of five days. The height of the dump is being very much lowered to eliminate breakage, and a screening plant with shaking screens and picking belts is being installed, which should very considerably improve the product from No. 2 mine.

The total output to the end of November for the eleven months of the year is 3,266,230 tons, comparing with 2,527,422 in 1909, and 3,377,225 in 1908. December output may possibly reach 300,000 tons. The record annual output from the Dominion Coal Company's mines was 3,555,068 tons in 1908, so that it is quite possible that 1910 may break all records for annual production. Taking into consideration the fact that the U. M. W. A. strike was not declared off until the 28th of April, this showing is an exceedingly good one. By the close of the year the contribution to the general output from the new mines in the Victoria-Lingan district will amount to almost a quarter of a million tons. It is only a little over two years since this district was opened up.

The St. Lawrence shipments for the season amounted to 1,227,667 tons, comparing with 961,904 tons during the season of 1909.

Rescue Stations.—Referring to notes on "Rescue Stations in Great Britain," that recently appeared in the Journal, the following account of the use of breathing apparatus may be of interest.

The Denaby and Cadeby Collieries Company operate extensive and deep mines on what was formerly regarded as the Eastern fringe of the South Yorkshire coalfields. The workings have a high temperature, partly owing to the depth and partly to the tendency of the seam to "gob-fires." As a result of one of these gob-fires, an accumulation of black-damp had made its way from the older Denaby workings to the present workings in the Cadeby mine. In order to clear the ventilation it was necessary to remove some obstructions in the area filled by the black-damp. It was decided to utilize breathing apparatus for this purpose, and a party of four men descended the No. 2 shaft and walked for a distance of one mile to the point where the damp was coming off. They encountered a good many obstructions, and it was necessary to crawl for a considerable distance along old roads with very narrow area. The party succeeded in removing one old brattice stopping and had reached another one when two members of the party asked to go back, stating that their strength was giving out. This was not due to any lack of oxygen, but to the intense heat, which is stated to have been in the neighbourhood of 160 degrees. The party turned back and arrived in the fresh air of the intake after an absence of an hour and a quarter in the old workings. The following day Mr. T. W. Mosby, who was the leader of the first party, with two fresh men and one man who had been a member of the party on the previous day, made another attempt to clear the ventilation. This time, however, they substituted mouthpieces for the helmets that had been used the previous day. Mr. Moseby states that the party felt more comfortable with the mouthpieces and, after working for one hour and a quarter, they succeeded in clearing away all the obstructions, and by six o'clock on the following night some three hundred yards of the Cadeby workings had been cleared of damp.

It may be mentioned that the apparatus used at most rescue stations are now so arranged that they can be used with either the helmet or with the mouth-breathing arrangement. Certain circumstances seem to require the helmet type of apparatus and

other circumstances are more favourable for the mouth-breathing type. In fighting a mine fire where the apparatus party have to face intense heat in their endeavour to get near the flames, there can be no doubt that the helmet type of apparatus is the only one that will afford the necessary protection to the face and head. On the other hand, where a rescue party has to make its way for a long distance through constricted passages in a heated and humid atmosphere, the mouth-breathing arrangement is stated by many experienced men to be preferable, because it admits of free perspiration and enables the head to be kept cooler.

In the working test above referred to, the apparatus used was of the Draeger type and the party had received their training at the Wath Rescue Station. Mr. Mosby's opinion of the usefulness of breathing apparatus, as given to a newspaper reporter, is interesting as being the opinion of a man who knows from experience what he is saying. It is as follows: "If life is in jeopardy in a mine through accumulation of gas, and there is a road for the rescue team to travel on, they will be able to fetch a man out without any danger to themselves; provided, of course, that it can be done under the two hours limit. A lot depends upon the man's stability, and the man with plenty of lung power who is able to stand great exertion and great heat stands the best chance."

ONTARIO.

Cobalt.—In the week ended December 2 over a thousand tons left the camp. This is probably the heaviest week that the camp has known: certainly in silver ounces it was.

The McKinley-Darragh output for November was 320,000 ounces and the estimate for the year is two and a half millions. The Savage is now producing between 50,000 and 60,000 ounces per month.

In November the McKinley-Darragh shipped eleven cars of concentrates.

The shipments for November increase the lead for 1910 as the banner year to almost 3,000 tons, in spite of the large number of mills and the bullion shipped instead of the low grade ore. Twenty-two mines shipped in November, against nineteen in October. The increased production is to some extent due to the higher price of silver, the ore being rushed out while it is still at 55 or 56 cents to the ounce.

November was also the heaviest month for bullion shipments that the camp has known. Four mines put out $87,243, the Nova Scotia contributing $32,579.96, the Buffalo 5,750, the O'Brien $22,932.80, and the Crown Reserve $24,268.67. Altogether 176 bars were exported in November.

At the annual meeting of the Cobalt branch of the Canadian Mining Institute the following officers were elected for the year: Mr. Chas. A. O'Connell, chairman; Mr. A. A. Cole, secretary-treasurer, and Messrs. Norman Fisher of the Temiskaming, Hugh Park of the Nipissing, and A. E. Culbert of the O'Brien, the committee. Mr. A. A. Cole was nominated as the representative of the Cobalt branch for the General Council of the Institute. The speeches of the evening were by Professor Miller on the International Geological Conference which he attended at Stockholm, Sweden, and Mr. Cyril Knight's very brief impressions of Porcupine's geology.

On its property in Munro, eight miles east of Matheson, the Detroit New Ontario is now installing two fifty horsepower boilers and a four-drill compressor. The intention is to sink to the 400-foot level and to crosscut from that point.

A shaft is being sunk on the Valentines Mines claim at the south end of Cross Lake. It will be put down a hundred feet by contract on the No. 8 vein and afterwards at that level the strong calcite leads discovered on the surface will be cut.

Seven hundred feet north of its No. 3 shaft and 500 feet southwest of its No. 1 the Hargraves has run into high grade ore again at the 375-foot level. The vein will average about three inches wide and may probably run 4,000 ounces to the ton. The find was made in the long crosscut run from the No. 3 shaft parallel to the Kerr Lake line.

From the winze 65 feet below the 200-foot level of the City of Cobalt a vein of high grade from half an inch to two inches has been struck. The find was made on the Cobalt Townsite boundary and undoubtedly runs into that property.

The Rochester Cobalt is now trying to borrow $25,000 on the property in order to continue development. Directors can sell 69,000 shares of stock at ten cents each.

The Nipissing will build a big concentrator for its low grade ore, and for the purpose of discovering the best method of treating it, it has erected on its property a large sampling plant. The Nipissing is now concentrating only at the Kendall, where the low grade is handled by the Nipissing Reduction Company.

In addition to the usual three per cent., the McKinley-Darragh has declared for the New Year disbursement a 12 per cent. bonus. The McKinley-Darragh will have paid on January 1, 49 per cent., or $1,144,914.30.

There is an electric rate war between the Cobalt Hydraulic and the British Canadian Power Company all over Northern Ontario. The Fasken interests within a few weeks have obtained the control of the Cobalt Power Company, the Cobalt Light, Heat & Power Company, and the New Liskeard Power Company. All these companies are supplying power and the Hydraulic air.

The 60 tons shipped by Cobalt Lake will net that company, after freight and treatment charges, somewhere in the neighbourhood of $10,000.

While there is no possible doubt that the ore reserves of the La Rose Consolidated have almost been doubled by the discoveries on the Lawson, the La Rose and the Princess, it does not seem likely that the dividend will be increased next quarter.

The new lateral vein alone on the La Rose has increased the ore reserves of the company by $2,000,000.

The new vein on the Lawson continues to show excellent values, and it has been opened up for a distance of 60 feet or more. For that distance at the 200-foot level it averages nine inches and is 4,000 ounce ore and upwards.

Porcupine.—After allowing a private company to commence cutting the right-of-way for an electric railway into the Porcupine the Ontario Government have decided that they will build into Porcupine themselves, and have voted $450,000 for that purpose. The work done by the Haileybury syndicate holding the charter has been taken over by the Government, and it is said they will be compensated. There will be no loss of time in pushing forward the construction of the railroad.

Few assays from the 100-foot drift on the main vein of the Timmins go below $15, and many hundreds have been made. A winze is now being sunk below the 100-foot level on ore.

There is a very keen demand for claims in the Porcupine area, New York and English buyers in particular seeking anything in a good location in Tisdale, Whitney, Shaw, the Reserve, and Langmuir.

Very considerable interest is being taken in Langmuir Township, near Night Hawk Lake. Claims have been selling freely there for good sums. Victor Mattson, the Swede, who found Gold Island in Night Hawk Lake, has discovered native silver in a wide dike of calcite and barite. It has been stripped for 1,200 feet and the native shows in several places. It is exciting the greatest interest in the camp.

Several more banks have decided to locate at Porcupine. The Traders is already there and the Bank of Ottawa. Now it is announced that the Imperial Bank and the Bank of Commerce will establish branches this winter and the Royal Bank will also be represented.

Several plants have already been ordered for the Porcupine camp. The Timmins has completed its order for a 30-stamp mill, the Dome has purchased a 12-drill compressor, the Rea Mines have had shipped in a 20-horsepower boiler and a hoist, and the Foley-O'Brien a 4-drill compressor and two 50-horsepower boilers.

New Brunswick capitalists have bought the Walsh claims in the Reserve for $50,000 with a first deposit of $2,500. The dike is reported to be 100 feet wide with good free gold showings.

On the Powell claims in Porcupine another good find has been made in the discovery before the snow fell of a 40-foot wide vein of porphyry carrying free gold. Camps have been erected on the Powell claims and a road cut in from the Dome.

There was a very pronounced rush over the Porcupine trail once the route was declared open for sleighing and heavy traffic. The early and severe frost should make the ice good and the going fine.



The Powell Claim

Mr. P. Kirkgaard, head of the Deloro Smelting & Refining Company, has purchased the Feldon claims in Tisdale, the purchase price being $35,000.

The breaking into articles of freight on transit into the camp and the many wholesale robberies of prospectors' shacks that have occurred in the camp have aroused a very bitter feeling among mining men, and they demand some protection from the law.

The Burns-Goad claims, the centre of the important section in the southwest of Shaw, have been sold to Toronto capitalists for, it is said, $100,000 with $5,000 down. The Redstone River section has grown in importance, as has also the whole of Shaw Township, very much in the past two weeks.

There is a rush of stakers into Thomas Township, and some of the claims staked are already disposed of to syndicates who are ready to throw them into companies or to take a gamble with them themselves.

The Hon. Frank Cochrane, Minister of Lands, Forests, and Mines, Mr. J. H. Black, superintendent of the T. & N. O., and Mr. Clement, the chief engineer, have all visited the Porcupine camp within the past two weeks.

South Lorrain.—On November 29th power was turned on from the Beaver Lake substation of the British Canadian Power Company, and the Wettlaufer and the King George are now running with the juice. The company has 1,500 horse-power available for the use of the camp. Only transformers are being established at Beaver Lake, as the company will supply nothing but electricity.

Since the seven tons of high grade ore was shipped from the Bellellen at South Lorrain the drift has been continued on the vein at the 70-foot level for some distance. Another shaft is being sunk on the Little Keeley vein which shows six to eight inches wide of solid smaltite.

Though no official announcement has been made it seems most probable that the Lewisohns have agreed to take up their option on their big block of Wettlaufer stock, which will give them control of the mine. The mine is proving a bonanza.

Gowganda.—There will be at least three shippers from the Gowganda camp this season, with the possibility of two more. The Millerett has ordered a 10-stamp mill completely equipped for fine sampling, and the Reeves-Dobie is expected to have its new machinery in operation by the end of this month at least.

The Calcite Lake Mining Company has struck into some rich ore at the 92-foot level of its shaft after sinking on a comparatively barren calcite vein. The company is now bagging ore and may ship this winter. Close by the Bishop Gowganda is also getting results. Calcite Lake is eight miles south of Gowganda.

At Gowganda itself the Mann has found a 6-inch vein of 500-ounce ore which the presence of mills in the neighbourhood renders of some value if it does not improve in grade. The Bartlett's new control are stoping out all the silver they can see in order that they may get out a car to continue development with.

At Miller Lake, in addition to the activities of the Millerett, where a good surface discovery was made before the snow fell, the Miller Lake O'Brien has developed into a shipper this summer. At the 80-foot level there is an almost continuous ore body showing high grade for 200 feet, while the vein as drifted on at the 150 is stronger and richer than at the upper level.

Tests made in Toronto show that the dump ore and the low grade in the mine at the Millerett will run 44 ounces to the ton. Concentrates from this ore run 1,400 ounces.

The Morrison, near Miller Lake, is sinking two shafts on its big vein, which up to a short time ago showed mainly bismuth. Now in one of the shafts a small but rich lead of native silver has been cut right in the big calcite lead.

Other sections in the Gowganda district, where various properties have made good, are Hangingstone Lake, where the T. & H. B. Co. has taken up its option on the O'Gorman and Sweet claims; Spawning Lake, where the Thompson Mining Company found a fine surface vein; Shining Tree and Smoothwater. Everything has been held up by bad transportation and the seducing of capital into better advertised fields.

BRITISH COLUMBIA.

The western branch of the Canadian Mining Institute will hold a general meeting of its members at Nanaimo, Vancouver Island, in February, when the papers and discussions will be chiefly on coal mining matters. It is proposed to hold the spring meeting at Trail, where are situated the big smelting works and lead refinery of the Consolidated Mining & Smelting Company of Canada, Ltd. The removal of Mr. A. B. W. Hodges to South America several months ago further reduced the resident representatives of the West, which may yet have to consider itself fortunate to have any at all on the council of the institute. What will be the eventual result of this position, unsatisfactory as it is to many western members, remains to be seen. Last year Ontario and the East rejected every western nominee to the council but one.

Recently declared dividends were as follows: Hedley Gold Mining Company, quarterly distribution at the rate of 12 per cent. per annum; Le Roi No. 2, Ltd., two shillings per share on 120,000 shares; Crow's Nest Pass Coal Company, 1 per cent. Both the Le Roi No. 2 and the Crow's Nest Pass Coal Company paid similar dividends earlier in 1910.

East Kootenay.—More ore has lately been found in the St. Eugene mine, but particulars have not yet been made public. This mine is owned by the Consolidated Mining & Smelting Company, and in the company's last annual report it was stated that the ore reserves were estimated at about 20,000 tons, which was taken to indicate that the ore bodies had been nearly exhausted. The information regarding the finding of more ore is reliable, but whether the ore is in sufficient quantity to be of much importance has not yet been ascertained. However, the improvement in the situation is a little encouraging, even should a further change for the better not take place in the immediate future. It is hoped, though, that persistent exploration will eventually result favourably, and the life of the mine be thereby prolonged.

At the several collieries of Southeast Kootenay much coal is being mined and shipped. The Crow's Nest Pass Coal Company is working two collieries, namely, Coal Creek and Michel; the Hosmer Mines, Ltd., has made a much larger production of coal this year than last; and the Corbin Coal & Coke Company has also considerably increased its total output. There is little being done to further develop the large coal field in the upper Elk River country, which is still without railway or other transportation facilities.

Slocan.—The Rambler-Cariboo will ship ore soon, snow having fallen and the hauling being consequently easier. The Lucky Jim is continuing development work, this including driving another adit. The new opening is only a little above the railway track, so will give greater depth than has yet been reached, the other adits being well up the side of the mountain.

In the Cody neighbourhood, the Noble Five is reported to have found a vein of ore of good width and grade, but particulars have not been made public yet. The long raise from the deep-level tunnel of the Surprise mine to the old workings 800 feet above is more than halfway up, and a fan has been put in the level below to improve the ventilation for the miners.

Near Sandon, the Richmond-Eureka and Hope are both still working, but the Slocan Star has been closed, it is stated, for the winter. Little is being done at mines high up the mountains, for deep snow usually makes it not practicable to work them to advantage in winter. Near New Denver, the Mollie Hughes is being worked, and is sending out an occasional car of ore of good grade.

In the vicinity of Silverton, the Standard, Van Roi, and Hewitt mines remain the most important in the Slocan Lake district. The Standard will resume shipment of ore as soon as the snow shall be deep enough to make a good road; meanwhile, the ground is too soft for heavy hauling. This mine has one of the finest showings of galena ore ever seen in the district; at times there is fully 20 feet of clean ore in the face of No. 5 tunnel. The erection and equipment of the Van Roi concentrating mill is being proceeded with as rapidly as local conditions will permit; it is expected this work will shortly be completed. Much ore has been opened by new workings in the Van Roi mine. The Hewitt has shipped but little ore during recent years, but instead, the management has steadily pushed development work, so as to have large reserves of ore for milling whenever it shall be decided to commence concentrating on as large a scale as milling facilities will allow.

On Ten-Mile Creek, the Ellis Silver Mining Company, of Toronto, working the Eastmont mine, and Mr. S. S. Fowler doing development work on the Enterprise, which he holds under lease from its British owners, are the only ones mining in the district south of Silverton.

Rossland.—Recent developments on the Consolidated Mining & Smelting Company's Centre Star group of mines have been satisfactory. In the War Eagle mine, one of the group, another body of ore containing higher value in gold than much of the ore usually obtained from this group, was lately entered by the diamond drill, at 75 feet below the twelfth level. Development previously done on the twelfth level had proved the existence there of a strong vein, but the ore taken from it was of low grade, so the diamond drill was used to prospect it below the level, with the result that good ore was found. Assays of samples from over a width of 5 feet gave returns up to 3.24 oz. gold per ton, and 0.4 per cent. copper. Of three average samples assayed, two were found to contain gold at the rate of above 3 oz. to the ton. This development is an important one, and it resulted from following down some small streaks of ore first met with above the tenth level. Sinking from the twelfth level is in progress, preparatory to opening a stope in the high-grade ore discovered by diamond drilling, as above mentioned. Stope No. 1168, above the War Eagle eleventh level, which has been opened since the company's annual report, to June 30th last, was made, has been yielding a considerable tonnage of ore of good quality. In the company's Centre Star mine, too, developments have been generally satisfactory, with pay ore on several levels, though not of so high a grade as that in the War Eagle. Diamond drilling is being continued in the lower levels of this mine, but as yet not much good ore has been found in the bottom of the mine. In both the Idaho and Iron Mask mines stopes are continuing to yield a fair tonnage of ore for smelting.

Progress is being made with deep development by the Le Roi No. 2 Company. The cross-cut driven about 1,000 feet south on the 1,300-foot level some time ago entered a large ore body, but the value of the ore thus far opened is less than was hoped for. There has not yet been time, though, to do any considerable development in the ore. It contains a fair percentage of copper, which is regarded as a promising indication. The greater part of the development so far done on the 1,300-foot level has necessarily been dead work, in consequence of which but little has yet been ascertained concerning the ore-body, but there is believed to be good reason to look for profitable development later.

Ore is still being extracted from some of the old workings of the Le Roi. There have been rumors in circulation relative to prospective buyers of this property, but the liquidator has announced that nothing definite has yet taken place in the direction of its sale. Two properties in the south belt of Rossland camp, namely the Mayflower and the Blue Bird, are looking well, both having opened good showings of galena ore. Further development of these finds is in progress and it is hoped permanent good results will follow. The I. X. L. is being worked in a small way under lease, with profit to the few men working it.

Trail.—The Consolidated Mining & Smelting Company's smeltery is receiving a comparatively large quantity of ore, both from its own mines and those operated by others, the latter being chiefly silver-lead properties, the production of which is much smaller than that of copper mines. The supply of copper ores is being well maintained, but lead ores are not obtainable in such quantity as during the years 1908 and 1909. Several mines that shipped a considerable tonnage in those two years have not latterly been producing, though one or two of them are expected to do so shortly. Meanwhile improvements are being made at the smeltery as occasion calls for them.

Boundary.—Work has been resumed in the Greenwood-Phoenix Tramway Company's tunnel, Greenwood, with 22 men employed. Mr. Duncan McIntosh, manager, has received assurances from Chicago, where the larger shareholders in the company reside, that money will be provided for driving to a distance of at least 3,000 feet. The dimensions of the tunnel are, approximately, 9 by 8 feet. The face has lately been in hard granite, but it is thought less difficult ground is not far ahead, after reaching which progress will be greater than under existing conditions. The tunnel is in about 800 feet.

At the Granby Consolidated M. S. & P. Co's smeltery, Grand Forks, preparations were made last month for blowing in Nos. 7 and 8 blast furnaces, and thereafter operating the smeltery up to its full ordinary capacity. Meanwhile arrangements had been made at the mine to again make the daily output of ore equal to the requirements of the eight blast furnaces. Since the destruction by fire several months ago of the ore-crushing and shipping facilities at the No. 3 tunnel outlet from the mine, the quantity of ore shipped daily has been curtailed. Temporary arrangements have been made to ship from No. 3 by way of the 200-foot level, which has been connected with No. 3 by a raise. On the 200-foot level the ore is trammed to the Victoria shaft, hoisted thence to the surface, and shipped over the Canadian Pacific Railway to Grand Forks. Next spring a new crushing plant and shipping bins will be provided at the outlet from No. 3 tunnel, and after completion of these works it will again be practicable to ship over the Great Northern, which has rail-

way connection with that outlet, though not with the Victoria shaft.

The maximum treatment capacity of the British Columbia Copper Company's smeltery at Greenwood is now about 2,600 tons daily, but the ordinary day's run, with all three furnaces in blast, is, when conditions are favourable, 2,400 to 2,500 tons of ore. Before the enlargement of two of the blast furnaces, about 1,800 tons was the quantity ordinarily smelted with three furnaces operating. The company is trying to maintain an average output of about 36,000 tons per month from its Mother Lode mine; 18,000 tons from the New Dominion Copper Company's Rawhide mine (operated under the same management); 3,500 tons from its Wellington camp mine; 2,500 tons of sulphide ore from the Napoleon mine, near Marcus, Washington; while the remainder of its supply comes from other sources. An aerial tramway, 29,000 feet between terminals, is being constructed, from the company's Lone Star mine, distant from the smeltery eight miles and situated immediately south of the International Boundary line, in the adjoining State of Washington. This tramway will have a carrying capacity of 20 tons an hour. Its lower terminal is at the site of the Boundary Falls smeltery (not now being operated), and connection thence with the smeltery at Greenwood is by C. P. R.

The Consolidated Mining & Smelting Company of Canada, Ltd., beside shipping ore from the Snowshoe mine, which it works under lease, is also preparing to send ore to its smeltery at Trail from its Phoenix Amalgamated group, which adjoins the Granby Company's property on the south. The company is also shipping ore from its No. 7 mine, conveying it over an aerial tramway to bins on the C. P. R. line at Boundary Falls, where it is loaded on cars for Trail.

A first carload of coal has been shipped from the small coal mine being worked three miles west of Midway. Some indications of coal have been discovered on Myers Creek, between Midway and Rock Creek, and prospecting work has shown that a short distance below the surface there is a 4-inch seam of coal which is widening as it is sunk on. A small local organization will ascertain whether or not coal in workable quantity occurs here.

Similkameen.—In the Lower Similkameen, the Hedley Gold Mining Company is completing putting in steam machinery and plant to provide for continuing operating the stamp mill throughout the winter, which has not always been practicable when dependence was placed on water power only. About Princeton, higher up the Similkameen Valley, beside the Princeton colliery, from which coal is being shipped regularly, other coal properties are being opened, these including the coal measures of the United Empire and the Osoyoos Coal Company, both of which are reported to have workable seams of coal. In the Granite Creek district the Columbia Coal & Coke Company, of Winnipeg, has done much development and is putting in power plant; its known coal reserves are large, and its enterprise is well managed and is stated to be adequately financed for development purposes. Another industry, the establishment of which is in hand, is that of manufacturing cement, for which a company has been organized. The extension of the V. V. & E. Ry. from Princeton to Granite Creek, now well on towards completion, is benefitting the district materially.

Coast.—From a London journal it is learned that the annual meeting of the Tyee Copper Company was held in London on November 10th. The chairman was reported to have said: "During the year the price of copper had been even lower than in the previous year, and the effects were such as to hamper the company's business seriously, mine owners having no inducement to proceed with development, to ship ore actively, or to open new mines. Nevertheless, the company had received 21 per cent. more ore than in the previous year. The quantity received, however, had only sufficed to keep the furnaces running 188 days, yet, as the standing charges were the same, whether the furnaces were fully or partially employed, the financial results afforded hope of improvement. Between May 1st and August 1st, 1910, the ore received was 19½ per cent. in excess of the quantity for the corresponding period of 1909. The manager reported that negotiations for the acquisition of an important group of properties had been almost closed. He (the chairman) was sanguine as to the company's future. The report and accounts were unanimously adopted."

GENERAL MINING NEWS.

NOVA SCOTIA.

Springhill, N.S., Dec. 2.—A telegram has been received here from the executive of the Dominion Steel Company to the effect that no change of policy will be made on the part of the company with respect to the strike situation. The United Mine Workers have taken the communication into consideration.

The terms of the acquisition by the Dominion Steel Corporation of a controlling interest in the Cumberland Coal Company at Springhill were made known to-day. There were outstanding $900,000 six per cent. Cumberland Bonds, for which the Steel Corporation paid $120, in five per cent. Steel Bonds. For the $2,000,000 of Cumberland common stock Steel paid $600,000 par value in Steel common stock, which has a market value of $360,000. In all, the Cumberland people received in securities about $1,800,000.

QUEBEC.

Montreal.—Mr. J. H. Plummer has given out the following statement: "It has been arranged that a controlling interest in the stock of the Cumberland Coal & Railway Company will at once be transferred to the leading directors of the Dominion Steel Corporation. There will be for the present no change in the local management. The general policy to be pursued will be that in force in the Dominion Coal Company." This announcement of the President of the Dominion Steel Corporation is of the greatest importance, as it hitches up a valuable property with the greatest steel company in the Dominion, and will no doubt bring to an end the unfortunate strike at Springhill, which has been on for over fourteen months. The securities of the acquired company are a bond issue of one million dollars, and two million dollars of stock, and although the directors have taken the controlling interest personally, it will, of course, be eventually merged with the big company. The company's policy is to secure the largest coal areas possible in anticipation of a very great steel industry, and the statement is made that the railway from Springhill Junction to Pugwash will be at once carried on to completion.

Montreal.—At a three-hour meeting of Amalgamated Asbestos directors, Mr. R. M. Aitken, of Kitcat & Aitkin, London, England, was elected a director, representing large English interests. There were present at the meeting Mr. Thomas McDougall, in the chair; Hon. Robert Mackay, H. E. Mitchell, H. H. Melville, Percy P. Cowans, J. McIntyre, Hon. James Beck, and R. M. Aitkin. The organization is now being gradually whipped into shape, and it will be the aim of the directors to extend the scope of the company's operations, and put the pruning knife into the expense accounts. The directors decided to begin upon themselves, and directors' fees were reduced to the vanishing point. Among other things it was decided to change the company's fiscal year in order to make it end December 31, instead of May 31, as at present.

ONTARIO.

Cobalt.—The statement that Little Nipissing mine last week shipped a car of high-grade ore to the amount of 63,000 pounds, is incorrect, the shipment being mostly ore from the Coniagas mine. The car was made up of 17¾ tons from the Coniagas mine and only 13¼ from the Little Nipissing mine.

Toronto, Dec. 2.—The decision of the Ontario Government to extend the T. & N. O. Ry. into the Porcupine gold camp, is expected to give an impetus to wild-catting operations in the way of mining promotions, and there are evidences that it has already done so. However, it is intimated that the Government will get after the wild-catters with a big stick. Hon. Frank Cochrane, Minister of Lands and Mines, leaves next week for a personal inspection of the projected railway route and the whole Porcupine field as at present developed. It may be taken for granted that the new sections of the Ontario Companies Act dealing with flotations of speculative companies and sales of stock will be rigorously enforced, particularly in so far as they affect the issue of prospectuses, advertisements, commissions, and sales of stock. Under the provisions all commissions paid to sales agents must be authorized by letters patent and disclosed in the prospectus. Shares or capital cannot be directly or indirectly applied in payment of commission except as authorized. No subscriptions for stock shall be binding upon the subscriber unless, prior to subscribing, he shall have received a copy of the prospectus.

Ottawa, Dec. 6.—The advent of winter has caused the small mica mines in the Gatineau district to close down. They are not deep enough to allow of working in cold weather. The mica market is quiet, no big sales or shipments being reported. Local mica men expect a very dull winter, as most of the big firms using the mineral have been well stocked.

Cobalt, Dec. 7.—From four shafts last month the Nipissing mined $200,851 net and shipped $398,410 also net, or after estimated treatment and freight charges had been deducted. Of the total of $200,851, $84,000 came up the Fourth of July shaft alone. The month of November was a most noteworthy one for Nipissing in the form of discoveries of new ore underground, and the increasing of ore reserves. The discoveries included the new vein at the Kendall, the discovery of ore at the shaft of the top of No. 12, and the new leads on No. 164. Any one of these would have been important, and have added very considerably to the Nipissing's value.

Cobalt.—It is understood that the Peterson Lake and Nova Scotia directors have entered into an agreement whereby all ore in the disputed territory will be run through the Nova Scotia mill and shipped, the proceeds being retained in the Peterson Lake treasury until the courts decide how it shall be apportioned.

BRITISH COLUMBIA.

Nelson, B.C.—The force of men on the Rambler-Cariboo was doubled December 1st. There are 32 men at work on the mine at present and the management has decided that double the amount can be used. Ore has been opened up on 7, 8, 9 and 10, and drifting is being done on the 1,050 level. Upraises from 9 to 8 and from 12 to 10 are under course of construction, and all the ore that can be handled is being taken out. Winter quarters, which were burned out in the fire this summer, have been rebuilt. The concentrator will be moved down the hill below the compressor and a tram built three miles to McGuigan as soon as the railroad, which was also burned out, has been rebuilt to that point. Over $9,000 has been expended on the property since the fire.

Phoenix, Nov. 29.—George Gill and Joseph Christian were victims of a premature explosion at the Rawhide mine. Christian will recover, but Gill's chances are very doubtful. They were setting off a blast in the mine and the fuse when lit ran very rapidly to the dynamite, which was discharged prematurely with the men but a few feet away. Both men were badly burned and bruised by flying rocks and now lie in the hospital.

MINING NEWS OF THE WORLD.

GREAT BRITAIN.

There has been issued from the Home Office Part III. of the General Report and Statistics for 1909 dealing with Mines and Quarries. Mr. R. A. S. Redmayne, Chief Inspector of Mines, states that the average price of metals for the year showed little alteration compared with the figures for 1908, but towards the close of 1909 there were signs of improvement, especially in the case of tin, which was more than £20 per ton higher in December than in the preceding January.

The report states that the total value of the minerals raised during the year amounted to £119,394,486, a decrease of £10,609,184 as compared with 1908. This decrease is mainly accounted for by the decreased value of coal. The total output of coal was 263,774,312 tons, and the value £106,274,900, showing an increase of 2,245,517 tons and a decrease of £10,323,948 respectively on the figures for 1908. The average price of coal was 8s 0.7d per ton in 1909, as compared with 8s 11d in 1908. The quantity of coal exported, exclusive of coke and manufactured fuel and of coal shipped for the use of steamers engaged in foreign trade, was 63,076,799 tons, an increase of more than half a million tons on the exports for 1908. France received over 10 2-5 million tons, Germany over 9 2-3 million tons, Italy over 9 million tons, Sweden nearly 4 million tons, Russia nearly 3 1-3 million tons, Egypt, Spain and Denmark each over 2½ million tons, and the Netherlands and the Argentine each over 2 millions. Adding the 3,246,300 tons exported in the form of coke and manufactured fuel, and the 19,713,907 tons shipped for the use of British and foreign steamers engaged in foreign trade, the total quantity of coal which left the country was 86,037,006 tons. The amount of coal remaining for home consumption was 177,737,306 tons, or 3.949 tons per head of the population. The quantity of coke obtained in the year was 18,867,149 tons, valued at £11,896,913; and 1,511,645 tons of briquettes, valued at £978,498. The combined values of the output of clay and shale, igneous rocks, limestone, oil shale, salt, sandstone and slate for 1909 exceeded 7¾ millions sterling. Of the metallic minerals raised in the United Kingdom, iron ore took the lead, the output being 14,979,979 tons, valued at £3,689,777. The ore yielded 4,802,163 tons of iron, or more than one-half of the total quantity of pig-iron made in the country. Gold, lead, silver and tin all show an increase from British ores, whilst copper, iron and zinc each exhibit a decrease in the production for 1909, as compared with the preceding year.

The official returns of British salt shipments for last month show a total of 48,880 tons, an increase of 12,469 tons. The chief increases are 5,000 tons United States, 3,000 tons Sweden and Norway, 1,000 tons Holland and 1,600 tons Denmark. Liverpool increased its shipments by 3,000 tons, Runcorn, Weston and the Ship Canal were 5,000 tons better. Middlesbrough shows an increase of 4,667 tons. Fleetwood fell away by 1,956 tons. The ten months' salt trade totals 773,979 tons, an increase of over 75,000 tons.

The South Wales coal strike was marked by several important features late in November. On the one hand there was a report, on the authority of Mr. Matt Morgan, that he, with Mr. W. Abraham, the miners' President, and Mr. Onions, the treasurer, are to meet Mr. Askwith, of the Board of Trade, in London,

with a view to the continuance of the peace negotiations. On the other hand, the general conference called by the strikers and held at Cardiff decided to request all the lodges in the coal field to send delegates with a mandate to vote for or against a general strike throughout Wales. The vote on this point will be taken at the adjourned conference at Cardiff. The conference of November 21st, which was repudiated by the Miners' Federation, who recommended all Federationists to abstain from attendance, was of a fairly representative character, being attended by 100 delegates from almost every part of the coal field. This policy of a general strike was strongly recommended but most of the delegates said they could not vote on that question, as their lodges had not given them a mandate to that effect. In that way the conference came to be adjourned, in order that the lodges might be specifically asked to instruct their delegates upon the question of a general strike. The whole morning was spent in receiving reports from the collieries in the affected area. These were generally to the effect that the workmen were idle because they "refused to work for wages and under conditions that no self-respecting men should tolerate." They alleged that the "oppression of the employers had become intolerable," that the conditions were "inhuman," and that when workmen, after hard and honest toil, had failed to realize more than a few pence per day, the employers had chosen to brand them as loafers, or told them to limit their families to suit their scanty earnings.

BELGIUM.

The imports of petroleum products into Belgium during August amounted to 21,471 tons, compared with 19,810 tons in August, 1909. For the eight months to the end of August the total imports were 135,825 tons, against 242,589 tons for the corresponding period of last year.

AUSTRIA.

The Austrian Government has communicated to the press the following statement which is of considerable interest to all shareholders in oil producing companies operating in Galicia: "The Government proposes to open an investigation for the purpose of discussing the crisis in the petroleum industry. This investigation is now fixed by the Ministry of Commerce for Monday, 28th instant, at 10 a.m., in the session hall of the Vienna Chamber of Commerce. Invitations to take part in this have been sent to representatives of the crude oil producers, refiners, wholesale and retail dealers in oil and a series of oil experts. With each invitation was enclosed a sheet of questions, marking out the following programme for the discussions: 1. The present position of crude oil production, of the refining industry and the trade in kerosene. 2. The situation as to prices from the consumer's point of view. 3. Is it necessary at the present time to introduce any special measures to place the mineral oil industry on a sound footing? In case of an affirmative reply, what measures are suitable for the purpose, which do not entail the burdening of the consumer by excessively enhanced prices? 4. What attitude should be taken with regard to the export business, and what means should be adopted in its support?

RUSSIA.

The total production on the four main areas of the Baku district during September amounted to 37,100,000 poods, against 43,700,000 poods produced during September, 1909, and 43,200,000 during August, 1910. The total production for the nine months of this year amounts to 364,200,000 poods, against 368,000,000 poods produced during the corresponding period in the preceding year.

SOUTH AFRICA.

A cablegram from Johannesburg states that during October the mines of the Rand alone (that is, excluding outside mines) crushed 1,868,718 tons, the average yield per ton being 28s, the working costs per ton 17s 9d, the profit per ton 10s 3d, and the aggregate profit £952,161.

AFRICA—GOLD COAST.

The Governor of the Gold Coast reports that the output of gold from the colony, including Ashanti, during the month of October amounted to 13,954 ozs, values at £58,008.

UNITED STATES.

Cripple Creek, Colo., Dec. 1.—The report on output and total bullion value of ores from the Cripple Creek mining district in November shows 74,180 tons treated, some 20,000 tons being handled by mills in the district. The average value per ton ranged from $3.5 to $65. The total value was $1,381,050. There was a general increase in the amount of ore handled at the several mills. The tonnage this month is about 4,000 tons more than last month and the gross bullion value is about $45,000 greater than that of October.

Cripple Creek, Colo., Dec. 3.—In November 60 cars were shipped out by the leasers and company from the Hull City shaft of the Vindicator Consolidated Company's estate. Of this amount 45 cars were shipped by lessees, the grade of ore being milling class, while 15 cars were shipped by the company from this shaft with better results. There are 10 sets of lessees in the shaft and all are in ore. Each contributes about the same amount toward the output. The 60 cars totalled better than 1,500 tons. A good deal of development work is being done by the company, especially on the lower levels.

Ouray, Colo., Dec. 1.—The regular quarterly dividend of a shilling a share, or 20 per cent. yearly, declared by the Camp Bird, Limited, attracts attention periodically to the earnings of a typical Colorado gold mine, but these dividend statements fall considerably short in representing the actual profits of the undertaking. Up to the end of the fiscal year ended April 30, 1910, the total of dividends paid was £1,287,000 (approximately $6,253,000) or 155 per cent. In five of the eight years since the acquisition of the property by the present owners the dividends were 20 per cent.; in the other three they were 27½, 15, and 12½ per cent. The smaller dividends for two years are accounted for by the heavy expense for construction made necessary by the destruction of the mill.

Butte, Mont.—The Butte district is maintaining its output of copper at 23,000,000 to 24,000,000 pounds a month, and about 22,000,000 pounds of that represents the production of the two Anaconda Company smelters. In November the total production was 23,700,000 pounds. The Anaconda Company changes its output of various mines to meet exigencies. At present the mines of the Butte Coalition department are at the lowest point of ore production in several years.

Antlers, Okla., Nov. 28.—Fourteen miners were killed or entombed in a mine 20 miles north of here to-day. Five bodies have been recovered. Nine men were entombed in the mine and Secretary Thomas of the mining company, says there is no doubt that all were killed. The five men whose bodies have been recovered were thrown from the mouth of the mine more than 100 feet into the air. The cause of the explosion has not been determined but it is believed to have resulted from gas formation. The mine is the property of the Choctaw Asphalt Company, of St. Louis.

Washington.—Expressing it as his opinion that the want of cheap fuel and the delay in opening the Alaska coal fields are the strongest adverse factors in the present problem of territorial progress, Governor Walter F. Clark, of Alaska, in his annual report to the Secretary of the Interior, declares that "the ill-advised policy of forbidding all development of the large coal resources of Alaska, or of placing such restrictions upon development as to make the embarkation of private capi- approximated 19,000 tons. This is about the average for the past four months.

tal impossible, is to be deprecated, while the policy of conservation by proper use is to be encouraged. This coal," he says, "is needed for the industries of the territory and for the physical comfort of our people, and on no account should it be withheld from those uses." The present impossibility of mining coal, either under title or lease, he explains is in a measure responsible for the suspension of one of the principal railroads. This has caused a general feeling of discouragement over the business situation in those parts of Alaska where development and settlement ought to be going on most rapidly. Governor Clark says it appeared in public discussions of the subject that the opposition to opening the Alaska coal fields "springs chiefly from two sources—those persons who fear a monopoly and those who would have this coal held as a reserve supply for the future." He further says that while the present coal-land law is not a good one "it certainly lends no hope to monopolists, but rather is calculated to discourage the embarkation of capital."

ALASKA.

Valdez, Alaska, Dec. 3.—The wild scramble for claims continues here. With the near approach of cold weather, the amateur as well as the seasoned prospector, is making use of every minute of daylight to place his monuments on unstaked ground. The snowfall along the coast range in this section is very heavy, and once the white blanket covers the hills, prospecting and claim staking will be at an end. Realizing the necessity of quick action, those who have not placed their names on location monuments are scouring the hills in search of paying lodes.

STATISTICS AND RETURNS

N. S. STEEL AND COAL—NOVEMBER.

The Nova Scotia Steel & Coal Company reports for November and for the year to date as follows: Coal mined—In November, 77,450 tons; year to date, 787,788 tons; increase over same date in 1909, 35,500 tons. Iron ore mined—November, 57,362 tons; year to date, 459,000 tons; increase, 39,500 tons. Pig iron made—November, 7,550; year to date, 60,894 tons; increase, 7,700 tons. Steel ingots cast—In November, 8,274 tons; year to date, 69,331 tons; increase, 10,200 tons. Billets cogged—In November, 6,376 tons; year to date, 53,079 tons; increase over 1909, 4,700 tons. Bars and plate rolled—In November, 4,487 tons; year to date, 45,597 tons; increase, 4,600 tons. Number of axles shipped—November, 2,099; year to date, 31,845; increase over 1909, 7,800.

DOMINION IRON AND STEEL OUTPUT.

The production of the Dominion Iron & Steel Company, Limited, for November was as follows: Pig iron, 23,122 tons; steel ingots, 26,625 tons; blooms, 23,083 tons; rails, 13,425 tons; rods, 7,488 tons; shipments, 19,925 tons. The output of coal at the Dominion Coal Company, Limited, collieries for the month was 325,000 tons.

COBALT ORE SHIPMENTS.

Following are the shipments from the Cobalt camp for the week ending December 2nd, and those from January 1st, 1910, to date. The shipments were made up of 15 cars of high grade and 16 cars of low grade ore.

	Ore in lbs. Dec. 2.	Ore in lbs. Since Jan. 1.
Beaver	54,160	280,377
Buffalo	61,490	2,238,478
City of Cobalt	....	608,875
Chambers-Ferland	64,000	1,655,300
Cobalt Central	....	293,286
Cobalt Lake	....	415,200
Cobalt Townsite	....	665,120
Colonial	....	309,730
Coniagas	74,880	2,145,416
Crown Reserve	....	5,526,840
Drummond	460,000	2,884,200
Hargraves	....	564,070
Hudson Bay	....	481,215
Kerr Lake	254,570	9,494,728
King Edward	....	263,406
La Rose	259,250	10,010,141
McKinley-Darragh	202,100	4,147,149
Nipissing	398,380	12,040,787
O'Brien	....	1,179,360
Peterson Lake (Little Nip)	63,580	561,000
Provincial	40,000	105,000
Right-of-Way	80,460	1,749,747
Rochester	....	60,750
Silver Cliff	....	321,400
Standard Cobalt	....	258,951
Temiskaming	....	1,973,350
Trethewey	....	1,000,890
Waldman	....	63,992
Wyandoh	....	48,300

Ore shipments for the week ending December 2 were 2,012,870 pounds, or 1,006 tons.

Total shipments from January 1 to December 2 were 61,347,058 pounds, or 30,673 tons.

COBALT BULLION SHIPMENTS.

The bullion shipments from Cobalt for the month of November were the largest in the history of the camp. One hundred and seventy-six bars were shipped, the weight being 157,556 ounces, and the value declared at $87,243.41.

The total shipments to date now read as follows:

	Ounces.	Value.
O'Brien	301,770	$169,824
Nova Scotia	129,999	77,250
Buffalo	110,924	56,749
Temiskaming	68,230	33,794
SCrown Reserve	60,931	32,891
Crown Res (Silver Leaf)	3,728	1,173
La Rose	44,057	23,339
Cobalt Gem	10,800	5,800
Beaver	3,168	1,820
Colonial	1,008	623
Campbell & Deyell's sampling works, name of mine not disclosed	1,264	539
	735,879	$403,802

COBALT SHIPMENTS BY MONTHS.

Ore shipments from Cobalt camp for the month of November were 3,864.68 tons, divided among 22 mines, and for the eleven months 29,993.06 tons, a gain over the same period last year of 2,936 tons, not including $403,802 worth of bullion shipped, a very substantial increase.

The gain of November, 1910, over November, 1909, amounted to 1,400 tons.

The shipments by months for the first eleven months of the year now read:

January	2,025.06
February	2,248.99
March	2,594.78
April	2,814.08
May	2,243.17
June	2,917.00
July	3,168.46
August	3,111.89

September	2,183.10
October	2,876.85
November	3,864.68
Total	29,993.06

McKinley-Darragh's November output was over 320,000 ozs, and the management confidently expects that the total production of silver for the year will be over two and a half million ounces.

TORONTO MARKETS.

December 8.—(Quotations from Canada Metal Co., Toronto).
- Spelter, 5.50 cents per lb.
- Lead, 3.70 cents per lb.
- Antimony, 8 to 8½ cents per lb.
- Tin, 40 cents per lb.
- Copper, casting, 13.50 cents per lb.
- Electrolytic, 13.50 cents per lb.
- Ingot brass, 8 to 12½ cents per lb.

Pig Iron (Quotations from Drummond McCall Co., Toronto).
- Summerlee No. 1, $23.00 (f.o.b. Toronto).
- Summerlee No. 2, $22.50 (f.o.b. Toronto).
- Midland No. 1, $20.00 (f.o.b. Toronto).
- Hamilton No. 1, $19.00 (f.o.b. Hamilton).
- Hamilton No. 2, $18.50 (f.o.b. Hamilton).
- Clarence, $20.00 (f.o.b. Toronto).
- Cleveland, $20.00 (f.o.b. Toronto).
- Coal, anthracite, $5.50 to $6.75.
- Coal, bituminous, $3.50 to $4.50 for 1¼-inch lump.

Coke.

December 6.—Connellsville Coke (f.o.b. ovens).
- Furnace coke, prompt, $1.40 to $1.50 per ton.
- Foundry coke, prompt, $2.00 to $2.15 per ton.

December 6.—Tin (Straits), 37.95 cents.
- Copper, Prime Lake, 13.00 cents.
- Electrolytic copper, 12.85 cents.
- Copper wire, 14.25 cents.
- Lead, 4.50 cents.
- Spelter, 5.95 cents.
- Sheet zinc (f.o.b. smelter), 7.75 cents.
- Antimony, Cookson's, 7.75 cents.
- Aluminium, 22.75 to 23.00 cents.
- Nickel, 40.00 to 45.00 cents.
- Platinum, ordinary, $39.50 per ounce.
- Platinum, hard, $41.50 per ounce.
- Quicksilver, $42.00 per 75-lb. flask.
- Bismuth, $1.95 per lb.

SILVER PRICES.

	New York cents.	London. pence.
November 23	55⅜	25 9/16
" 24	Holiday	25 7/16
" 25	54⅞	25 5/16
" 26	55⅛	25 7/16
" 28	55⅛	25 7/16
" 29	55¼	25½
" 30	55	25⅜
December 1	55	25⅜
" 2	55	25⅜
" 3	55	25⅜
" 5	54⅞	25 5/16
" 6	54¼	25 1/16

SHARE MARKET.

(Courtesy of Warren, Gzowski & Co.)

Miscellaneous—December 8th, 1910.

	Bid.	Ask.
Amalgamated Asbestos	12	..
Black Lake Asbestos	17	19
Dominion Coal	..	62
Dominion Steel	..	62
Dominion Steel Corp.	59¾	60
Granby	37	38
Consolidated Mining	50	60
Nova Scotia Steel	..	86¼
Crow's Nest Pass	..	77

Cobalt Stocks.—December 8th, 1910.

Amalgamated	.01	.03
Bailey	.07½	.07⅝
Beaver Consolidated	.27¼	.27¾
Buffalo	2.00	2.50
Chambers-Ferland	.14	.14½
City of Cobalt	.19¾	.20¼
Cobalt Central	.08⅜	.08¾
Cobalt Lake	.13¾	.14
Coniagas	4.86	..
Crown Reserve	2.67	2.69
Foster	.04	.07
Gifford	.03	.03¾
Great Northern	.09⅝	.09¾
Green Meehan	.01¾	.02
Hargraves	.27¾	.28¼
Hudson Bay	104.00	110.00
John Black	.02½	.03½
Kerr Lake	6.50	6.80
La Rose	4.47	4.55
Little Nipissing	.16¾	.16⅞
McKinley	1.36	1.37
Nancy Helen	.02½	.04½
Nipissing	10.70	10.90
Nova Scotia	.20	.21½
Ophir	.14	.25
Otisse	.01¾	.02⅛
Peterson Lake	.17⅝	.17⅞
Right of Way	.27	.28
Rochester	.06⅜	.06½
Silver Leaf	.05¼	.05½
Silver Bar	.01½	.04
Silver Queen	.04	.06
Temiskaming	.90½	.91
Trethewey	1.24	1.25
Watts	3 sellers	
Wettlaufer	1.05	1.07

New York Curb—December 8th, 1910.

Boston Copper	..	..
British Columbia Copper	6⅜	6½
Butte Coalition	17½	18
Canadian Mines	..	..
Chino Copper	20⅝	20⅞
Davis-Daly Copper	1⅜	1⅝
Ely Consolidated	37	38
Gila Copper	..	..
Giroux Mining	6½	6⅝
Goldfield Consolidated	8⅜	8½
Green-Canadian	6¾	6⅞
Harcuvar Copper	..	..
Inspiration Copper	9 1/16	9⅛
Miami Copper	19¾	19⅞
New Baltic Copper	6	8
Nevada Con. Copper	18¾	19
Ohio Copper	1½	1 3/16
Rawhide Coalition	4¾	5
Ray Central	1 13/16	1⅞
Ray Consolidated	18⅜	18½
Union Mines	¾	13/16
Yukon Gold	3⅞	4

United States Smelting, Refining & Mining Co.

Buyers of

Ores and Matte

Blister Copper Lead Bullion

Custom Copper Smelter	Chrome, N. J.	Custom Copper Smelter	Midvale, Utah
Custom Copper Refinery	Chrome, N. J.	Custom Copper Smelter	Kennett, Calif.
Custom Lead Refinery.	Grasselli, Ind.	Custom Lead and Copper Smelter	Needles, Calif.
	Custom Lead Smelter . .	Midvale, Utah	

INQUIRE OF

The United States Metals Refining Co., 42 Broadway, N.Y. City
United States Smelting Co., Salt Lake City, Utah
The Mammoth Copper Company, Kennett, California
The Needles Mining and Smelting Co., Needles, California
The Cia de Real Del Monte, Pachuca, Mexico

Main Office: 55 Congress St., Boston

United States Smelting, Refining and Mining Co.

SAFETY — SPEED — SPLENDOR

CANADIAN PACIFIC RAILWAY CO'S

"EMPRESSES" of the ATLANTIC

FASTEST and FINEST in the Canadian Service



An "EMPRESS" leaving Quebec.

"EMPRESS OF BRITAIN" "EMPRESS OF IRELAND"

hold all records between Liverpool and Canadian Ports

900 Miles on Enclosed and Sheltered Waters **LESS THAN FOUR DAYS AT SEA**

For Information as to Rates, Sailings, etc., apply to any Railway or Steamship Agent or to

W. G. ANNABLE, Gen. Pass. Agent, Board of Trade Bldg., Montreal

J. S. CARTER, Gen. Agent, 450 Main St., Winnipeg, Man.

I. E. SUCKLING, Gen. Agent, S. E. Corner King & Yonge Sts., Toronto, Ont.

Newton & Treloar

Commercial & General
PRINTERS

14 Johnson Street, Toronto



ON TIME

One of the most important business transactions which sensible minded men should perform on time is that of making proper provision for those who are dependent on them for the necessities of life.

The only way to do this is by means of life insurance. The only way to do it on time is to act now while in health. The most satisfactory way is to insure at once in the

North American Life
ASSURANCE COMPANY
"Solid as the Continent"
HEAD OFFICE, - - TORONTO

CONSTANT-HERZIG COMPANY
SUCCESSOR TO
C. L. CONSTANT COMPANY
MINING ENGINEERS AND MINE MANAGERS
ASSAYERS AND ANALYSTS
42 NEW STREET, - NEW YORK

Mine Management

Our organization offers many advantages to investors and mine owners seeking competent management. Under our scheme of management a continuity of policy is assured regardless of changes in the local staff. We are willing that our compensation depend upon results obtained. We know that our methods mean low working costs and maximum profits. Let us make you a proposition.

GOLD

Its Geological occurrence and Geographical distribution by J. Malcolm MacLaren, D. Sc., 700 pages, one colored plate and 278 illustrations. Price $7.00, including postage.

Stamp-milling of gold ores

by T. A. Rickard, price $2.50. A careful description of the gold-milling processes on both sides of the equator. This book is well illustrated.

Book Department,
CANADIAN MINING JOURNAL,
TORONTO.

PROFESSIONAL DIRECTORY.

The very best advice that the publishers of the Canadian Mining Journal can give to intending purchasers of mining stock is to consult a responsible Mining Engineer BEFORE accepting the prospectus of the mining company that is offered them. We would also strongly advise those who possess properties that show signs of minerals not to hesitate to send samples and to consult a chemist or assayer. Those who have claims and who require the services of a lawyer, with a thorough knowledge of Mining Law, should be very careful with whom they place their business.

ENGINEERS, METALLURGISTS AND GEOLOGISTS

Dominion of Canada

Ontario

Astley, J. W.
Bateman & Brown
Campbell & Deyell
Carter, W. E. H.
DeMorest, Stull & Low
Evans, J. W.
Flaherty, R. H.
Fowler, S. S.
Gwillim, J. C.
Hassan, A. A.
Hore, R. E.
Hille, F.
Leckie, J. E.
Loring, F. C.
Magee, Boyd
Meyer, Ralph A.
Miles, A. D.
Scott, O. N.
Segsworth, Walter E.
Smith, Alex. H.
Smith, W. H.
Tyrrell, J. B.
Willmott, A. B.

Quebec

Hardman, J. E.
Hersey, Milton L.
Woolsey, W. J.
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.
Fowler, S. S.

FOREIGN—New York

Hassan, A. A.

ASSAYERS, CHEMISTS AND ORE TESTERS

Dominion of Canada

Ontario

Brown, A. H.
Campbell & Deyell
Evans, J. W.
Heys, Thos. & Co.
John, D.
Canadian Laboratories, Ltd.

Quebec

Johnson, F. M. G.
Hersey, Milton Co., Ltd
Obalski & Dulieux

British Columbia

Bryant, C. M., & Co.

Foreign

New York

Ledoux & Co.
Constant, Herzig Co.,

ENGINEERS, METALLURGISTS AND GEOLOGISTS

ASTLEY, J. W.
CONSULTING MINING ENGINEER
TEMPORARY ADDRESS—Care of the Canadian Mining Journal, Toronto.
Formerly Supt. of LE ROI MINE, Rossland, B.C.

BATEMAN & BROWN
MINING ENGINEERS
COBALT
Management, Development and Examination of Properties.

BRYANT, C. M. & CO.
Assayers and Mining Engineers
VANCOUVER, B.C.

CARTER, W. E. H., B.A., Sc.
Consulting Mining Engineer,
85 Front Street East, - Toronto, Ont

C. St. G. Campbell, M.E.,
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Mining Engineers
Cobalt, - Ontario

DeMOREST, STULL & LOW
Civil and Mining Engineers.
Ontario Land Surveyors, Etc.
Sudbury, Ont.
Branch Office: Sturgeon Falls, Ont.

EVANS, J. W.
MINING ENGINEER
Mines and Mining Properties examined and reported upon.
Belleville, - - Ontario

FOWLER, S. S.
Mining Engineer,
NELSON, B.C.

GWILLIM, J. C.
Consulting Mining Engineer
Kingston, Ont.

HARDMAN, J. E.
Consulting Mining Engineer
MONTREAL, CANADA.

HASSAN, A. A.
Mining Geologist and Consulting Engineer
Cobalt, Ontario, Canada,
Residence: 61 Waldorf Court, Brooklyn, N. Y.
Geological Examinations and Valuations of Gold, Silver and Copper Mines and Prospects.
Any Code. Cable Address: "Asghar."

HILLE, F.
Mining Engineer.
Mines and Mineral Lands Examined and Reported On.
Port Arthur, Ontario, Canada.

HAULTAIN, H. E. T.
Consulting Mining Engineer,
41 National Trust Chambers,
TORONTO

HORE, R. E.
Geologist
Specialty: Cobalt Silver Deposits
MICHIGAN COLLEGE OF MINES
HOUGHTON, MICH.

PROFESSIONAL DIRECTORY.

CONTINUED FROM PRECEDING PAGE.

ENGINEERS, METALLURGISTS AND GEOLOGISTS.

Lamb, R. B.
Mining Engineer and Metallurgist
Traders Bank Bldg
Toronto, Ontario

Loring, Frank C.
Mining Engineer
Home Life Building, Toronto, Ont.
Cobalt, Ont.

Leckie, J. Edwards
Mining & Consulting Engineer,
Box 355. Cobalt, Ont.

McEvoy James
Mining Engineer,
Stair Building,
TORONTO.

Ralph A. Meyers, E.M., B. Sc.
Mining and Consulting Engineer
Box 1025, COBALT, ONT.

Magee, Boyd
Consulting Mining Engineer
HAILEYBURY AND TORONTO

Miles, A. D.
Mining Engineer,
SUDBURY, ONT.
Mining properties examined and investigations made with view to purchase or lease.

OBALSKI & DULIEUX
MINING ENGINEERS
Graduates from the High School of Mines Paris, France.
QUEBEC BANK BUILDING, Room 501.
PLACE D'ARMES 11, MONTREAL
Cable Address: OBADUL Phone M. 6503
Code A. B. C. 4th & 5th Edition
Examination of properties, reports, analysis, consultations, etc.. and any work connected with the mining profession.

Perkins, Frank Clinton
Consulting Electrical Engineer
Erie County Bank Building
BUFFALO, N. Y.

Alexander H. Smith
Mining Engineer
UNION BANK CHAMBERS, TORONTO
Telephone M, 1973

Scott, O. N., B.Sc.
Mining Engineer and Economic Geologist.
14 King Street West
Toronto.
Mining Properties Examined and Reported Upon.

Smith, W. H.
Mining Engineer and Metallurgist
Box 25, Cobalt, Ont. Bedford-McNeil Code

Spencer, W. H.
Mining Engineer
P.O. Box 119, HAILEYBURY, ONT.

Sutcliffe & Neelands,
Ontario Land Surveyors,
Civil and Municipal Engineers,
COBALT, COCHRANE, LISKEARD.

Walter E. Segsworth
Mining Engineer
103 BAY ST. TORONTO
PHONE MAIN 2311

Tyrrell, J. B.
Mining Engineer.
534 Confederation Life Building,
Toronto, - Canada

Willmott, A. B., M. A., B. Sc.
MINING ENGINEER
404 Lumsden Building, Toronto, Can.
Cable Abmott Phone Main 6407

Webb R. L.
Ass. A. I. E. E.
Mechanical and Electrical Engineer.
Speciality—Mine Power Plants.
338 Ellicott Sq.. Buffalo, N. Y.

Woolsey, W. J.
Mining Engineer
THETFORD MINES, QUE

Survey of Mining Claims, Townsites, Town Lots, Etc.
Mine Surveying Municipal Engineering
CODE & CODE
Ontario Land Surveyors and Civil Engineers
Offices: COBALT and GOWGANDA

ASSAYERS, CHEMISTS AND ORE TESTERS.

John, D.
M. E.
Chemist and Metallurgist
Haileybury, Ont.

Carey, Elmer Ellsworth,
Member American Electrochemical Society.
Electrolytic Amalgamation
37 King St., San Jose, California. U. S. A.

Brown, A. H.
Chemist and Metallurgist
Milling and Cyaniding Arsenical Gold and Silver Ores
Box 519, - Cobalt, Ont.

ASSAYERS, CHEMISTS AND ORE TESTERS.

MILTON HERSEY Co., Ltd.
Chemists, Engineers & Inspectors
Dr. Milton L. Hersey, President.
Provincial Analyst, (Quebec Govt.)
Assays of Ores,
Chemical, Electrical and Mechanical Tests of all Materials.
Mining Properties Examined.
HEAD OFFICE:
171 St. James St. Montreal

LEDOUX & CO.
Ore Samplers and Assayers
Office and Laboratory:
99 John St., New York.
Public Ore and Metal Sampling Works at the Port of New York.
We are not brokers or dealers, but receive consignments; weigh, sample and assay them, and attend to settlement, collection, and remittance, on behalf of sellers.

CANADIAN LABORATORIES LIMITED
ASSAYERS AND CHEMISTS
ASSAY OF ORES
All commercial products tested and analyzed.
OFFICES AND LABORATORIES
24 ADELAIDE STREET WEST
TORONTO, ONT.
W. K. McNEILL, B, Sc.
Manager

C. St. G. Campbell, M.E.
H. J. Deyell, C.E., M.E
CAMPBELL & DEYELL
Assayers and Chemists
Cobalt, - Ontario

Phone M 1889 Cable address "Heys"
Established 1873
HEYS, THOS., & SON,
Technical Chemists and Assayers,
124 Yonge Street, Toronto, Ont.
Sampling Ore deposits a specialty.

LAWYERS.

W. D. McPHERSON, K.C. J. M. LAING
McPHERSON LAING, & CO.
Barristers, Solicitors, Notaries, Etc.
GOWGANDA, CANADA
Toronto Office; McPHERSON & CO., 16 KING STREET WEST
Cable Address—Quermac, Toronto.

S. F. KAVANAGH
Assayer
Mining Broker
C. D. BOOTH, C. E.
Kavanagh & Booth
Mining Agents. Contractors.
Civil Engineers. Assayers.
Mining Properties bought and sold. Reported on and Developed.
Specialties—Porcupine and Rosie Creek, Ont. Fabre and Chibogamou, Que.
627 Goristine Bldg., Montreal.
Phone M-7515

ASSESSMENT WORK CONTRACTED
In any of the camps in Northern Ontario
ABSOLUTE SATISFACTION GUARANTEED
Let us quote you prices
CLAIMS BOUGHT AND SOLD
GIBSON, TERRILL & COMPANY
Haileybury, Ontario.

GOWGANDA PORCUPINE LAKE SHINING TREE
DALTON THOMAS
MINING CONTRACTOR
ASSESSMENT WORK A SPECIALTY
Gowganda Head Office—Box 98

Smith & Travers Diamond Drill Company, Limited
Box 12, SUDBURY, ONT.
404 Lumsden Bldg, TORONTO.
All classes of Diamond Drill Contracting and Manufacture of Diamond Drill Parts.

JOHNSON, ALBERT
Assessment Work—Drifting and Sinking contracted in Northern Ontario. Absolute Satisfaction Guaranteed.
Thirty Years experience in Gold, Copper and Iron Mining. Mining Claims for Sale.
Cobalt, Ont.

G. W. DIXON
ENGINEERS & MAPS, Limited
Engineering, Land and Underground Surveying
Latest Maps of all Mineral Districts.
Plans, Tracings, etc. made to order.
Customs Electric Blueprinting.
COBALT, - - - ONTARIO

DOBBS & YOUNG
First Class Gold and Silver Properties
PORCUPINE
ELK LAKE
SOUTH LORRAINE
GOWGANDA
Write us Box 541 or call on us,
Room 5, Royal Exchange Building,
COBALT, ONT.

"Mica and Phosphate Mining Property in the Township and Gore of Templeton adjoining the well-known Blackburn Mine—1180 acres fee simple, and 300 acres mining rights, also, Asbestos Property in Gaspe Peninsula."
For further information apply to
ALEX. McLAURIN,
524 Board of Trade Building,
Montreal

ACCOUNTANT, (Mine), Age 37, Single, Nine Years with present Company, desires a change.
Apply Canadian Mining Journal

ORE BUYERS

SILVER—COBALT
AND OTHER ORES BOUGHT
NIPISSING REDUCTION CO.
Main Office: TORONTO, ONT.
Works: COBALT, ONT.

DEPARTMENT OF MINES. GEOLOGICAL SURVEY.

PUBLICATIONS

The Geological Survey has published maps and reports dealing with a large part of Canada, with many local areas and special subjects.

A single copy of a map or report that is specially desired will be sent to Canadian applicants free of cost and to others at a nominal price.

Most of the older reports are out of print, but they may usually be found in public libraries, libraries of the Canadian Mining Institute, etc.

A catalogue of publications will be sent free to any applicant. Reports that are out of print are indicated in the catalogue by a dagger.

Applications for publications should be addressed to the Director, Geological Survey, Ottawa, and should state definitely the precise area concerning which information is desired. It is often of assistance in satisfactorily filling an order for a map or report, if the applicant states the use for which it is intended. Letters and samples that are of a Departmental nature, addressed to the Director may be mailed O.H.M.S. free of postage.

REPORTS RECENTLY ISSUED:

CANADA

1085. Descriptive Sketch of the Geology and Economic Minerals of Canada. Accompanied by a geological and mineral map of Canada, by G. A. Young and R. W. Brock.
1120. Summary Report of the Geological Survey for 1909.

NEW BRUNSWICK and NOVA SCOTIA

1107. Joint Report on the Bituminous or Oil Shales of New Brunswick and Nova Scotia. Also on the Oil Shale Industry of Scotland Part I, Economics, Part II, Geology by R. W. Ells.

QUEBEC

1077. Memoir No. 7, Geology of St. Bruno Mountain, Quebec, with maps, by J. A. Dresser.

ONTARIO

1059. A Geological Reconnaissance of the region traversed by the National Transcontinental railway between Lake Nipigon and Clay Lake, Ontario. Accompanied by two maps covering the region, by W. H. Collins.
1082. Memoir No. 6. Geology of the Haliburton and Bancroft Areas, Ontario, by Frank D. Adams and Alfred E. Barlow.

NORTH WEST PROVINCES

1035. Coal Fields of Manitoba, Saskatchewan, Alberta and Eastern British Columbia accompanied by a map, by D. B. Dowling.

BRITISH COLUMBIA

1093. Memoir No. 2. Geology and Ore Deposits of Hedley Mining District with maps, by Charles Camsell.
1139. Memoir 11-T Triangulation and Spirit Levelling of Vancouver Island, 1909, by R. H. Chapman.

YUKON and NORTH WEST TERRITORIES

1150. Whitehorse Copper Belt, accompanied by maps, by R. G. McConnell.
1097. A Reconnaissance across the McKenzie Mountains on the Pelly, Ross and Gravel Rivers, Yukon and North West Territories, with map, by Joseph Keele.

MAPS RECENTLY ISSUED

CANADA

1042. Mineral Map of Canada. Scale 100 miles to 1 inch.
1084. Geological Map of Canada. Scale 100 miles to 1 inch.

NOVA SCOTIA

1019. City of Halifax Sheet. Scale 1 mile to 1 inch.
1134. Map 14 A Hall Harbour Sheet. Scale 1 mile to 1 inch.

QUEBEC

1079. Geological and Topographical Map of St. Bruno Mountain, Chambly Co., Que. Scale 800 ft. to 1 inch.

ONTARIO

1061. Explored routes in a portion of North Western Ontario, traversed by the National Transcontinental railway between Lake Minnitaki and Lake of the Woods. Scale 4 miles to 1 inch.

ALBERTA

1032. Map No. 7A. Bighorn Coal Area, Alberta, by G. Malloch. Scale 2 miles to 1 in.
1117. Map 5A. Topographical map of Edmonton, scale 2.640 feet to 1 inch.
1118. Map 6A. Edmonton. Isobathic lines showing cover over "Clover Bar" coal seam, scale 2640 feet to 1 inch.

BRITISH COLUMBIA

1068. Geological Map (sketch) of the Sheep Creek Mining Camp, West Kootenay, B.C. Scale 1 mile to 1 inch.
1105. Map No. 4A. Geological—Golden Zone Mining Camp near Hedley, B.C., by C. Camsell. Scale 600 feet to 1 inch.
1106. Map No. 3A, Geological—Mining Claims on Henry Creek near Hedley, B.C., by C. Camsell. Scale 800 feet to 1 inch.
1095. Map 1A. Topographical map of Hedley Mining District, Scale 1000 feet to 1 inch.
1096. Map 2A. Geological Map of Hedley Mining District. Scale 1000 feet to 1 inch.

YUKON and NORTH WEST TERRITORIES

1099. Map of the Pelly, Ross and Gravel Rivers, Yukon and North West Territories. Scale 8 miles to 1 inch.
1089. Map 9A. Explored Routes on Parts of the Albany, Severn and Winisk Rivers. Scale 8 miles to 1 inch.
1103. Map 10A. Tantalus Coal Area, Yukon Territory. Scale 2 miles to 1 inch.
1104. Map 11A. Braeburn-Kynocks Coal Area, Yukon Territory. Scale 2 miles to 1 inch.

NOTE.—Maps published within the last two years may be had, printed on linen for field use. A charge of 10 cents is made for maps on linen.

The Geological Survey will, under certain limitations, give information and advice upon subjects relating to general and economic geology. Mineral and rock specimens, when accompanied by definite statements of localities, will be examined and their nature reported upon.

Communications should be addressed to THE DIRECTOR, GEOLOGICAL SURVEY, OTTAWA.



The Three Most Important Mining Books of Recent Years

They Cover

PRINCIPLES—ECONOMICS—METHODS

Principles of Mining. By H. C. Hoover, $2.50 (10/6) net postpaid.

The principles of mining as developed by modern science and business methods are here fully discussed under the general headings of Valuation, Organization and Administration. Important chapters cover investment from the public's standpoint, and the character, training and obligations of the mining engineer.

Cost of Mining By James R. Finlay. $5.00 (21s) net, postpaid.

An economic investigation of the cost of scientific, profitable mining. It contains valuable data obtained from official reports of the mines producing 75 per cent. of the metal under discussion. Detailed analyses cover cost of mining *coal, iron, lead, zinc, copper, gold and silver.*

Timbering and Mining. By W. H. Storms, $2.00 (8/6) net, postpaid.

Deals with practical methods, not theories. A straightforward account of the best, safest and most economical methods employed in the leading American mines.

Book Dept. CANADIAN MINING JOURNAL, Confederation Life Building TORONTO

The Davis Handbook of the Cobalt Silver District

by H. P. Davis

Illustrated with Photographs

PRICE

Paper Cover = = $1.50

Stiff " = = = $2.00

¶ The first section of this volume is an outline on the Geology, Mining Treatment and Marketing of the Ores of the Cobalt District, the object being to give all the data and general information necessary to guide investors, brokers and professional men generally.

¶ Included in this volume is a complete and accurate directory of all mining companies operating or organized to operate in the Cobalt Silver District of Ontario.

¶ Full information as to capitalization, directorates, locations and conditions of properties is given. Tabulated statements of production and dividends revised up to January, 1910, are included.

Book Department = *Canadian Mining Journal* = *Toronto*

BUYERS AND SELLERS OF METALS

The Consolidated Mining and Smelting Company of Canada Limited.

Offices, Smelting and Refining Department

TRAIL, BRITISH COLUMBIA

SMELTERS AND REFINERS

Purchasers of all classes of Ores.
Producers of Fine Gold and Silver, Base Bullion, Copper matte, Pig Lead, Lead Pipe, Bluestone and Electrolytic Bearing Metal

---

Oldest Experts in

Molybdenite
Scheelite
Wolframite
Chrome Ore
Nickel Ore
Cobalt Ore
Cerium, and all Ores and Minerals
Talc
Mica
Barytes
Graphite
Blende
Corundum
Fluorspar
Feldspar

GEO. G. BLACKWELL, SONS & CO., Limited
Metallurgists, Mine Owners, Merchants, Manufacturers
THE ALBANY, LIVERPOOL, ENGLAND

Largest Buyers, Best Figures, Advances on Shipments, Correspondence Solicited

CABLES—Blackwell, Liverpool, ABC Code, Moreing & Neal Mining and General Code, Lieber's Code, and Muller's Code.

ESTABLISHED BY GEO. C. BLACKWELL, 1869

HENRY BATH & SON, Brokers
London, Liverpool and Swansea
ALL DESCRIPTION OF . . . . . **METALS, MATTES, Etc.**

Warehouses, LIVERPOOL and SWANSEA.
Warrants issued under their Special Act of Parliament.

NITRATE OF SODA. Cable Address, BATHOTA, London

MACHINERY FOR SALE

Owing to change in power from steam to electric, we have a large quantity of machinery for sale, consisting of Steam Engines and Boilers, Air Compressor, a complete Lighting Plant (600 lights), Double Drum Hoisting Engine, Concentrating Tables and miscellaneous lot of other machinery.

Write for particulars and catalogue.

DELORO MINING & REDUCTION Co. Ltd.
DELORO - - ONTARIO

Michigan College of Mines

F. W. McNair, President

Located in the Lake Superior district. Mines and mills accessible for College work. For Year Book and Record of Graduates apply to President or Secretary.

HOUGHTON - - MICHIGAN

NICKEL

The Canadian Copper Company

Nickel for Nickel Steel

The Orford Copper Company

WRITE US FOR PARTICULARS AND PRICES

GENERAL OFFICES
43 Exchange Place - - NEW YORK.

Ontario's Mining Lands

The Crown domain of the Province of Ontario contains an area of over 100,000,000 acres, a large part of which is comprised in geological formations known to carry valuable minerals, extending northward from the great lakes and westward from the Ottawa river to the Manitoba boundary.

Iron in large bodies of magnetite and hematite; copper in sulphide and native form; gold, mostly in free milling quartz; silver, native and in other forms; zincblende, galena, pyrite, mica, graphite, corundum, talc, marl, brick clay, building stones of all kinds and other useful minerals have been found in many places and are being worked at the present time.

In the famous Sudbury region Ontario possesses one of the two sources of the world's supply of nickel, and the known deposits of this metal are very large. The silver mines of the Cobalt district have astonished the world by their richness, and promising gold discoveries have recently been made in Porcupine Lake.

In the older parts of the Province, salt, petroleum and natural gas are important products. The cement and clay industries have a large output.

The mining laws of Ontario are liberal, and the prices of mineral lands low.

The climate is unsurpassed, wood and water are plentiful, and in the summer season the prospector can go almost anywhere in a canoe.

The Canadian Pacific and other railways run through the entire mineral belt.

For reports of the Bureau of Mines, maps, mining laws, etc., apply to

HON. FRANK COCHRANE,
Minister of Lands, Forests and Mines,
Toronto, Canada.

PROVINCE OF QUEBEC

The chief minerals of the Province of Quebec are: Asbestos, Chromite, Copper, Iron, Gold, Silver, Phosphate, Mica, Plumbago, etc; ornamental and building materials etc.

The Mining Law gives absolute security of title and aid to the prospector. It may be summarized as follows:

All mines belong to the Government of the Province on all unsold lands and on all those sold since the 24th July, 1880, but gold and silver are always reserved whatever may be the date when the land was sold, unless it be otherwise mentioned in the patent.

With the exception of lands already disposed of, the whole Province, in surveyed and unsurveyed territory, is open to prospecting.

Miners' Certificates good for a calendar year may be obtained by sending $10.00 to the Department of Mines. Such certificates give the holder the privilege of staking out by himself claims to the extent of 200 acres, the minimum being 40 acres in unsurveyed land and one lot on surveyed Crown Lands, and part of a lot on private lands.

Such claim is valid for four months, without payment of any fee, and, within that time, the claim may be leased under a mining license, on payment of a fee of $10.00 plus a yearly rental of $1.00 per annum. No inspection of the discovery or assessment work is required.

The claim on unsurveyed land or the lot in surveyed territory may be purchased as a mining concession at the price of $20.00 per acre if within 20 miles of a railway in a straight line, or $10.00 if the distance is greater, and by fulfilling certain conditions mentioned in the law.

When the mines leased or sold are situated on private property, the land may be expropriated if the surface owner refuses to come to an amicable settlement with the holder of the mining rights.

The attention of the public is specially called to the new territory north of the height of land towards James Bay, which comprises an important mineral belt in which discoveries of minerals have been made, and through which the new Transcontinental railway will run.

Special arrangements have been made with Mr. Milton L. Hersey, 171 St. James Street, Montreal, for the assay and analysis of minerals at very reduced rates for the benefit of miners, and prospectors in the Province of Quebec.

The Bureau of Mines, at Quebec, will give all the information asked for in connection with the mines of the Province, and will supply maps, reports, copies of the law, tariff of assays, etc, to all who apply for the same.

All communications, letters and money must be addressed to

The Hon. Minister of Colonization, Mines and Fisheries
Quebec.

Province of Nova Scotia

Leases for Mines of Gold, Silver Coal, Iron, Copper, Lead, Tin

AND

PRECIOUS STONES

Titles given Direct from the Crown, Royalties, and Rentals Moderate

Copies of the Mining Law and any information can be had on application to

The Hon. Christopher Chisholm

Commissioner Public Works and Mines, - - HALIFAX, NOVA SCOTIA

School of Mining

A COLLEGE OF APPLIED SCIENCE

AFFILIATED TO QUEEN'S UNIVERSITY

KINGSTON - ONTARIO

1. Four Years' Course for a Degree (B.Sc.)
2. Three Years' Course for a Diploma in
   - (a) Mining Engineering.
   - (b) Chemistry and Mineralogy.
   - (c) Mineralogy and Geology.
   - (d) Chemical Engineering.
   - (e) Civil Engineering.
   - (f) Mechanical Engineering.
   - (g) Electrical Engineering.
   - (h) Sanitary Engineering.
   - (i) Power Development.

For Calendar of the School and further information apply to The Secretary, School of Mining, Kingston, ∴ ∴ ∴ Ontario

MINING & SCIENTIFIC PRESS

Controlled by T. A. RICKARD — **Established 1860** — **Published weekly at San Francisco, Cal.**

In every issue valuable articles are published on mining, metallurgy, and geology, the latest news from special correspondents at the principal mining centers, letters giving the ideas and experience of successful men, and other items of useful knowledge.

THE MINING MAGAZINE

Established September, 1909

T. A. RICKARD, Editor — **Published monthly at London, England**

A monthly magazine is the natural corollary of a technical weekly. It permits of more deliberate and more extended notice of matters concerning which the news element is less important.

The Mining Magazine includes a review of the world's progress in mining, metallurgy and economic geology, written by men who have personal knowledge of the regions and conditions discussed.

COMBINATION RATE: To new subscribers to both papers in yearly rate

	Combination
Canada U. S. and Mexico,	$6.00
United Kingdom	7.00
Other countries in Postal Union	8.00

Address either office:—
MINING AND SCIENTIFIC PRESS, 667 Howard St., San Francisco
THE MINING MAGAZINE, 819, Salisbury House, London, E. C.

University of Toronto

FACULTY OF APPLIED SCIENCE AND ENGINEERING

Courses in

1. Civil Engineering.
2. Mining Engineering.
3. Mechanical Engineering.
4. Architecture.
5. Analytical and Applied Chemistry
6. Chemical Engineering.
7. Electrical Engineering.

For Calendar and other information apply to the Secretary

A. T. LAING.

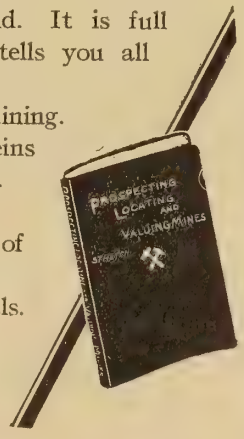


Prospecting, Locating and Valuing Mines

By R. H. Stretch, E. M.

Not only prospectors but all investors in mining properties should own this book. It is a safe guide and an invaluable reference work. It is the *standard*. Ten thousand copies have been sold. It is full of facts and data. It tells you all about

Mines—and mistakes in mining.
Mineral Deposits and Veins and how to detect them.
Locations and Patents.
Preliminary Development of Mines.
Discussions of Various Minerals.
Useful Tables and Diagrams.



Cloth, Library edition, $2.00 net, postpaid
Leather, pocket size, $2.50 " "

BOOK DEPARTMENT
CANADIAN MINING JOURNAL
CONFEDERATION LIFE BUILDING, TORONTO

NOTICE

Only a Few Left

Book on Cobalt, Sudbury and Moose Mountain. 100 pages, well illustrated. **Price $1.00.**

Mineral Resources of Canada. 136 pages, 32 color reproductions of the most important minerals of the Dominion. **Price $1.00.**

Book of Dominion Coal Co., Mining and Transportation. By F. W. Gray, 128 pages. Well illustrated. **Price $1.00.**

Davis Handbook of the Cobalt Silver District. 230 pages, well illustrated and maps. **Paper cover $1.50, hard cover $2.00.**

BOOK DEPARTMENT

Canadian Mining Journal

Confederation Life Building,
TORONTO

ALPHABETICAL INDEX TO ADVERTISERS

A

Allis - Chalmers - Bullock, Inside Front Cover.
Ackroyd & Best, Ltd.....xiii
Allan, Whyte & Co.....vi
Asbestos Mfg. Co., Ltd.outside B.C.
Astley, J. W.....xix
American Diamond Rock Drill Co. xvi

B

Bateman & Brown xix
Beatty, M. & Sons, Ltd. ix
Baszanger, Jacques & Co xi
Bell's & Morecom, Ltd.....i
Berger, C. L., & Sons xv
Bryant, C. M. & Co.....xix
Blackwell, Geo. G., Sons & Co.xxiv
Bath, Henry & Son xxiv
British Columbia, Province of.xxviii
Bennett, Wm. & Sons vi
Behrend Concentrators, Ltd. ..xi
Brown, A. H.....xxi
Bruce Peebles xiv
Brown Mach. Co., Ltd. vii
Beath, W. D. & Son.....xiv

C

Canadian Cleveland Drill Co., Ltd. i
Canadian Rand Co,, Ltd. iii
Canadian Bank of Commerce...iv
Canadian Laboratories xx
Canadian Pacific Railway x
Canadian Mining Institute x
Cumberland Railway & Coal Co..xv
Campbell & Deyell ....xix & xx
Curtis & Harvey, Ltd.....vi
Consolidated Mining & Smelting Co. xxiv
Canadian Westinghouse Co..xxxii
Canadian Bag Co.....iii
C. P. R. Steamship Line ...xvii
Carter, W. E. H.....xix
Canadian Fairbanks Co., Ltd..xviii
Canadian Copper Co..... ...xxiv
Cobalt Electric Equipment Co., Ltd, ...viii

D

Deister, Emil iv
Dominion Bridge Co.....viii
Dominion Coal Co., Ltd. ii
Demorest, Stull & Low xix
Department of Mines, Canada..xxii
Deister Slime Tables iv
Davis, John & Son xvi
Deloro Mining & Reduction Co.xxiv
Eugene Dietzgen Co., Ltd.....ix

E

Evans, J. W.....xix
Edgar Allen & Co., Ltd.....xiv

F

Fleck, Alex., Ltd.....xiii
Flory, S., Mfg. Co.....x
Fowler, S. S..... xix

G

Greening, B., Wire Co., Ltd...viii
Gwillim, J. C.....xix
Groch & Groch.....xx

H

Hardman, J. E.....xix
Hassan, A. A. xix
Hille, F. xix
Hersey, Milton, Co., Ltd,.....xx
Heys, Thos. & Son.....xxi
Hamilton Powder Co.....xxxii
Hore, R. E. xx
Hadfield's Steel Foundry Co....vii

I

Intercolonial Railway xxxi

J

Jeffrey Mfg. Co. xv
John, D. xx
Jenckes Machine Co. xvi
Jones & Glassco i

L

Ludwig Nauen xvi
Loring, Frank C.....xix
Laurie & Lamb i
Lymans, Ltd. xiii
Link Belt Co.....xii
Leckie, J. Edwards xix
Ledoux & Co. xx
Leonard, E. & Son..... viii

M

McDougall, John, Caledonia Iron Works Co., Ltd., Inside Front Cover
Miles, A. D,.....xx
Michigan College of Mines ..xxiii
Mining and Scientific Press..xxiii
Montreal Steel Works xxxi
Mussens, Limited ....Front Cover
Magee, Boyd xx
Meyer, R. A. xx

N

Newton & Treloar xxvii
Nipissing Reduction Co., Ltd.
Nissen Stamps xviii
Nova Scotia, Province of....xxvi
Northern Canada Supply Co., Ltd. xiv
North American Life Assurance Co..... xvii
Nova Scotia Steel & Coal Co..viii

O

Ontario Powder Co.....vii
Orford Copper Company xxiv
Ontario, Province of xxv

P

Peacock Bros .....vi, vii, xvi
Paterson Mfg. Co, ...iii
Perkins, F. C.....xx

Q

Quebec, Province of xxvi

R

Robb Engineering Co. ix

S

Spencer, W. H.....xx
Sullivan Machinery Co ii
Standard Diamond Drill Co....xiii
Stanley, W. F. & Co., Ltd.....ix
Smart-Turner Machine Co., Ltd. xvi
Scott, C. N. xx
School of Mining xxiii
Standard Explosives, Ltd., Back Cover
Smith Premier Typewriter Co....ii
Smith, Thos. & Wm., Ltd...xxix
Segsworth, W. E.....xx
Smith, A. H.....xx
Smith, W, H.....xx

T

Tyrrell, J. B.....xx
Turner, J. J. & Sons xviii

U

United Typewriter Co., Ltd.....xi

V

Vandeleur & Nichols xiv

W

Waterous Engine Works Co.....v
Walker Bros. vi
Willmott, A. B. xx
Wetherill Separating Co.....xiv
Woolsey, W. J.....xx

BRITISH COLUMBIA

The Mineral Province of Canada

has produced to the end of 1906, $68,721,103 of Placer Gold; $41,015,697 of Lode Gold, $25,586,008 of Silver; $17,625,739 of Lead; $35,546,578 of Copper; $79,334,798 of Coal and Coke; and $5,813,799 of Other Minerals; or a total of **$273,643,722.** The Mineral Production of the Province for 1906 was

$24,980,546

The Tonnage of Ore mined in 1906 was 1,963,872 tons. The Gold Production in 1906 was $5,579,039 the Lead Output 52, 408,217 lb., and the Copper 42,990,488 lb.

Lode Mining has only been in progress for about 14 years, and not 20 per cent. of the mineral land has been even prospected; 300,000 square miles of unexplored mineral-bearing land are open for prospecting.

The Mining Laws of this Province are more liberal and the fees lower than any other Province in the Dominion, or than any Colony of the British Empire.

Mineral Locations are granted to discoverers for nominal fees.

Absolute Titles are obtained by developing such properties, the security of which is guaranteed by Crown Grants.

Full Information, together with Mining Reports and Maps, may be obtained by addressing

HON. MINISTER OF MINES

THOS. & WM. SMITH Ltd.

NEWCASTLE-ON-TYNE, ENGLAND.

Steel Wire Ropes for all classes of MINING WORK, AERIAL ROPEWAYS, CRANES, OIL WELLS, LOGGING, DREDGES, STEAM SHOVELS, Etc., Etc.

Use Smith's "RED THREAD" BRAND for Economical working costs.



VIEW IN ST. LAWRENCE ROPERY

Showing a reel containing 2,200 yds. of 5-in. circ. Hauling Rope, weighing over 12 tons, being lifted by electric overhead travelling crane.

Every facility for the rapid handling and turning out of the largest and heaviest

WIRE ROPES FOR ALL PURPOSES.

CANADIAN REPRESENTATIVE:

D. W. CLARK, P.O. Box 521, TORONTO, ONT.

AGENTS:

EVANS, COLEMAN & EVANS, Ltd., Vancouver, B.C.
DOMINION EQUIPMENT & SUPPLY CO., Winnipeg, Man.
ANGEL ENGINEERING & SUPPLY CO. Ltd., St. John's, N.F.
BAINES & PECKOVER, Toronto, Ont.

The Canadian Miner's Buying Directory.

Air Compressors—
Allis-Chalmers-Bullock.
Sullivan Machinery Co.
Walker Bros., Limited.
Canadian Rand Drill, Ltd.
John McDougall Caledonia Iron Works,
Peacock Bros.
Laurie & Lamb.
Mussens, Ltd.

Assay Apparatus—
Lymans, Ltd.

Ball Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Mussens, Ltd.

Beams—Steel—
Dominion Bridge Co.

Belt Conveyors—
Allis-Chalmers-Bullock.
Jeffrey Mfg. Co.
Link-Belt Co.
Waterous Engine Works.
Canadian Fairbanks Co., Ltd.

Belting—
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jones & Glassco.
Link Belt Co.
Northern Canada Supply Co., Ltd.

Boilers—
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
John McDougall Caledonia Iron Works.
Peacock Bros.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.
E. Leonard and Sons.

Blasting Batteries—
Canadian Rand Co., Ltd,

Blasting Powder—
Hamilton Powder Co.
Ontario Powder Co.
Standard Explosives, Ltd.

Buckets—
M. Beatty & Sons.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Waterous Engine Works.

Building—Steel Frame—
Dominion Bridge Co.

Cages—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Link-Belt Co.
Mussens, Ltd.

Cars—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Cableways—
Peacock Bros.
Allan, Whyte & Co.
Jenckes Machine Co., Ltd.

Chemical Apparatus and Supplies—
Lymans, Ltd,

Chain—
B. Greening & Co.
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
Canadian Fairbanks Co., Ltd.

Conveying Machinery—
Jeffrey Mfg. Co.
Allis-Chalmers-Bullock Co., Ltd.
Jenckes Machine Co., Ltd.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.
Mussens, Ltd,
Canadian Fairbanks Co., Ltd.
Vandeleur & Nichols.

Cobalt Dealers—
Geo. G. Blackwell, Sons & Co.
Henry Bath & Sons.
Nipissing Reduction Co., Ltd.

Coal—
Cumberland Railway & Coal Co.
Dominion Coal Co.
Nova Scotia Steel & Coal Co.

Coal Cutting Machines—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Condensers
E. Leonard and Sons.

Crossings, Diamond—
Montreal Steel Works, Limited.
Peacock Bros.

Coal Washers—
Jeffrey Mfg, Co.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.

Cranes—
Smart-Turner Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Concentrating Plants—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Emil Deister.
Canadian Behrend Dry Concentrating Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd,

Crushing Plants—
Allis-Chalmers-Bullock.
Hadfield's Steel Foundry Co.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
The Waterous Engine Wks. Co.
Mussens, Ltd.
Peacock Bros.

Cyanide Plants—
Allis-Chalmers-Bullock.

Dredging Machinery—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Link-Belt Co.
Mussens, Ltd.
Peacock Bros,
John McDougall Caledonian Iron Works Co., Ltd.

Drills, Rock—
Allis-Chalmers-Bullock.
M. Beatty & Sons.
Canadian Rand Co., Ltd.
Canadian Cleveland Drill Co., Ltd.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Sullivan Machinery Co.

Drills, Diamond—
American Diamond Dock Drill Co.
Standard Diamond Drill Co.
Sullivan Machinery Co.

Dynamos—
Vandeleur & Nichols.

Electric Portable Drills—
Jeffrey Mfg Co.
Mussens, Ltd,

Electric Generators—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Jeffrey Mfg. Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Motors—
Allis-Chalmers-Bullock.
Canadian Westinghouse Co.
Peacock Bros.
Canadian Fairbanks Co., Ltd.

Electric Supplies—
Canadian Westinghouse Co.

Elevating Machinery—
Allis-Chalmers-Bullock.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg, Co.
Waterous Engine Works.

Engineering Instruments—
C. L. Berger & Sons.
Stanley, W. F.
Keuffel & Esser Co.
Peacock Bros.

Engines—
Allis-Chalmers-Bullock.
Alex. Fleck, Limited.
Robb Engineering Co., Ltd.
Sullivan Machinery Co.
Jenckes Machine Co., Ltd.
Smart-Turner Machine Co., Ltd.
Waterous Engine Works Co.
Laurie & Lamb.
Peacock Bros.
Canadian Fairbanks Co., Ltd,
John McDougall Caledonian Iron Works Co., Ltd.
E. Leonard and Sons.

Condensers—
John McDougall Caledonian Iron Works Co., Ltd.

Fans, Ventilating—
Jeffrey Mfg. Co.
Mussens, Ltd.
Peacock Bros.

Forges—
Canadian Fairbanks Co., Ltd.
Mussens, Ltd.

Forgings—
John McDougall Caledonian Iron Works Co., Ltd.
Montreal Steel Works, Ltd.
Peacock Bros.

Frogs—
Montreal Steel Works, Ltd.

Furnaces (Roasting)—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Girders, Steel—
Dominion Bridge Co.

Grigging Machinery—
Waterous Engine Works.

Hose (Steam, Air, Water)—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Canadian Fairbanks Co., Ltd.

Hoisting Machinery—
Allis-Chalmers-Bullock.
Canadian Rand Drill, Ltd.
Canadian Fairbanks Co., Ltd.
Jeffrey Mfg. Co.
Jenckes Machine Co., Ltd.
Link-Belt Co.
Mussens, Ltd,
M. Beatty & Sons.
Peacock Bros.
Sullivan Machinery Co.
S. Flory Mfg. Co.
Waterous Engine Works.
E. Leonard and Sons.

Jacks—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Jigs—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.

Locomotives—
Jeffrey Mfg. Co.
Canadian Westinghouse Co.

Link Belt—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.

Metal Merchants—
Henry Bath & Son
Geo. G. Blackwell, Sons & Co.
The Consolidated Mining & Smelting Co. of Canada, Ltd.

Motors—
Vandeleur & Nichols.

Mica Dealers—
Henry Bath & Son.
Geo. G. Blackwell, Sons & Co.

Mining Supplies—
Allis-Chalmers-Bullock.
Canadian Cleveland Drill Co,, Ltd.
Alex. Fleck, Limited.
Jenckes Machine Co., Ltd.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros.

Miners' Outfits—
Northern Canada Supply Co., Ltd.

Nickel—
Canadian Copper Co.
Orford Copper Co.

Nissen Stamps—
Canadian Fairbanks Co., Ltd.

Ore Sacks—
Canadian Bag Co.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.

Pneumatic Tools—
Peacock Bros.
Canadian Rand Co., Ltd.

Perforated Metal—
B. Greening Wire Co.

Picks—
Mussens, Ltd,

Printing—
Newton & Treloar.

Prospecting Mills—
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Canadian Fairbanks Co., Ltd.

Prospecting Machinery.
Standard Diamond Drill Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pulsometers—
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Pumps (Mining)—
Allis-Chalmers-Bullock.
M. Beatty & Sons, Ltd,
Canadian Rand Drill, Ltd.
Alex. Fleck, Limited.
E. Leonard and Sons.

Pipe (Riveted)
E. Leonard and Sons.
Jeffrey Mfg. Co.
John McDougall Caledonia Iron Works.
Northern Canada Supply Co., Ltd.
Peacock Bros.
Smart-Turner Machine Co., Ltd.
Mussens, Ltd.
Peacock Bros.
Canadian Fairbanks Co, Ltd.

Retorts
E. Leonard and Sons.

Roofing, Steel—
Dominion Bridge Co.
Paterson Mfg, Co.

Rock Drills—
Canadian Cleveland Drill Co.
Mussens, Ltd.

Rope Drives—
Link-Belt Co.
Waterous Engine Works.
Jones & Glassco.
John McDougall Caledonian Iron Works Co., Ltd.

Rails (Steel)—
Montreal Steel Works, Ltd.
Mussens, Ltd.

Rope (Wire, Manila, Cotton)—
B. Greening Co.
Allis-Chalmers-Bullock.
Peacock Bros.
Allan, Whyte & Co.

Roasting Plants—
Allis-Chalmers-Bullock.

Scales—
Canadian Fairbanks Co., Ltd.

Screens—
B. Greening Wire Co,
Allis-Chalmers-Bullock.
Jenckes Machine Co., Ltd.
Jeffrey Mfg. Co.
Peacock Bros.
Link-Belt Co.
Waterous Engine Works.

Shafting—
John McDougall Caledonian Iron Works Co., Ltd.
Canadian Fairbanks Co., Ltd.
Northern Canada Supply Co., Ltd.
Smart-Turner Machine Co., Ltd.

Smelting Machinery—
Allis-Chalmers-Bullock.
Mussens, Ltd.
Peacock Bros.

Springs—
Montreal Steel Works, Ltd,

Stamp Mills—
Allis-Chalmers-Bullock.
Peacock Bros.
Jenckes Machine Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Steel Castings (Manganese)—
Montreal Steel Works, Ltd.
Peacock Bros.

Structural Metal Work—
Dominion Bridge Co.

Surveying Instruments—
Stanley, W. F.
C. L. Berger & Sons.
John Davis & Son.
Keuffel & Esser Co.
Peacock Bros,

Steel (Tool)—
Montreal Steel Works, Ltd.
Morton & Co.
Mussens, Ltd.
Canadian Fairbanks Co., Ltd.

Tramways—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Mussens, Ltd.

Turbines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Laurie & Lamb.

Tube Mills—
Allis-Chalmers-Bullock.
Peacock Bros.

Winding Engines—
Allis-Chalmers-Bullock.
Jenckes Machine Co.
Peacock Bros.
Waterous Engine Works.
Mussens, Ltd.
M. Beatty & Sons.
E. Leonard and Sons.

Wire Cables—
Allan, Whyte & Co.
Allis-Chalmers-Bullock.
B. Greening Wire Co.
Jeffrey Mfg. Co.
Mussens, Ltd.
Northern Canada Supply Co., Ltd.
Peacock Bros,

Water Wheels & Tanks—
John McDougall Caledonia Iron Works.
Jenckes Machine Co.

MONTREAL STEEL WORKS, LIMITED,

P.O. BOX 2369 Montreal

— Manufacturers of —

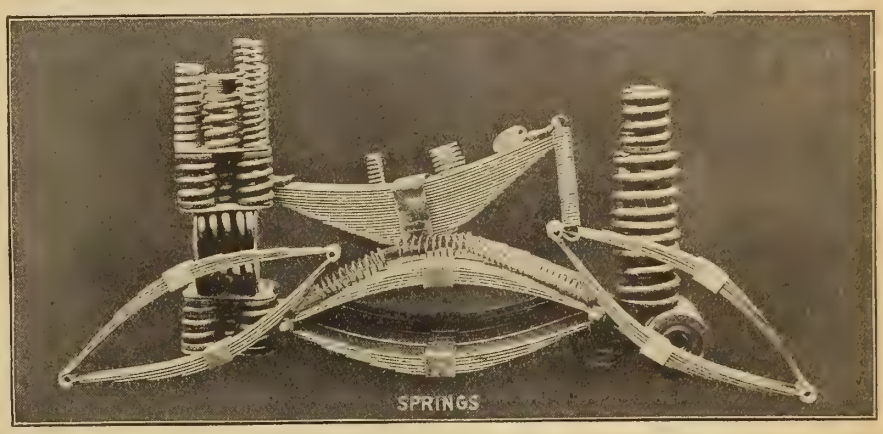
Steel Castings
(Acid Open Hearth System)

Switches and Track Work
for Steam and Electric Roads

Springs
of all kinds

Manganese Steel Castings
for wearing Parts, insuring Great Hardness and Durability

INTERLOCKING PLANTS
TRUCKS FOR ELECTRIC CARS



AGENTS FOR CANADA FOR

BARROW HAEMATITE STEEL CO., Barrow-in-Furness, England

Quotations for Tee Rails, Fish Plates, etc., promptly furnished. Catalogues sent on application.

"FOREST, STREAM AND SEA-SHORE"



A book of over 200 pages, illustrated in colors and in half-tone, giving well-written description of the country contiguous to the line of railway, replete with historic incident, legend and folk-lore, worthy a place in any library. Send ten cents in stamps to

General Passenger Department, Intercolonial Railway

MONCTON, N.B.

Baldwin-Westinghouse
Electric Mine Locomotives

Economical Mine Operation

and modern methods demand that you use electrical equipment. The same power used for cutting and drilling, is also used for hauling.

Service Records show that you should use **Baldwin-Westinghouse Mine Locomotives.**

Let us tell you more about them, and give you figures on their records in some large mines.

Write nearest office.



Canadian Westinghouse Co., Limited

General Office and Works, HAMILTON, ONTARIO.

ders Bank Bldg., TORONTO.
439 Pender Street, VANCOUVER.

For particulars address nearest office:
HAMILTON.
158 Portage Ave. East, WINNIPEG.
311 8th Ave. West, CALGARY

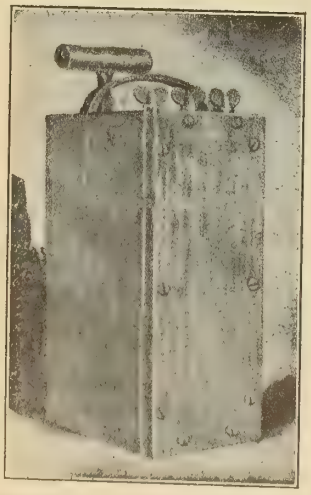
52 Victoria Square MONTREAL.
Telephone Bldg. HALIFAX.

HAMILTON POWDER COMPANY

Head Office: 4 Hospital Street, Montreal

MANUFACTURERS OF

High Explosives, Stumping Powder, Blasting and Sporting Powder, etc.
Safety Fuse, Electrical Fuses, Batteries, and other Accessories.



Three Post Magneto Electric Blasting Machine

NOBEL GELIGNITE

It always breaks cleanly to the bottom of the drill holes and is free from fumes of any kind Equal to 75% Dynamite and is sold at a price producing very much better results in terms of Rock Broken or Extracted and money spent.

"WINTER BRAND" DYNAMITE

Is only one strength, if anything, a little stronger than 50% Dynamite. **It does not freeze,** or rather, explodes with perfect efficiency when frozen **and needs no thawing.**

"AUTUMN BRAND" DYNAMITE

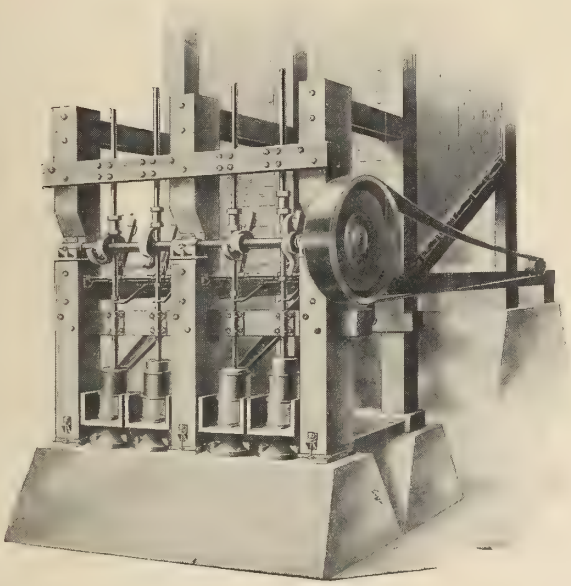
Is packed in all the usual percentages. The powder is similar in appearance, character and effect to ordinary Dynamite, except that the freezing temperature of the Nitro-Glycerine is reduced from 42° F to a little under 30° F.

PERMITTED EXPLOSIVES for Coal Mines
Nobel Monobel, Saxonite and Carbonite.

A letter or telegram addressed to the head office or any of the following agencies will receive prompt attention.

COBALT TORONTO KENORA WINNIPEG, MAN.
VICTORIA, B.C. VANCOUVER, B.C. CALGARY, ALTA. NELSON, B.C.

The Nissen Stamp Mill



Nissen Stamp Mill

STAMP. The Nissen Stamp drops with great crushing effect upon a feed comparatively free of the fines caused by preceding impacts. This causes a natural splash which radiates from the centre of the die, carrying the pulp to a circular screen, every aperture in which presents a full opening for the pulp which has already reached size to pass through. As the stamp ascends preparatory for the succeeding blow, a partial vacuum is formed under the stamp shoe, which greatly assists the rapid return of the oversize to the die. This condition, the circular form of mortar, and the ascending stamp, lead to a suction effect which hastens the return of oversize to the die, a feature distinctive to the Nissen Stamp. Thus, a greater number of effective drops per minute is possible, resulting in greater capacity.

FEEDER. Each Nissen Stamp is provided with a tappet driven, automatic ore feeder of the Challenge type. This feeder is easily adjusted for different rates of feed, and is very sensitive in responding to the action of the stamp.

MORTAR. The Nissen Mortar is circular in plan and made to accommodate but one stamp, thus confining the crushing zone to a field of activity which forbids pulp coming to rest or becoming sluggish in that circulatory movement essential to efficiency.

The screen of the Nissen Mortar is circular and extends more than half way around the mortar, forming an area of discharge for one Nissen Stamp equal to about two-thirds that employed for five stamps of the old type.



Boston Consolidated Type "B" Nissen Mortar

THE CANADIAN FAIRBANKS CO., Limited

Fairbanks Scales—Fairbanks Morse Gas Engines—Safes and Vaults

MONTREAL TORONTO ST. JOHN, N.B. WINNIPEG SASKATOON CALGARY VANCOUVER

W. T. RODDEN, Managing Director

J. F. JOHNSON, General Superintendent

T. L. GALLAGHER, Sales Manager

STANDARD EXPLOSIVES

LIMITED

MANUFACTURERS OF

High Explosives, Mining and Blasting Powders

DEALERS IN

Safety Fuse, Detonators, Electrical Fuses, Batteries and all Blasting Accessories

HEAD OFFICE:

Board of Trade Building, Montreal

WORKS:

Ile Perrot, near Vaudreuil, P. Q.

Magazines at Quebec, Cobalt, Haileybury, Elk Lake City and Kenora



BELL ASBESTOS MINES

No. 3 Mill. This Mill is built in two units. Each unit has a milling capacity of from 25,000 to 30,000 tons of marketable Asbestos fibres per annum. The Bell Asbestos Mines are capable of supplying the world's demands for Asbestos

For Crude, Carded and Cleaned Fibres, address

Bell Asbestos Mines

Thetford Mines
P.Q.
Canada

Ambler
Pennsylvania
U.S.A.

Victoria Square
Montreal
Canada

The Most Productive Mines of High-Grade Asbestos Crudes and Fibres in the World.